

Sharing and Reusing
Code

It is often desirable to either
use code that somebody else
has written or share code that
you have written with somebody
else.

Python has a built in
way of handling this
called "Modules"

A module is simply a file that contains functions and code that can be included or imported into another program file.

import random

Once we import a module, we refer to functions or variables using the "dot" operator.

random.randint(0, 5)

Module name.
taken from
import random

the dot
operator

Left hand side = container
Right hand side = object.

function or
variable name.

Read this as:

from "random" find and
call "randint" with parameters
0 & 9.

We will see more of the
dot operator more in the
future.

Make sure you are comfortable
with this notation

Modules being 'just' files creates a potential problem.

A file could be called as the main program or imported just for the variables and functions

Python's method of solving the problem is to define a special variable.

`-- name --` ↴ called
 dunder name
 for "double
 under score name"

If the file was the initial one run,

`--name-- = '--Main--'`

otherwise:

`--name-- = "name of module"`

We can use this to separate out code that is run in the file such as test code from the functions we make available to others.

```
if __name__ == '__main__':
    print("I was called directly")
    run_tests()
```

Example: Updating our
readability program to work
as a module.

Example: using our readability code as a module.

Documentation.

When you share a module
you also need to tell
people how to use the
module.

We do this with a "docstring"
in Python.

doc strings are very light weight
and easy to use.

This means Python code is often
better documented than code from
other languages.

Step 1.

Put a string (in triple quotes """)
at the top of the module.

This describes the general purpose
of the module.

Step 2: Document functions

Immediately following the function definition (the `def` line)
Put a string (again `"""`)
that describes the function

A good docstring Contains:

- A short description of what the function does
- Instructions on how to call the function.

This usually includes
a description of the type
& purpose of each parameter

Step 3:

There is no Step 3.

A person does not need to open a module to read the docstrings.

`help(module name)`

will display the docstrings for the module.

(The main documentation & the documentation for each function)

`help(module-name, function-name)`

displays the docstring for
just that function.

How do you install Modules?

- ① download a zip file from
internet & unzip it
on your computer in a
folder Python will look in.

Python looks for modules
using something called the
Search Path.

- 1) The current directory
- 2) PYTHONPATH environment variable.
- 3) Directory set up when you install Python.

See

`http://realpython.com/lessons/
module-search-path/`

for more information.

② Use pip to automatically

pip → "Pip installs packages"

Pip is a Python program that goes out to a module repository, searches for the module you specify and installs it for you.

pip install numpy

↑ ↑ ↑

Program name Command. Package name.

Usefull pip Commands

- install - installs a package if not already installed.
- install --upgrade - installs or upgrades a package to latest version.
- list - displays all installed packages

Pip installs all packages from

pypi.org

Anybody can upload a package
to pypi.org and thousands
(264,967) of modules have been.

Sometimes a module name
is too long or would conflict
with your code. We can rename
a module when we import it.

```
import matplotlib as plt  
import random as rnd
```

Sometimes we don't want to use dot notation to refer to function in a module.

```
from matplotlib import hist  
we can then call  
hist(list_of_data)
```

← notice we didn't have to write plt.hist()

There are lots of modules
built into python and available.
on pypi.org.

- math - additional math oper.
- date time - handle dates & times
- requests - connect to web pages
- Numpy - Numeric computations
- beautiful soup - Screen Scrapping
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