

# Compsci 101

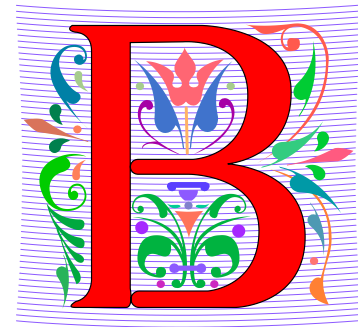
## Python Code, Variables

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January 17, 2023

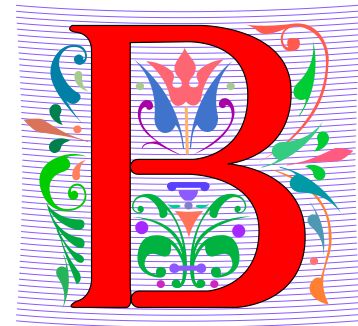
```
st = f.read().decode('utf-8')  
st = st.lower()  
total = len(st)
```

# B is for ...



- **Bug**
  - What you will always have and need to fix
- **Bits**
  - Zeros (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

# 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

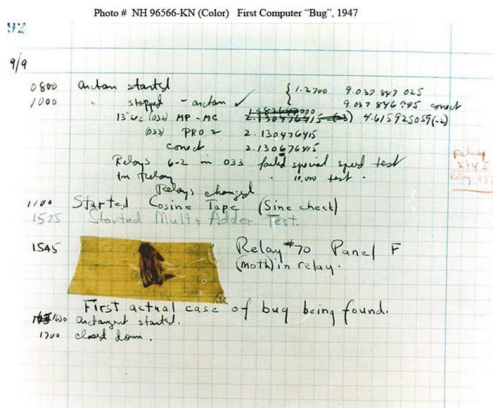
01000001      code for letter "A"

- **Boolean**

- Type that's true or false

# 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.'"

# 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**

# 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**

# 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



# 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 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-1 Understanding Code

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

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

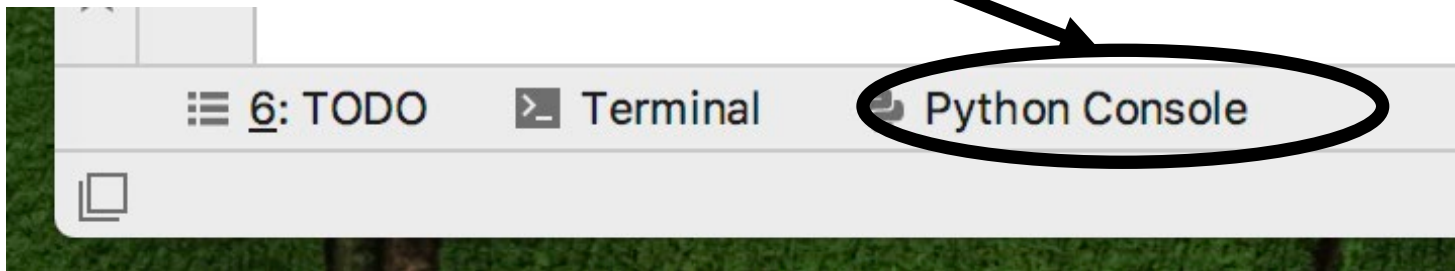
- **Relate to a file. Consider:** `cats.jpg`
- **What is its name?**
- **What is its type?**
- **What is its value?**

# 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"
```

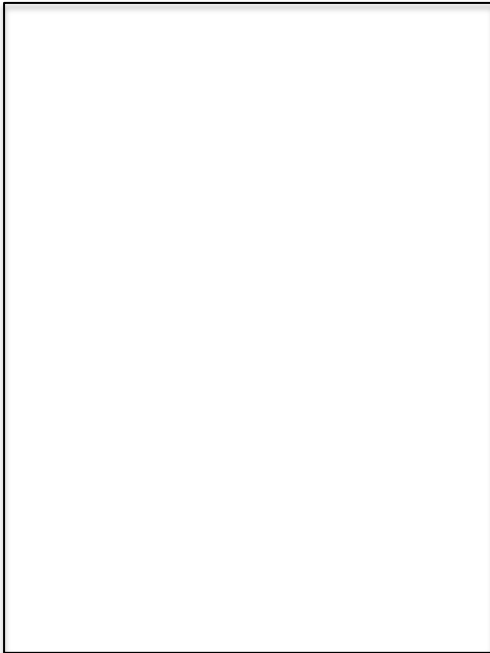


# Variables

- **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

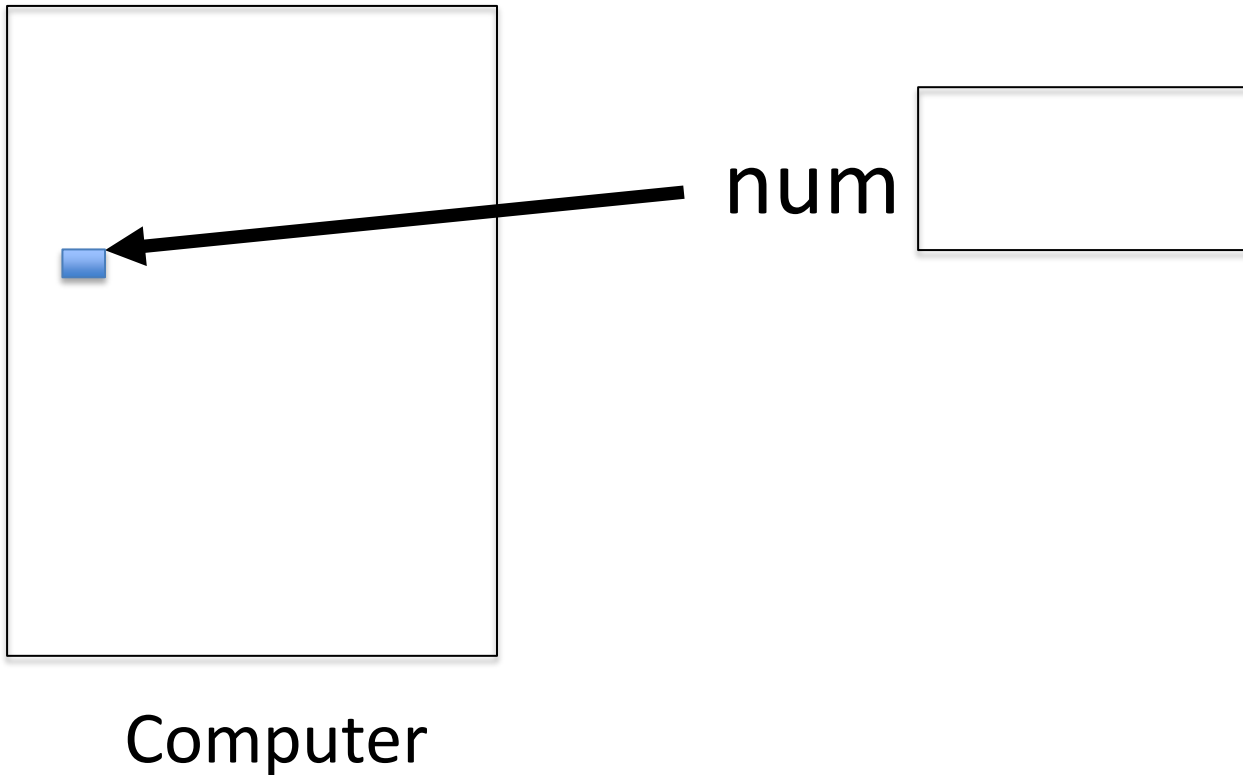
1) `num = 6`



Computer

# Variable idea

1) `num = 6`



# 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

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

- **In expressions? What is value**

# Basic Python

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

