Principles of Robot Autonomy I

Section Logistics

Stanford University

Autonomous Systems Lab

Sections

- Modeled after sections in CS 106A/B/X/L
- Provide hands-on experience for commonly-used tools in robotics
  - AKA tools you'll be using for your homework and final projects
- Taking feedback from previous years to heart

Section Logistics

- First 15-30 minutes will be a presentation about the aims of the section, references, and a description of the hands-on activity you’ll be doing
- Rest of the time (1.5+ hours) will be for you and a partner (your tablemate) to complete the hands-on activity
- You submit your results on Gradescope when you’re done

Do I have to stay the whole time?

- Once you complete the activity and submit your results, you can leave

Do I have to arrive on time?

- Yes
- … unless you have an overlapping class conflict. In that case, you should still arrive ASAP and make a group with someone else that is arriving similarly late
    - If you’re *the only one* that arrives late, then you can join an existing group

- Section slides and the activity handout will be posted online, so you can still catch up
- However, we *will not* stay after hours

Questions about Section Logistics?

Principles of Robot Autonomy I

Section 1: Introduction to Python2.7, Git, and Debugging

Aims

- Learn how to use Git for version control
- Start working with Python 2.7 and some of its most common packages
- Tips and tricks for debugging

OS Setup

- Only need a local Python 2.7 installation for the first two homeworks
  - Later, we’ll be providing a server for running ROS remotely and rendering the visualization on your laptop

- You have the following options:
  1. Install Python and run your scripts locally on Windows/MacOS/Linux
  2. Set up a dual boot with Ubuntu 16.04
  3. Set up a virtual machine with Ubuntu 16.04
  4. Log into Stanford FarmShare

Git

- Popular source code version control system
- You probably already use it!
    - Github, BitBucket, etc. all support Git
- Replaces the days of
    - Important_doc.docx
    - Important_doc_v2.docx
    - Important_doc_final.docx
    - Important_doc_final2.docx
    - Important_doc_final2_USE_THIS_ONE.docx

Git

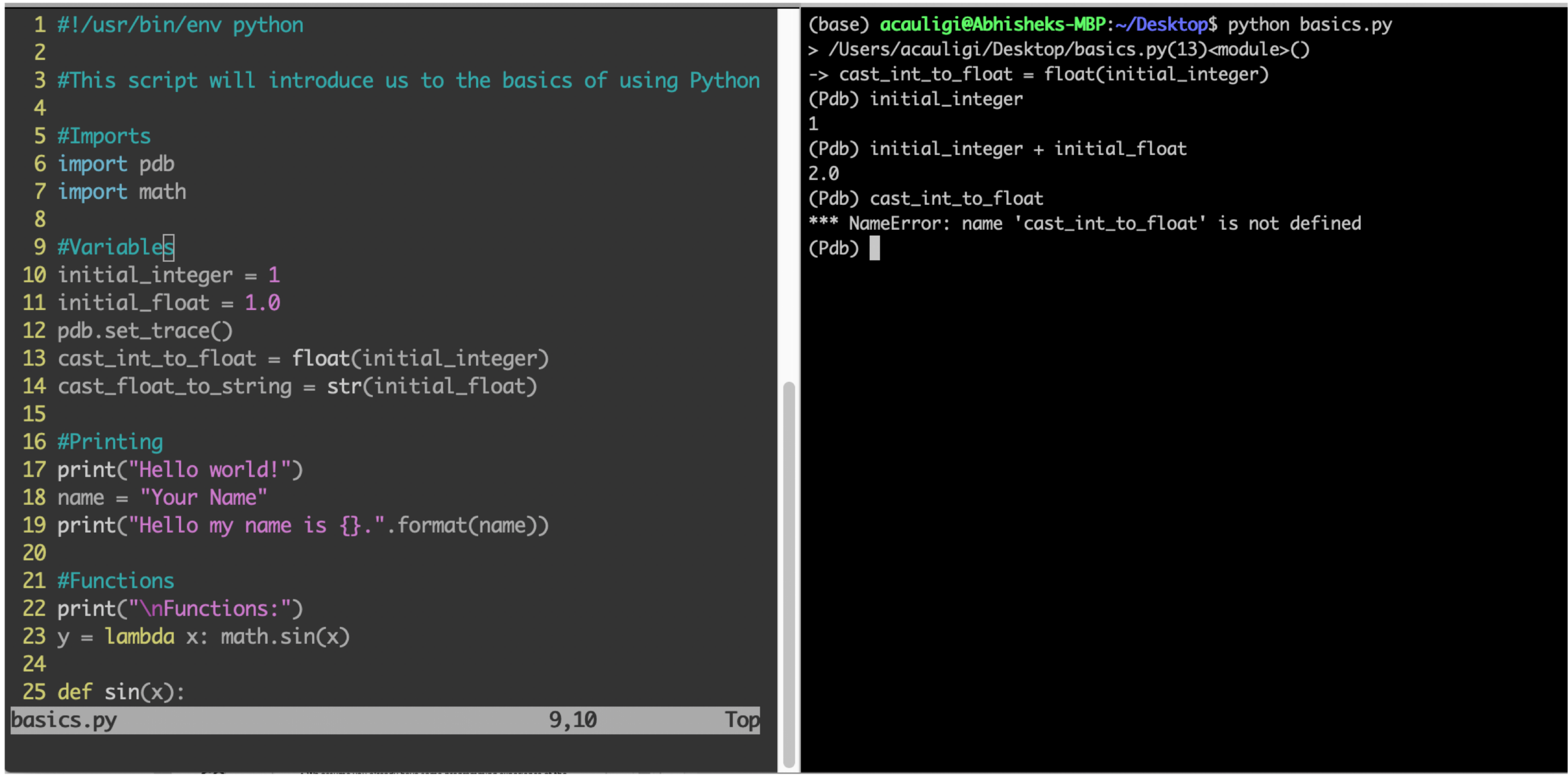
- Strongly recommend getting used to using Git on your homework
  - If you have a Github account, you can fork the homework repo and clone that out

Python 2.7

- We assume you already have some programming experience at the level of CS 106A
- As a result, rather than providing a full-blown tutorial about Python, we'll direct you to last year's Python + NumPy tutorial (hands-on!)
- It can be found online at: http://asl.stanford.edu/aa274_win1819/pdfs/recitation/Tut3_NumPy.pdf

Debugging

- pdb



```
#!/usr/bin/env python

#This script will introduce us to the basics of using Python

#Imports
import pdb
import math

#Variables
initial_integer = 1
initial_float = 1.0
pdb.set_trace()
cast_int_to_float = float(initial_integer)
cast_float_to_string = str(initial_float)

#Printing
print("Hello world!")
name = "Your Name"
print("Hello my name is {}.".format(name))

#Functions
print("\nFunctions:")
y = lambda x: math.sin(x)

def sin(x):
basics.py                                          9,10          Top
```

```
(base) acauligi@Abhisheks-MBP:~/Desktop$ python basics.py
> /Users/acauligi/Desktop/basics.py(13)<module>()
-> cast_int_to_float = float(initial_integer)
(Pdb) initial_integer
1
(Pdb) initial_integer + initial_float
2.0
(Pdb) cast_int_to_float
*** NameError: name 'cast_int_to_float' is not defined
(Pdb)
```

Debugging

- More generally the debugging process is:
  - Google it
  - Ask a peer in the class
  - Google it
  - If all else fails, then post on Piazza or at office hours

Section 1

- Focuses on Python and common use-cases for it in this course
- We’ll ask you to perform a few basic mathematical operations and plot the results