

Subprocess

```
In [1]: import subprocess
```

Calling subprocesses

There are several convenience methods for calling subprocesses, either using or discarding their output:

- `call()`
- `check_call()`
- `check_output()`

```
In [2]: subprocess.call('ls')
```

```
Out[2]: 0
```

```
In [3]: subprocess.check_call('ls')
```

```
Out[3]: 0
```

```
In [4]: subprocess.check_output('ls')
```

```
Out[4]: '01-BasicPythonSyntax\n01-BasicPythonSyntax_files\n01-BasicPythonSyntax.html\n01-BasicPythonSyntax.ipynb\n02-Builtins\n02-Builtins_files\n02-Builtins.html\n02-Builtins.ipynb\n03-FileIO\n03-FileIO_files\n03-FileIO.html\n03-FileIO.ipynb\n04-UsingModules\n04-UsingModules_files\n04-UsingModules.html\n04-UsingModules.ipynb\n05-Strings\n05-Strings_files\n05-Strings.html\n05-Strings.ipynb\n06a-Packages\n06-Regex\n06-Regex_files\n06-Regex.html\n06-Regex.ipynb\n07-Functions\n07-Functions_files\n07-Functions.html\n07-Functions.ipynb\n08-AdvancedFunctions\n08-AdvancedFunctions_files\n08-AdvancedFunctions.html\n08-AdvancedFunctions.ipynb\n09-Logging\n09-Logging_files\n09-Logging.html\n09-Logging.ipynb\n10-OOP1\n10-OOP1_files\n10-OOP1.html\n10-OOP1.ipynb\n11-OOP2\n11-OOP2_files\n11-OOP2.html\n11-OOP2.ipynb\n12-Decorators\n12-Decorators_files\n12-Decorators.html\n12-Decorators.ipynb\n13-Generators\n13-GeneratorsAndIterators_files\n13-GeneratorsAndIterators.html\n13-GeneratorsAndIterators.ipynb\n14-ContextManagers\n14-ContextManagers_files\n14-ContextManagers.html\n14-ContextManagers.ipynb\n15-Threading\n16-Multiprocessing\n17-Subprocess\n17-Subprocess.ipynb\n18-Virtualenv\n19-Testing\n20-MoreModules.ipynb\nfabfile.py\nfabfile.pyc\nFastTrackToPython.pdf\nindex.md\nVagrantfile\n'
```

```
In [5]: subprocess.check_output(['ls', '-a'])
```

```
Out[5]: '.\n..\n01-BasicPythonSyntax\n01-BasicPythonSyntax_files\n01-BasicPythonSyntax.html\n01-BasicPythonSyntax.ipynb\n02-Builtins\n02-Builtins_files\n02-Builtins.html\n02-Builtins.ipynb\n03-FileIO\n03-FileIO_files\n03-FileIO.html\n03-FileIO.ipynb\n04-UsingModules\n04-UsingModules_files\n04-UsingModules.html\n04-UsingModules.ipynb\n05-Strings\n05-Strings_files\n05-Strings.html\n05-Strings.ipynb\n06a-Packages\n06-Regex\n06-Regex_files\n06-Regex.html\n06-Regex.ipynb\n07-Functions\n07-Functions_files\n07-Functions.html\n07-Functions.ipynb\n08-AdvancedFunctions\n08-AdvancedFunctions_files\n08-AdvancedFunctions.html\n08-AdvancedFunctions.ipynb\n09-Logging\n09-Logging_files\n09-Logging.html\n09-Logging.ipynb\n10-OOP1\n10-OOP1_files\n10-OOP1.html\n10-OOP1.ipynb\n11-OOP2\n11-OOP2_files\n11-OOP2.html\n11-OOP2.ipynb\n12-Decorators\n12-Decorators_files\n12-Decorators.html\n12-Decorators.ipynb\n13-Generators\n13-GeneratorsAndIterators_files\n13-GeneratorsAndIterators.html\n13-GeneratorsAndIterators.ipynb\n14-ContextManagers\n14-ContextManagers_files\n14-ContextManagers.html\n14-ContextManagers.ipynb\n15-Threading\n16-Multiprocessing\n17-Subprocess\n17-Subprocess.ipynb\n18-Virtualenv\n19-Testing\n20-MoreModules.ipynb\nfabfile.py\nfabfile.pyc\nFastTrackToPython.pdf\n.git\nindex.md\n.vagrant\nVagrantfile\n'
```

```
In [6]: subprocess.call(['ls', '/directory/does/not/exist'])
```

```
Out[6]: 2
```

```
In [7]: try:
        subprocess.check_output(['ls', '-a', '/directory/does/not/exist'])
    except subprocess.CalledProcessError, error:
        print 'Exception raised: %s' % error
```

Exception raised: Command '['ls', '-a', '/directory/does/not/exist']' returned non-zero exit status 2

```
In [8]: try:
        subprocess.check_call(['ls', '-a', '/directory/does/not/exist'])
    except subprocess.CalledProcessError, error:
        print 'Exception raised: %s' % error
```

Exception raised: Command '['ls', '-a', '/directory/does/not/exist']' returned non-zero exit status 2

```
In [9]: subprocess.check_output('ls -a'. shell=True)
```

```
Out[9]: '.\n.\n01-BasicPythonSyntax\n01-BasicPythonSyntax_files\n01-BasicPythonSyntax.html\n01-
BasicPythonSyntax.ipynb\n02-Builtins\n02-Builtins_files\n02-Builtins.html\n02-Builtins.ipynb\n03-FileIO\n03-
FileIO_files\n03-FileIO.html\n03-FileIO.ipynb\n04-UsingModules\n04-UsingModules_files\n04-UsingModules.html\n04-
UsingModules.ipynb\n05-Strings\n05-Strings_files\n05-Strings.html\n05-Strings.ipynb\n06a-Packages\n06-Regex\n06-
Regex_files\n06-Regex.html\n06-Regex.ipynb\n07-Functions\n07-Functions_files\n07-Functions.html\n07-
Functions.ipynb\n08-AdvancedFunctions\n08-AdvancedFunctions_files\n08-AdvancedFunctions.html\n08-
AdvancedFunctions.ipynb\n09-Logging\n09-Logging_files\n09-Logging.html\n09-Logging.ipynb\n10-OOP1\n10-
OOP1_files\n10-OOP1.html\n10-OOP1.ipynb\n11-OOP2\n11-OOP2_files\n11-OOP2.html\n11-OOP2.ipynb\n12-Decorators\n12-
Decorators_files\n12-Decorators.html\n12-Decorators.ipynb\n13-Generators\n13-GeneratorsAndIterators_files\n13-
GeneratorsAndIterators.html\n13-GeneratorsAndIterators.ipynb\n14-ContextManagers\n14-ContextManagers_files\n14-
ContextManagers.html\n14-ContextManagers.ipynb\n15-Threading\n16-Multiprocessing\n17-Subprocess\n17-
Subprocess.ipynb\n18-Virtualenv\n19-Testing\n20-
MoreModules.ipynb\nfabfile.py\nfabfile.pyc\nFastTrackToPython.pdf\n.git\nindex.md\n.vagrant\nVagrantfile\n'
```

```
In [10]: import shlex
command_string = 'ls -l -a'
print shlex.split(command_string)
subprocess.check_output(shlex.split(command_string))
```

```
['ls', '-l', '-a']
```

```
Out[10]: 'total 2824\nrwxr-xr-x 1 vagrant vagrant 2482 Oct 9 20:46 .\n-rwxr-xr-x 24 root root 4096 Oct 3
03:20 ..\n-rwxr-xr-x 1 vagrant vagrant 238 Oct 9 06:52 01-BasicPythonSyntax\nrwxr-xr-x 1 vagrant vagrant
510 Oct 8 08:14 01-BasicPythonSyntax_files\n-rw-r--r-- 1 vagrant vagrant 167970 Oct 8 08:14 01-
BasicPythonSyntax.html\n-rw-r--r-- 1 vagrant vagrant 37640 Oct 7 10:58 01-BasicPythonSyntax.ipynb\nrwxr-xr-x
1 vagrant vagrant 136 Oct 8 13:17 02-Builtins\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8 08:15 02-
Builtins_files\n-rw-r--r-- 1 vagrant vagrant 73444 Oct 8 08:15 02-Builtins.html\n-rw-r--r-- 1 vagrant vagrant
16244 Oct 7 10:58 02-Builtins.ipynb\nrwxr-xr-x 1 vagrant vagrant 102 Oct 8 13:41 03-FileIO\nrwxr-xr-x 1
vagrant vagrant 510 Oct 8 08:15 03-FileIO_files\n-rw-r--r-- 1 vagrant vagrant 41620 Oct 8 08:15 03-
FileIO.html\n-rw-r--r-- 1 vagrant vagrant 9576 Oct 7 10:58 03-FileIO.ipynb\nrwxr-xr-x 1 vagrant vagrant
374 Oct 9 06:52 04-UsingModules\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8 08:15 04-UsingModules_files\n-rw-r--
r-- 1 vagrant vagrant 137356 Oct 8 08:15 04-UsingModules.html\n-rw-r--r-- 1 vagrant vagrant 45766 Oct 7
10:59 04-UsingModules.ipynb\nrwxr-xr-x 1 vagrant vagrant 170 Oct 8 15:59 05-Strings\nrwxr-xr-x 1 vagrant
vagrant 510 Oct 8 08:15 05-Strings_files\n-rw-r--r-- 1 vagrant vagrant 79928 Oct 8 08:15 05-
Strings.html\n-rw-r--r-- 1 vagrant vagrant 17750 Oct 7 10:59 05-Strings.ipynb\nrwxr-xr-x 1 vagrant vagrant
238 Oct 8 18:02 06a-Packages\nrwxr-xr-x 1 vagrant vagrant 102 Oct 8 16:26 06-Regex\nrwxr-xr-x 1 vagrant
vagrant 510 Oct 8 08:15 06-Regex_files\n-rw-r--r-- 1 vagrant vagrant 64794 Oct 8 08:15 06-Regex.html\n-rw-
r--r-- 1 vagrant vagrant 12896 Oct 7 10:59 06-Regex.ipynb\nrwxr-xr-x 1 vagrant vagrant 102 Oct 9 10:12
07-Functions\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8 08:16 07-Functions_files\n-rw-r--r-- 1 vagrant vagrant
45536 Oct 8 08:16 07-Functions.html\n-rw-r--r-- 1 vagrant vagrant 8062 Oct 9 08:01 07-Functions.ipynb\nrwxr-
xr-x 1 vagrant vagrant 136 Oct 9 10:59 08-AdvancedFunctions\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8
08:16 08-AdvancedFunctions_files\n-rw-r--r-- 1 vagrant vagrant 34295 Oct 8 08:16 08-AdvancedFunctions.html\n-
rw-r--r-- 1 vagrant vagrant 5848 Oct 7 17:05 08-AdvancedFunctions.ipynb\nrwxr-xr-x 1 vagrant vagrant 170
Oct 7 16:25 09-Logging\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8 08:16 09-Logging_files\n-rw-r--r-- 1 vagrant
vagrant 47018 Oct 8 08:16 09-Logging.html\n-rw-r--r-- 1 vagrant vagrant 10741 Oct 7 16:48 09-
Logging.ipynb\nrwxr-xr-x 1 vagrant vagrant 102 Oct 9 19:35 10-OOP1\nrwxr-xr-x 1 vagrant vagrant 510
Oct 8 08:16 10-OOP1_files\n-rw-r--r-- 1 vagrant vagrant 35789 Oct 8 08:16 10-OOP1.html\n-rw-r--r-- 1 vagrant
vagrant 6375 Oct 7 17:05 10-OOP1.ipynb\nrwxr-xr-x 1 vagrant vagrant 136 Oct 9 14:19 11-OOP2\nrwxr-xr-x
1 vagrant vagrant 510 Oct 8 08:17 11-OOP2_files\n-rw-r--r-- 1 vagrant vagrant 72396 Oct 8 08:17 11-
OOP2.html\n-rw-r--r-- 1 vagrant vagrant 14740 Oct 7 17:50 11-OOP2.ipynb\nrwxr-xr-x 1 vagrant vagrant 170
Oct 9 15:13 12-Decorators\nrwxr-xr-x 1 vagrant vagrant 510 Oct 8 08:17 12-Decorators_files\n-rw-r--r-- 1
vagrant vagrant 64594 Oct 8 08:17 12-Decorators.html\n-rw-r--r-- 1 vagrant vagrant 12311 Oct 7 18:36 12-
Decorators.ipynb\nrwxr-xr-x 1 vagrant vagrant 102 Oct 9 16:17 13-Generators\nrwxr-xr-x 1 vagrant vagrant
510 Oct 8 08:17 13-GeneratorsAndIterators_files\n-rw-r--r-- 1 vagrant vagrant 71092 Oct 8 08:17 13-
GeneratorsAndIterators.html\n-rw-r--r-- 1 vagrant vagrant 12557 Oct 7 19:06 13-
GeneratorsAndIterators.ipynb\nrwxr-xr-x 1 vagrant vagrant 204 Oct 9 17:36 14-ContextManagers\nrwxr-xr-x 1
vagrant vagrant 510 Oct 8 08:18 14-ContextManagers_files\n-rw-r--r-- 1 vagrant vagrant 47276 Oct 8 08:18
14-ContextManagers.html\n-rw-r--r-- 1 vagrant vagrant 9241 Oct 7 19:42 14-ContextManagers.ipynb\nrwxr-xr-x
1 vagrant vagrant 544 Oct 8 07:42 15-Threading\nrwxr-xr-x 1 vagrant vagrant 272 Oct 8 07:46 16-
Multiprocessing\nrwxr-xr-x 1 vagrant vagrant 136 Oct 9 19:30 17-Subprocess\n-rw-r--r-- 1 vagrant vagrant
19419 Oct 9 20:09 17-Subprocess.ipynb\nrwxr-xr-x 1 vagrant vagrant 204 Oct 9 18:54 18-Virtualenv\nrwxr-xr-
x 1 vagrant vagrant 850 Oct 9 20:42 19-Testing\n-rw-r--r-- 1 vagrant vagrant 25677 Oct 9 20:45 20-
MoreModules.ipynb\n-rw-r--r-- 1 vagrant vagrant 1211 Oct 8 08:32 fabfile.py\n-rw-r--r-- 1 vagrant vagrant
1823 Oct 8 08:33 fabfile.pyc\n-rw-r--r-- 1 vagrant vagrant 1548914 Oct 8 08:20 FastTrackToPython.pdf\nrwxr-xr-x
1 vagrant vagrant 442 Oct 9 19:44 .git\n-rw-r--r-- 1 vagrant vagrant 1358 Oct 9 20:46 index.md\n-rw-r--r-
- 1 vagrant vagrant 61 Oct 3 03:19 .vagrant\n-rw-r--r-- 1 vagrant vagrant 4008 Oct 3 03:20
Vagrantfile\n'
```

Popen

The above methods are just wrappers around the Popen constructor:

```
In [11]: help(subprocess.Popen.__init__)
```

Help on method `__init__` in module `subprocess`:

```
__init__(self, args, bufsize=0, executable=None, stdin=None, stdout=None, stderr=None, preexec_fn=None,
```

```
close_fds=False, shell=False, cwd=None, env=None, universal_newlines=False, startupinfo=None, creationflags=0)
unbound subprocess.Popen method
Create new Popen instance.
```

```
In [12]: sp = subprocess.Popen('ls', stdout=subprocess.PIPE)
print sp.stdout
```

```
<open file '<fdopen>', mode 'rb' at 0x185e930>
```

```
In [13]: print sp.stdout.read(20)
```

```
01-BasicPythonSyntax
```

```
In [14]: sp.wait()
```

```
Out[14]: 0
```

```
In [15]: sp = subprocess.Popen('vi')
```

```
In [16]: sp.poll()
```

```
In [17]: sp.terminate()
```

```
In [18]: sp.wait()
```

```
Out[18]: -15
```

```
In [19]: sp = subprocess.Popen(
        'ls',
        stdout=subprocess.PIPE)
print sp.communicate()
```

```
('01-BasicPythonSyntax\n01-BasicPythonSyntax_files\n01-BasicPythonSyntax.html\n01-BasicPythonSyntax.ipynb\n02-
Builtins\n02-Builtins_files\n02-Builtins.html\n02-Builtins.ipynb\n03-FileIO\n03-FileIO_files\n03-FileIO.html\n03-
FileIO.ipynb\n04-UsingModules\n04-UsingModules_files\n04-UsingModules.html\n04-UsingModules.ipynb\n05-Strings\n05-
Strings_files\n05-Strings.html\n05-Strings.ipynb\n06a-Packages\n06-Regex\n06-Regex_files\n06-Regex.html\n06-
Regex.ipynb\n07-Functions\n07-Functions_files\n07-Functions.html\n07-Functions.ipynb\n08-AdvancedFunctions\n08-
AdvancedFunctions_files\n08-AdvancedFunctions.html\n08-AdvancedFunctions.ipynb\n09-Logging\n09-Logging_files\n09-
Logging.html\n09-Logging.ipynb\n10-OOP1\n10-OOP1_files\n10-OOP1.html\n10-OOP1.ipynb\n11-OOP2\n11-OOP2_files\n11-
OOP2.html\n11-OOP2.ipynb\n12-Decorators\n12-Decorators_files\n12-Decorators.html\n12-Decorators.ipynb\n13-
Generators\n13-GeneratorsAndIterators_files\n13-GeneratorsAndIterators.html\n13-GeneratorsAndIterators.ipynb\n14-
ContextManagers\n14-ContextManagers_files\n14-ContextManagers.html\n14-ContextManagers.ipynb\n15-Threading\n16-
Multiprocessing\n17-Subprocess\n17-Subprocess.ipynb\n18-Virtualenv\n19-Testing\n20-
MoreModules.ipynb\nfabfile.py\nfabfile.pyc\nFastTrackToPython.pdf\nindex.md\nVagrantfile\n', None)
```

Pipelines

```
In [20]: sp1 = subprocess.Popen(
        [ 'ls', '-l' ],
        stdin=subprocess.PIPE,
        stdout=subprocess.PIPE)
sp2 = subprocess.Popen(
        [ 'grep', 'FileIO' ],
        stdin=sp1.stdout,
        stdout=subprocess.PIPE)
sp1.stdin.close()
print sp2.communicate('FileIO\nSomethingElse')[0]
```

```
drwxr-xr-x 1 vagrant vagrant    102 Oct  8 13:41 03-FileIO
drwxr-xr-x 1 vagrant vagrant    510 Oct  8 08:15 03-FileIO_files
-rw-r--r-- 1 vagrant vagrant 41620 Oct  8 08:15 03-FileIO.html
-rw-r--r-- 1 vagrant vagrant  9576 Oct  7 10:58 03-FileIO.ipynb
```

Exercises

- Write a script that uses `os.listdir()` and `subprocess.check_output()` to run a command on every file in a directory (for instance, the `stat` command)
- Write a script that creates a pipeline containing two or more commands

```
In [20]:
```

