The Python Language (Part 1)

Robert M. Dondero, Ph.D.
Princeton University

Objectives

- We will cover:
  - A subset of Python...
  - That is appropriate for COS 333...
  - Through example programs

Agenda

- **Overview**
- Simple programs
- Building and running
- Functions
- Standard library

Overview

Guido
Van Rossum

Overview

- Characteristics:
  - Dynamically typed
  - Rich standard library
  - Expressive

"Python is the most powerful language you can still read."

-- Paul Dubois

Overview

- Why study Python?
  - It's elegant
  - It's popular
  - It can illustrate much of the course's material
  - You are new to it?

- We'll use **Python 3.12**

Agenda

- Overview
- **Simple programs**
- Building and running
- Functions
- Standard library

Simple Programs

- See **hello1.py**

```
$ python hello1.py
hello, world
$
```

Simple Programs

- See **hello2.py**

```
$ python hello2.py
hello, world
$
```

Agenda

- Overview
- Simple programs
- **Building and running**
- Functions
- Standard library

Building and Running

- Initially…
  - Perform the instructions in the *A COS 333 Computing Environment* document

- Then…
  - Activate your cos333 virtual environment

```
$ activate333
```

Building and Running

Procedure 1 (Mac/Linux/Windows):

```
$ python hello2.py
```

Procedure 2 (Mac/Linux):

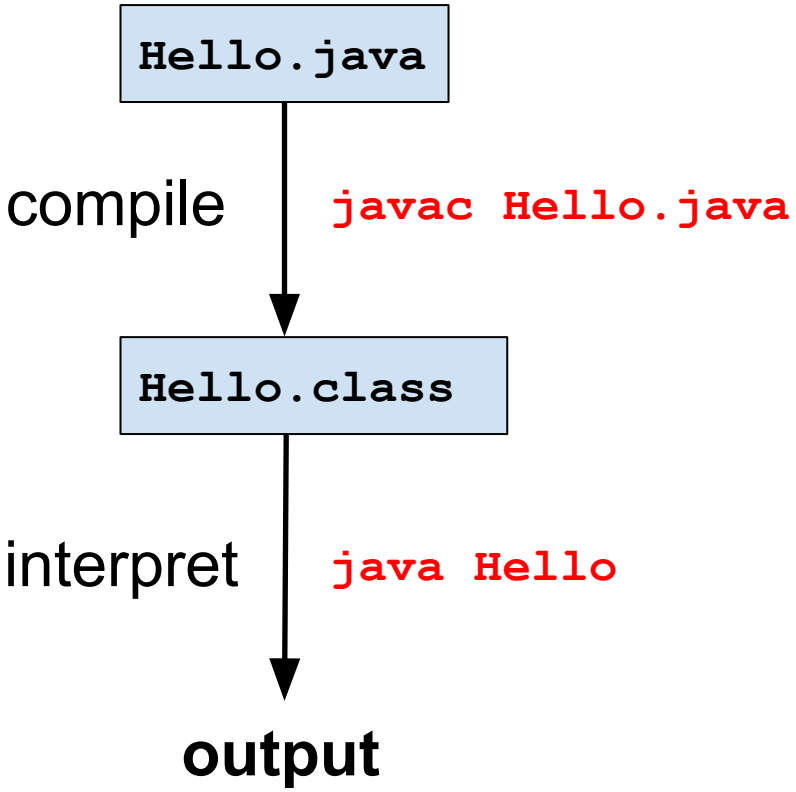
```
$ chmod 700 hello2.py
$ ./hello2.py
```

Requires #! line

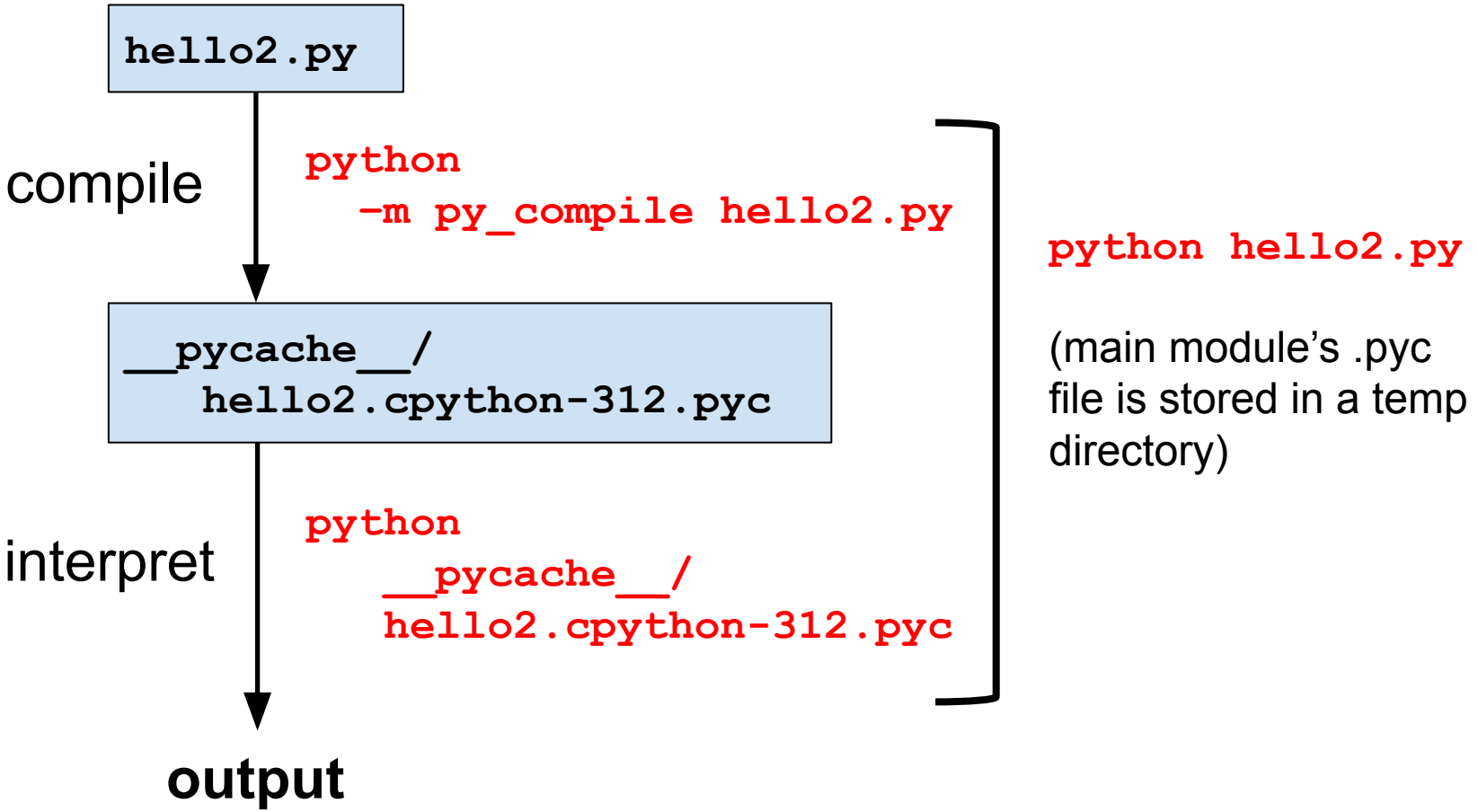
Procedure 3 (Windows):

```
C:\>hello2.py
```

Aside: Building and Running with Java



Building and Running



Aside: python -m

```
$ python somefile
```

`python` executes *`somefile`*, which resides in your working directory

```
$ python -m somefile
```

`python` executes *`somefile`*, which resides in your virtual environment's `lib` directory (More precisely, uses Python's `sys.path` to find *`somefile`*)

Building and Running

- Finally…
  - Deactivate your cos333 virtual environment

```
$ deactivate
```

Agenda

- Overview
- Simple programs
- Building and running
- **Functions**
- Standard library

Functions

- See **sub.py**

```
$ python sub.py
3
5
3
$
```

Agenda

- Overview
- Simple programs
- Building and running
- Functions
- **Standard library**

Standard Library

- See **squareroot1.py**

```
$ python squareroot1.py
1.4142135623730951
$
```

Standard Library

- See **squareroot2.py**

```
$ python squareroot2.py
1.4142135623730951
$
```

Summary

- We have covered these aspects of Python:
  - Overview
  - Simple programs
  - Building and running
  - Functions
  - Standard library
- See also:
  - **Appendix**: Interactive Python

Appendix:
Interactive Python

Interactive Python

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> print(1 + 2)
3
>>> 1 + 2
3
>>> quit()
$
```

Interactive Python

Interactive Python is valuable for **learning**

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> import math
>>> math.sqrt(2)
1.4142135623730951
>>> quit()
$
```

Interactive Python

Interactive Python is valuable for **learning**

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> from math import sqrt
>>> sqrt(2)
1.4142135623730951
>>> quit()
$
```

Interactive Python

Interactive Python is valuable for **testing**

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> import hello1
hello, world
>>> quit()
$
```

Interactive Python

Interactive Python is valuable for **testing**

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> import hello2
>>> hello2.main()
hello, world
>>> hello2.main()
hello, world
>>> quit()
$
```

Interactive Python

Interactive Python is valuable for **testing**

```
$ python
Python 3.12.3 (main, Apr 10 2024, 05:33:47) [GCC
13.2.0] on linux
Type "help", "copyright", "credits" or "license" for
more information.
>>> from hello2 import main
>>> main()
hello, world
>>> main()
hello, world
>>> quit()
$
```