Introduction to Programming





Outline

- What you will get out of this class?
- What is a program?
- What is a programming language?
- What is Python?
- A tour of Python and IDLE.
- Class resources
- Workshop

What you will get out of this class

- Throughout the class we will be building pong using the concepts we learn each class
- Each class we will release source for a new step in pong
- Each class homework will be assigned to help you cement your knowledge of the concepts covered
- Demo time

What is a program?

- A program is a series of instructions to be executed
- Source code is text the machine can translate into instructions
- Source gets translated into machine readable code which the machine then executes

What is a programming language?

- Artificial language designed to express computations that can be performed by a machine
- Can be compiled or interpreted
- Compiled languages are translated to machine code before being run
- Interpreted languages are translated into machine code while the program runs

What is Python?

- An cross-platform interpreted programming language
- Created by Guido van Rossum
- Especially good for scripting and prototyping
- Makes a great first language

A Tour of Python And IDLE

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A Tour of Python And IDLE (cont.)

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Hello World

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   makes to its subprocess using this computer's internal loopback
   interface. This connection is not visible on any external
   interface and no data is sent to or received from the Internet.
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IDLE 2.6.1
>>> x = "hello world"
>>> print(x)
hello world
>>>
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Dissecting Hello World

- x is a variable
- "Hello World" is a string
- x = "Hello World" stores the string in x
- print is a function
- print takes a string as an argument
- print(x) replaces x with "Hello World" and prints it

Primary Data Types

- Words and Letters
 - Strings "Hello World", "C", 'c', 'This is great!'
- Numbers
 - Integers 12, 23
 - Floating point 2.7, 3.14159
 - Complex 2j
- Booleans True, False

Strings

- Single double or triple quotes work
- String can be indexed "abc"[0] is "a"
- Strings can be added together "abc" + "def" is "abcdef"
- Strings can be multiplied "h4cdc" * 3 is HacDC's wireless password!
- Strings have length len("abc") is 3

Numbers

- The regular arithmetic functions all work '+', '-', '*', '/', '%', '**'
- 1 + 1 is 2
- (1 * 3) ** 2 / 2 is 4 (what?)
- An integer divided by an integer is an integer -7/2 is 3
- An integer divided by a float is a float 7/2.0 is 3.5
- A float divided by an integer is a float -7.0/2 is 3.5
- A float divided by a float is a float -7.0/2.0 is 3.5

Booleans

- Either True or False
- Are good for testing things
- True == True is True
- True == False is False

Logical Expressions

- Evaluate to a boolean
- Logical operators are 'and', 'or', 'not', 'is', 'in', '==', '!=', '<=', '>=', '<', '>'
- True == not False is True
- True is False is False
- 3 >= 4 is False
- "a" in "abc" is True

Class Resources

- Wiki
 - Slides, sample code, useful links http://wiki.hacdc.org/index.php/Intro_to_Programming
- Mailing list
 - Ask questions, share code, help each other http://hacdc.org/cgi-bin/mailman/listinfo/prog101

Workshop Time!

- Download wrapper_turtle.py
- There are 7 functions: forward, backward, left, right, penup, pendown, done.
- from wrapper_turtle.py import *
- help(function_name) to see a description of what it does