CS21: INTRODUCTION TO COMPUTER SCIENCE

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Fall 2017
Swarthmore College
Outline Sept 11:

• Recap last time + finish graduate.py

• Mathematical operations and math library
  • Pythagorean theorem program

• String operations (length and repetition)
  • Pretty print program

Reminders
• Lab 1 due Saturday night
Recap Friday
Key ideas

• We will always use `def main():` and then write main indented

• *Expressions* (3+5) vs. *statements* (x = 3+5)
  • In the interpreter, the results of expressions are shown
  • In the editor (i.e. in our code) we need to write full statements

• *Comments*: use hashtag symbol (#)

• User variable names that implicitly show type

• `print(..)` is very powerful! A way to see what is going on and to give the user valuable information

• `input(..)` always returns a string, so may need to convert
# Ask the user for their graduation year and the current year, then compute how many years until graduation.
# Author: Sara Mathieson
# Date: 9/8/17

def main():
    grad_year_str = input("Enter your graduation year: ")
    grad_year = int(grad_year_str)
    curr_year_str = input("Enter the current year: ")
    curr_year = int(curr_year_str)
    years_left = grad_year - curr_year
    print("You have", years_left, "years left until graduation!")

main()

Note: atom tab default is 2 spaces, change to 4
Mathematical operations
Mathematical operations in python

- Addition: 7+2  \[9\]
- Subtraction: 7-2  \[5\]
- Multiplication: 7*2  \[14\]
- Division: 7/2  \[3.5\]
- Integer division: 7//2  \[3\]
- Exponentiation: 7**2  \[49\]
- Mod: 7%2  \[1\]

- Precedence rules: “PEMDAS” (Parenthesis, Exponentiation, Multiplication, Division, Addition, Subtraction)
Math Library in python

Python 3.6.2 (default, Sep 4 2017, 14:43:54)

[ ]

Type "help", "copyright", "credits" or "license" for more information.

>>> import math

>>> math.sqrt(9)
3.0

>>> math.pi
3.141592653589793

>>> math.e
2.718281828459045

>>> math.sin(math.pi/2)
1.0

>>> exit()

Python 3.6.2 (default, Sep 4 2017, 14:43:54)

[ ]

Type "help", "copyright", "credits" or "license" for more information.

>>> from math import *

>>> sqrt(9)
3.0

>>> pi
3.141592653589793

>>> e
2.718281828459045

>>> sin(pi/2)
1.0

>>> exit()
Program to try with a partner

1) Ask the user for the two (short) sides of a right triangle, then compute and print the hypotenuse.

\[ a^2 + b^2 = c^2 \]
String operations
String operations

- Length: \( \text{len(“swarthmore”)} \) = 10
- Empty string: ""
- Concatenation: "a" + "b" = "ab"
- Repetition: "a"*5 = "aaaaa"
Program to try with a partner

1) Print stars before and after the name.

```
What is your name? Sara Mathieson
***************
Sara Mathieson
***************
```

2) Print stars on the sides too.

```
What is your name? Sara Mathieson
***************
* Sara Mathieson *
***************
```

3) Use a different symbol(s).

```
What is your name? Sara Mathieson
------------------------
| Sara Mathieson |
------------------------
```
Keyboard shortcuts so far

- **up** and **down** arrows for cycling through previous commands
- **Alt-tab** for switching between terminal and atom
- **tab** to autocomplete a file name or command

- **ATOM**
- **Ctrl-s** for save
- **Ctrl-n** for new file
- **Ctrl-z** undo
- **Ctrl-w** close window

https://www.cs.swarthmore.edu/courses/CS21Labs/f17/docs/using-atom.html