

# CompSci 101

## Fall 2021

Lecture 2

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# Reminders

- Social distance
- Livestream/async option
- Ed Discussion
- Assignments
  - Assign 0 live
  - APT-0 live
- Lab 0-Friday
  - Attend your assigned section!
- Assessments
  - 3C Assessment-Learning Innovation
  - “Who Are You?”-Ms. Velasco
  - 80% response rate → Extra credit

# PFTD

- Programming introduction
  - Algorithms
  - Key instructions
  - Python
  - Values, variables
  - Assignment
  - Strings
  - Comments
  - Operators

# People to Know: Luis von Ahn



- Duke (BS, Math)
- Carnegie Mellon (PhD, CS)
- Cryptography
- CAPTCHA, reCAPTCHA
- Duolingo

# Algorithms

- Step-by-step solution to problem.
- Solved in a finite amount of time.
- How do you get to the Bryan Center from this class?
- Importance of design first!
- Programs express algorithms in a language a computer understands.

# Program (Software) Development

- Define the problem
- Design a solution
- Implement the solution
- Test the solution
- Deliver solution
- Maintain/update solution

# Key instructions

- Input
- Output
- Assignments\*
- Math/Logic
- Conditionals
- Repetition

*\*not listed in book*

# Programming in Python

## Shell mode

- From the command line (Python console)
  - Good for seeing the result of one line of code

```
>>> |
```

## Program mode

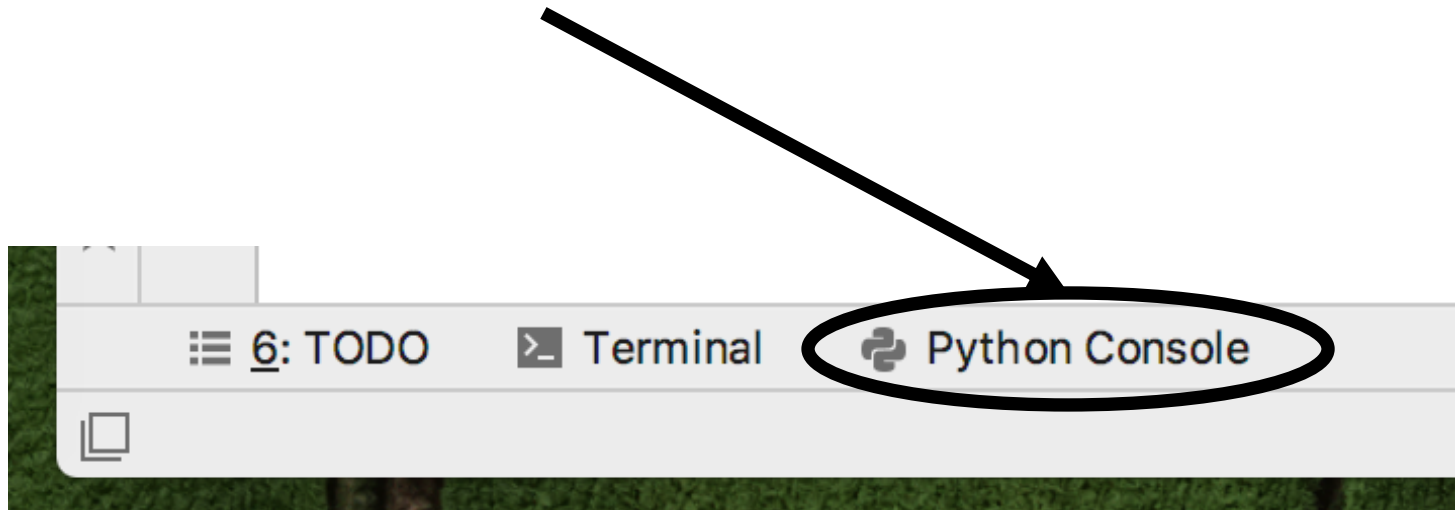
- From PyCharm
  - Good for creating larger programs

```
if __name__ == '__main__':
```



# Interactive Console

- Look in the bottom left corner of PyCharm
- Click on “Python Console”



# Values vs. Variables

## Values

- 5
- “Hey”
- 3.4
- False

## Variables

- num1
- greeting
- gpa
- result
  
- Naming conventions
  - *Must start with letter/underscore*
  - *Cannot start with a number*
  - *Case-sensitive*

# Variables

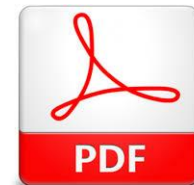
- Store values so we can use/re-use them in expressions
  - Name associated with storage (spot in memory)
  - Assign value to a variable
- How to read: `num = 5, word = "hello"`
  - Why say 'gets' or 'is assigned' and not 'equals'
  - We'll use 'equals' later to mean equality

# Exploring Language

- Do you first learn how to say something useful or do you learn the rules of grammar
  - Duolingo: El banco esta cerrado
  - How do you say: “she wants coffee?”
- Connecting to things you already know helps with learning!
  - Variables - names, types, values

# Names, Types, and Values

- What type is each of these files?
  - homework.pdf, blurp.mp4, egal.jpg
  - Does the name/suffix define the type or is it the bits in the file that defines the type?
  - *Value* of blurp.mp4 not the same as moo.mp4
  - *Type* of blurp.mp4 is the same as moo.mp4
  - *Name* of stairwaytoheaven.mp3 means ...



# Numeric Python Building Blocks

- Numbers are not everything! But good start
  - Values and arithmetic expressions
  - Integer aka int: 0, 3, -2, 5, ...
  - Float: 2.5, 3.6673, 1.938e+120
  - Operators: +, -, \*, /, \*\*
  - Operators: // and %
- Demo in Python Console

# Summary of Numbers

- Integers are arbitrarily large in Python 3
- Float values do not have infinite precision
  - Floats are for decimal values
- Be attentive to parentheses and precedence
- Understand / and // and %
  - $5/4$  not the same as  $5//4$
  - %: remainder

# Assignment

- Assigns a value to a variable.
- Uses “=”
- Assign the value on the right of the = to the variable on the left.
  - age=21
- Are these valid?
  - name='Kim'
  - 2=place
  - gpa=3.25
  - student=name



# Subtleties

- Variables on LHS and RHS
  - Value compared to Name
  - LHS – Left Hand Side
  - RHS – Right Hand Side

```
num1 = 17
num2 = num1 + 12
```

- What happens here?
  - Value compared to Name
- In expressions? Value

```
var1 = 17
var2 = var1 + 12
var1 = "hello"
var2 = var1 * 3
```

# What's happening here?

```
8 ▶ if __name__ == '__main__':  
9     print("This is a simple program.")  
10    num1 = 1  
11    num2 = 2  
12    sum = num1+num2  
13    print(sum)
```

# Python Strings

- A string is a sequence of characters
  - String literals use single or double quotes
  - "hello" and 'world' are both strings
- Operators we'll use: + and [:]
  - Concatenation and Slicing
  - Adding and taking apart? *Today just adding*
- Demo in Console

# Types and Conversion

- How do you convert a .mp4 to a .mov?
  - Change the bits from one format to another
- Can we add a string and an integer?
  - What does  $5 + \text{"cow"}$  mean?
  - What does  $5 * \text{"cow"}$  mean?
  - Why?

# Comments

- Notes to yourself (and anyone reading)
- Extremely important for writing good programs
- Different ways to create comments
- #
- ““““
- ””””
- Ctrl-/

Activity 1:

<http://bit.ly/101f21-08-26-1>

# Questions?