Compsci 101
Introduction

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```
st = f.read().decode('utf-8')
st = st.lower()
total = len(st)
```
B is for …

- Bug
  - What you will always have and need to fix
- Bits
  - Zeros and Ones that are our C,G,A,T
- Break
  - An easy way out of a loop
- Boolean
  - Type that's true or false
Barbara Liskov

• Among first women in US to earn Ph.D. in Computer Science: 1968
• Turing Award 2008, Software Engineering and Programming Languages
• Object-Oriented
  • CLU
• Liskov Substitution Principle

“Every time you exchange e-mail with a friend, check your bank statement online, or run a Google search, you are riding the momentum of her research” – MIT President Rafael Reif about Liskov
Announcements

• Survey coming out– complete this week
• Lab 1 is Friday
• Prelab 1 before lab– Install Python/Pycharm
  • Ways to get help:
    • Office hours, consulting hours
    • Post on Ed Discussion – what type of machine, etc
    • https://colab.duke.edu/resources

• Ed Discussion Back channel during lecture
• QZ03 and reading due Thursday at 10:15am
• Assignment 1 - Blockly due 1/18
Is this the right course for you?

- **CompSci 101**
  - beginner
  - little or no programming experience
- **CompSci 201**
  - 4/5 on AP CS A
  - OR Programming Experience in Python or Java or ?
    - Problem solving with arrays or lists
    - Looping structures (while/for)
    - Writing functions/methods
    - Problem solving with Sets, Dictionaries or maps?
Can’t take CompSci 101 if

• You already took CompSci 201, or CompSci 116, or ENG 103 …..

• You won’t get credit for this course

• This is a beginner course
Practice results in Success
Don’t get behind!!!

• Difficult to catch up…
Plan for the Day (PFTD)

• Look at a sample Python Program
  • OK if you don’t understand it all
• How to run Python Code
  • Run complete program in Pycharm
  • Short code segments with Python Console
    • Python Console is in Pycharm
• Names, types, and values in Python
• Functions in Python
Understanding Code

• We will look at an interesting Python program
  • Try to figure out what it does

• You Likely Will NOT understand all this code
• Maybe none of it

• That’s OK
How Breakout Groups Work with Google form links

• Given a bitly link
  • Type it in OR click on it on the calendar page
  • http://bit.ly/101s22-0111-1

• What you should do:
  • Introduce yourselves
  • Each person fills out the google form
  • Includes your email, name and netid
  • Discuss each question and fill out
  • Be mindful of time
WOTO-1 Understanding Code
WOTO-2 Understanding Code
Names, Types, and Values

- Relate to a file. Consider: homework.pdf
- What is its name?
- What is its type?
- What is its value?
Names, Types, and Values

• Relate to a file. Consider: cats.jpg
• What is its name?
• What is its type?
• What is its value?
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
Interactive Console

• Short way to look at Python values and expressions
• Look in the bottom left corner of PyCharm
• Click on “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 %
  • Modulus or remainder
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 Python Console
Types and Conversion

• How do you convert a .jpg to a .png?
  • Change the bits from one format to another

• Can we add a string and an integer?
  • What does 5 + "cow" mean?
  • What does 5 * "cow" mean?
  • Why?
Using Python Console

• Not writing a whole program
• Just checking out values or writing simple code

• What is the difference in Python Console of:
  >>> print("a" +" " + "b")

  >>> "a" + " " + "b"
Variables

- We use variables to store values so we can use them and 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
Variable idea

1) num = 6
Anatomy of a variable

• Variables in Python have a type, changeable
  • Initially var = 5, change to var = “hello”
  • Use the `type(...)` function to determine type, but documentation/comments are better

• Variables are names/labels, references to an object stored elsewhere (basically)
  • My address is “202 Main Street”
  • That’s the name/label, my house is elsewhere
  • For var = “hello”, the string is elsewhere
Subtleties

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

• What happens here?
  • Value compared to Name

• In expressions? What is value

```
num1 = 17
num2 = num1 + 12

var1 = 17
var2 = var1 + 12
var1 = “hi”
var2 = var1 * 3
```
Basic Python