

Compsci 101

Python Code, Variables

Susan Rodger
January 17, 2023

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

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B is for ...



- **Bug**
 - What you will always have and need to fix
- **Bits**
 - Zeros (0) and Ones (1), like C,G,A,T makes up DNA
- **Byte**
 - 8 bits that represent a character
- **Boolean**
 - Type that's true or false

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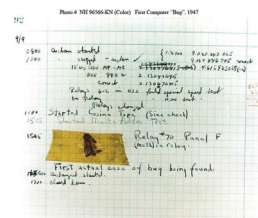
01000001 code for letter "A"
- **Boolean**
 - Type that's true or false

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Grace Hopper

- **Computer Scientist**
- **Rear Admiral in US Navy**
- **One of first programmers for one of first computers: Harvard Mark 1**
- **Handed out nanoseconds**
- **First computer bug in 1947**



“The only phrase I've ever disliked is, 'Why, we've always done it that way.' I always tell young people, 'Go ahead and do it.'”

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Announcements

- **Prelab 1 before lab 1– Install Python/Pycharm**
 - Ways to get help:
 - Office hours, consulting hours
 - Post on Ed Discussion – what type of machine, etc
 - Install Fest at Co-lab, Last day this afternoon
- **Ed Discussion Back channel during lecture**
- **QZ03 and reading due Thursday at 10:15am**
- **Assignment 0 - Blockly due 1/19**

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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?

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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**

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Where to sit? Laptops?

- **Sit anywhere but the top 2 seater row and the top 5 full rows. NEVER SIT THERE, WE will ask you to move!**
 - Come forward meet someone
- **Laptop policy**
 - Use your laptop in class only for CompSci 101
 - No watching sports videos, or shop, etc
 - RUDE and distracting to other students
 - Don't come to class if you feel you have to do this
 - Not be doing other coursework

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Practice, Practice, Practice

Practice results in Success

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Don't get behind!!!

- **Difficult to catch up...**

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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

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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

WOTO-1 Understanding Code
<http://bit.ly/101s23-0117-1>

How Wotos Work with Google form links

- Given a bitly link
 - Type it in OR click on it on the calendar page
 - <http://bit.ly/101s23-0117-1>
- 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

Links on Course
Webpage on
Today's date:

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

WOTO-2 Understanding Code
<http://bit.ly/101s23-0117-2>

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?

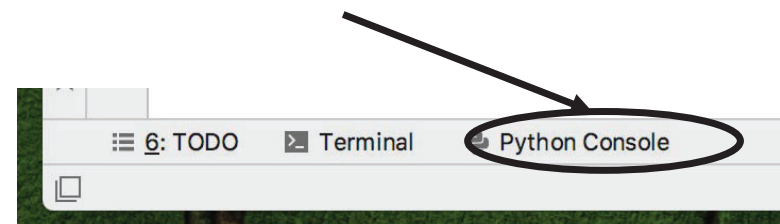
Numeric Python Building Blocks

- **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?**
- **Can we add a string and an integer?**

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")
```

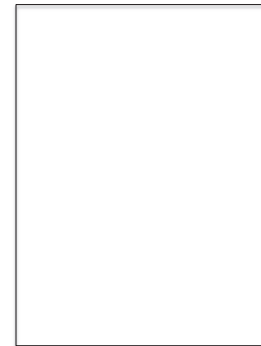
```
>>> "a" + " " + "b"
```

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

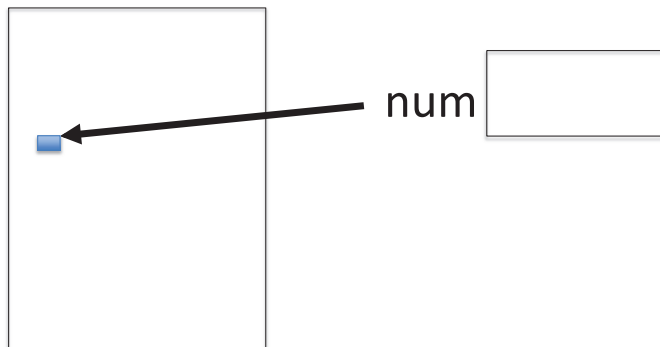
1) num = 6



Computer

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
- **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

<http://bit.ly/101s23-0117-3>

