

# CS21: INTRODUCTION TO COMPUTER SCIENCE

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Prof. Mathieson

Fall 2017

Swarthmore College

Sit somewhere new!

# 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

# graduate.py (example solution)

```
# 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

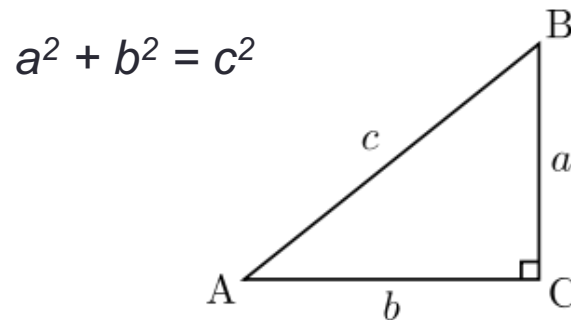
```
Python 3.6.2 (default, Sep  4 2017, 14:43:54)
[GCC 4.2.1 Compatible Apple LLVM 8.1.0 (clang-802.0.42)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>>
>>>
>>>
>>> import math
>>>
>>> math.sqrt(9)
3.0
>>> math.pi
3.141592653589793
>>> math.e
2.718281828459045
>>> math.sin(math.pi/2)
1.0
>>>
>>> exit()
```

```
Python 3.6.2 (default, Sep  4 2017, 14:43:54)
[GCC 4.2.1 Compatible Apple LLVM 8.1.0 (clang-802.0.42)] on darwin
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.



# String operations

# String operations

- Length: `len("swarthmore")` **10**
- Empty string: `""` length?
- 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>