Compsci 101
Python Code, Variables

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```python
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 ...

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- Bits
  - Zeros (0) and Ones (1), like C,G,A,T makes up DNA
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  - 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

• **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?

• 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
Variable idea

1) \( \text{num} = 6 \)
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
Basic Python