COMP 383 Computational Biology

Intro to Python

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Why Python?

1. Everybody’s doing it. It has a large (and growing) user base among scientists.

2. Python is a general purpose, high level, programming language – you should be able to do anything you want to do using Python, and it should be relatively easy to accomplish.

3. It’s free, well-documented, and runs on all operating systems.

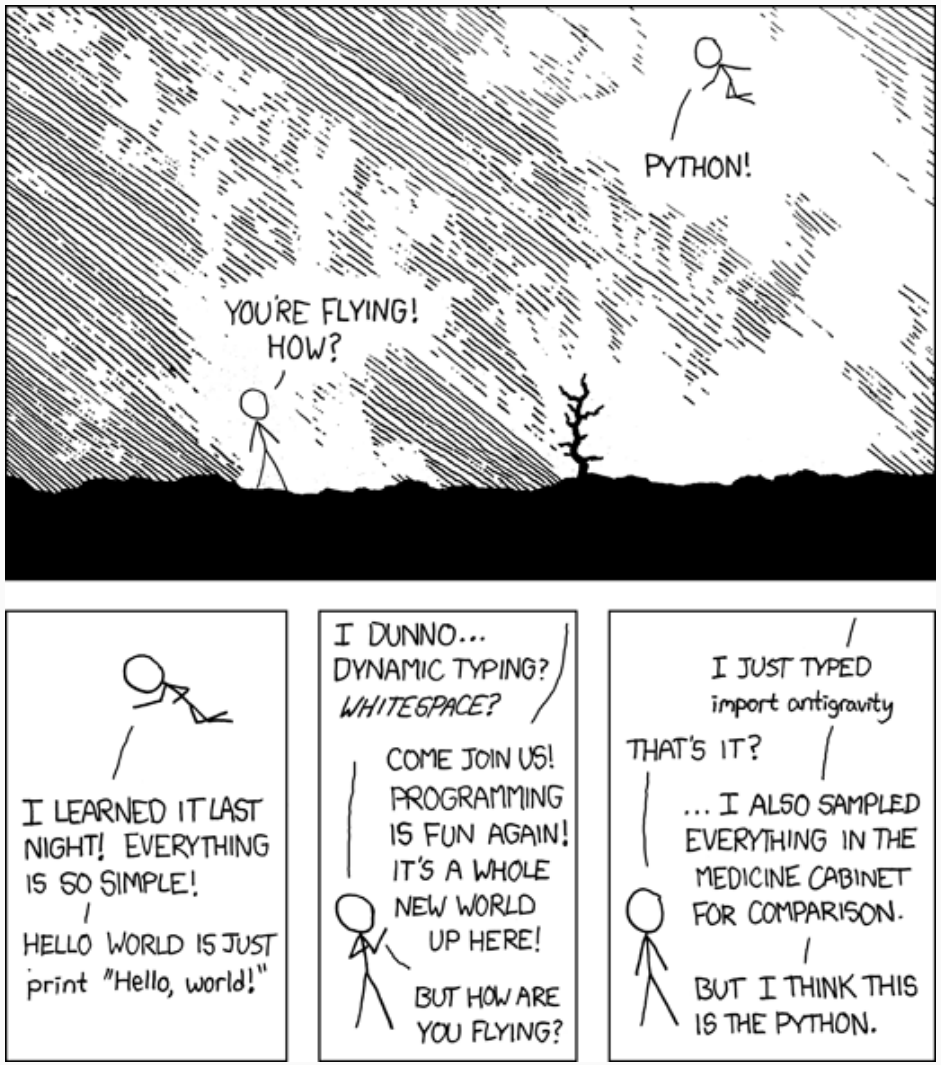
Why Python?

4. It’s easier for novices to pick up than most other languages and it’s also used by many professional programmers. This makes collaborating with both novices and experts easier.

5. A dynamic language like Python allows us to write small programs quickly and to also manage the complexity of larger ones.

6. If we want to squeeze every last ounce of performance out of our hardware, then a compiled language (e.g. C, C++) is better, but if we want to quickly answer a research question or build a pipeline around other software, Python is often easier/faster.

Why Python?


PYTHON!
YOU'RE FLYING! HOW?
I LEARNED IT LAST NIGHT! EVERYTHING IS SO SIMPLE!
HELLO WORLD IS JUST print "Hello, world!"
I DUNNO... DYNAMIC TYPING? WHITESPACE?
COME JOIN US! PROGRAMMING IS FUN AGAIN! IT'S A WHOLE NEW WORLD UP HERE!
BUT HOW ARE YOU FLYING?
I JUST TYPED import antigravity
THAT'S IT?
... I ALSO SAMPLED EVERYTHING IN THE MEDICINE CABINET FOR COMPARISON.
BUT I THINK THIS IS THE PYTHON.

Python 2 vs. Python 3

For this class, I recommend Python version 3.x rather than Python 2.7

- ROSALIND assumes 2.7, so some of the ROSALIND hints may require slightly different syntax
- Demo some differeces between `python2` and `python3` on `compbio`
- `https://boole.loyolachicagocs.org/guacamole/#/login/`

Python 3 Strings - Try in console

```
print("Hello, World!")
a = "Hello"
b = "World"
type(a)
print(a + ", " + b + "!"*3)
a[0:4]

## Hello, World!
## <type 'str'>
## Hello, World!!!
## 'Hell'
```

Python 3 Numbers - Try in console

```
a = 12
b = 2.5
a + b
c = a + b
type(a)
type(b)
print(str(a) + " + " + str(b) + " = " + str(c))

## 14.5
## <type 'int'>
## <type 'float'>
## 12 + 2.5 = 14.5
```

Python 3 Division - Try in console

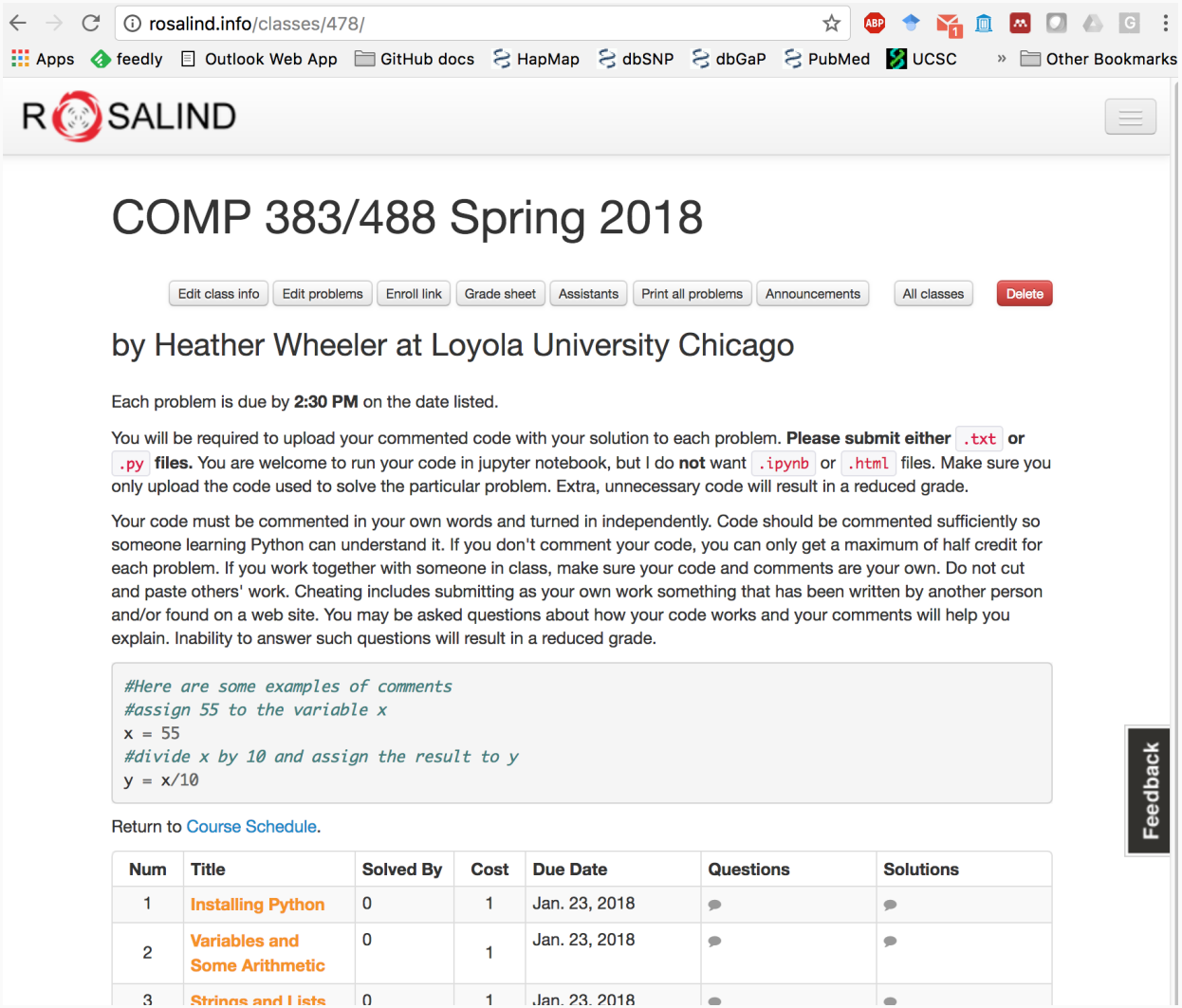
```
17 / 5
17 // 5
17 % 5
type(17 / 5)
type(17 // 5)
type(17 % 5)

## 3.4
## 3
## 2
## <type 'float'>
## <type 'int'>
## <type 'int'>
```

To Install Python Locally

- You should download the **Anaconda distribution**
- Includes bunch of packages useful for scientific computing
- https://www.continuum.io/downloads and select Python 3.x version

Recommended IDE for testing scripts: Jupyter Notebook

- Included with Anaconda
- Also available on the compbio server through your browser. Log in at http://compbio.cs.luc.edu:8000/.
    - If not on a campus wired connection, you must connect to LSA first. See here for LSA setup.

Start first assignment in ROSALIND

http://hwheeler01.github.io/CompBio/assignments/