

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, Practice, Practice

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

- 
- [Link 1](#)
 - [Link 2](#)
 - [Link 3](#)
 - [Link 4](#)

WOTO-1 Understanding Code

<http://bit.ly/101s22-0111-1>

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WOTO-2 Understanding Code

<http://bit.ly/101s22-0111-2>

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Names, Types, and Values

- Relate to a file. Consider: [homework.pdf](#)
- What is its name?
- What is its type?
- What is its value?

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Names, Types, and Values

- Relate to a file. Consider: [cats.jpg](#)
- What is its name?
- What is its type?
- What is its value?

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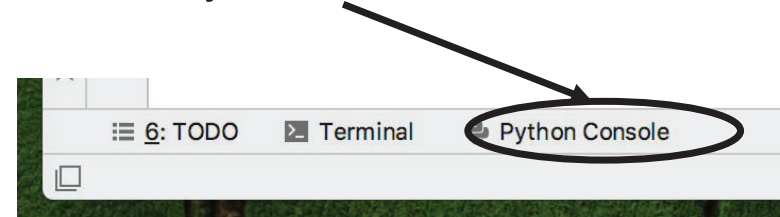
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Numeric Python Building Blocks

- 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")
```



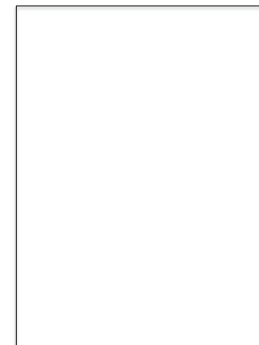
```
>>> "a" + " " + "b"
```

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`



Computer

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

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

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

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

Basic Python
<http://bit.ly/101s22-0111-3>

