## Class 1: Introduction to Python

#### **Python in interactive mode**

You can use Python directly on the command line. Open IDLE and you’ll get a Python shell. It should look like this:

>>>

#### **Integers**

*Use Python* as a calculator (search "Python operators"):

>>> 1 + 1

2

>>> 6 / 3

2

>>> 2 \*\* 3

8

>>> (3 + 5) / (1 + 3)

2

*Exercises:*

1. Calculate 39482 \* 243 using the Python shell.
2. What happens when you divide 5/2? What about 5.0/2.0?

**Strings**

Use Python to output text:

>>> print("Hello World")

Hello World

>>> print("Hello " + "World")

Hello World

*Exercises:*

1. Have the computer greet you personally using the Python shell.
2. Have the computer insult you (or someone else) using the Python shell.

Use Python to manipulate text (search "Python string methods"):

>>> "hello world".capitalize()

"Hello World"

>>> "Hello World" \* 5

"Hello WorldHello WorldHello WorldHello WorldHello World"

>>> len("Hello World")

11

*Exercises:*

1. Palindromes! Start with the strings "de" and “ed”, and print out "deed deed deed deed deed"
2. Try these methods: .islower() and .swapcase().
3. Go to docs.python.org and find out what the isupper method does
4. What happens if you put # in front of the line?
5. Try pressing alt+p (the alt key and the p key at the same time.)
6. What happens if you try print("forgot the close the string) and press enter?. How do you continue?

Square brackets and how to use them:

>>> "Hello World"[0]

"H"

>>> "Hello World"[-1]

"d"

>>> "Hello World"[1:7]

"ello W"

>>> "Hello World"[1:9999999]

"ello World"

>>> "Hello World"[1:]

"ello World"

>>> "Hello World"[1:-1]

"ello Worl"

>>> "Hello World"[0:-1:2]

*Exercises:*

1. Return only the 3rd character in a string. (Remember that computer science is zero indexed)
2. What does "string"[0:0] return?
3. What about "string"[0:], “string”[::-1] or "string"[:]?
4. Try “string”[0:-1:2]
5. How would you get every third letter in a string?

**Variables**

*Use Python* to print store variables:

>>> name = "Chewbacca"

>>> print(name)

Chewbacca

>>> print(name.swapcase())

cHEWBACCA

>>> print(name)

Chewbacca

# Notice that the variable was unchanged by the previous

# command. What would you have to do to make the value of the

# variable change to the swapcase() value?

>>> letters = len(name)

>>> print(letters)

9

*Exercises:*

1. Assign your own name to the variable "name"
2. Have the computer greet you personally using the variable "name"
3. The oldest living person, Jiroemon Kimura, is 115 years old. Assign his age to a variable and the current year to another variable. Use them to calculate when he was born.
4. Call the .swapcase() method on "name"

**Input**

Get the program to ask for your name, and then say hello:

>>> name = raw\_input("What is your name?\n")

What is your name?

**\*type in your name\***

>>> print("Hi **"** + name)

"Hi **Your name"**

You might want to save your programs, so we’ll move to a text editor. In IDLE select “new window” from the File menu.

#### **Saving Programs**

Save the following program as hello.py in IDLE or your text editor of choice.

Move the code from before as a file:

name = raw\_input("What is your name?\n")

print("Nice to meet you " + name)

In IDLE, save the program and then select "run module" from the Run menu.

*Example 1:*

# Sing Old McDonald

print("Old McDonald had a farm")

print("Ee i ee i oh")

print("And on his farm he had some chickens")

print("Ee i ee i oh")

print("With a cluck cluck here")

print("And a cluck cluck there")

print("Old McDonald had a farm")

print("Ee i ee i oh")

Let’s use variables:

# Sing Old McDonald

animals = "cows"

noise = "moo moo"

print("Old McDonald had a farm")

print("Ee i ee i oh")

print("And on his farm he had some " + animals)

print("Ee i ee i oh")

print("With a " + noise + " here")

print("And a " + noise + " there")

print("Old McDonald had a farm")

print("Ee i ee i oh")

*Exercises:*

1. Get this program to ask for a person’s favorite animal (in the plural), and the noise the animal makes, and then sing them Old McDonald.
2. Rename the animals variable in your program to fauna. What error do you get if you forget to change all the occurrences of the variable?
3. What are alternate ways to write this program. Could you use the escaped new line (\n)? Could you store other repeated parts as variables?

#### **Lists**

In addition to having data types that store one piece of information. Python has data types which store a multiple items.

>>> list = [ 3, 4, 5 ]

Remember from strings last week:

>>> s = "some string"

>>>s[0]

“s”

Similarly you can get an element of an list, or find the length of the list:

>>> letters = ["a", "b", "c"]

>>> letters[0]

"a"

>>> len(letters)

3

You can do other things to lists as well:

Add an element

>>> letters.append("z")

>>> print(letters)

["a", "b", "c", "z"]

Remove an element

>>> letters.remove("z")

>>> print(letters)

["a", "b", "c"]

Test to see if an element is in the lis

>>> "a" in letters

True

>> "w" in letters

False

You can use lists to store anything you’d like:

string\_list = [ "tomatoes", "cheese", "milk" ]

boolean\_list = [ True, True, False]

mixed\_list = [ 5, "words", False]

nested\_list = [5, ["words", False]]

*Exercises*

1. Try creating a list of lists. What is the length of this list? What happens if you try to print it?
2. How would you find the length of first list in your list?

## HOMEWORK Exercises:

1. Try out some of the exercises on some of the online many online python resources: codingbat, udacity, codecademy are some great places to look
2. Ask for someone’s favorite food. Use the [] operator sing them a version of the C is for cookie song. (as a bonus use the \* operator or variables to shorten your code for the repetitive portions of the song)
3. Use the [:] technique for finding bits of a string to write a program that sings "The Name Game" song ([http://en.wikipedia.org/wiki/The\_Name\_Game](http://en.wikipedia.org/wiki/The_Name_Game))) You can assume for now that the name given is one word and begins with a consonant.

## Cliff Notes version:

* Python has many data types. We learned about numbers (like 7, -1, and 30298092.34) and strings (like "apple", "ball", and "super dee duper")
* You can use normal arithmetic operators on numbers (like +, -, /, and \*)
* There are many methods on strings. You can look for the ones you want in the docs at docs.python.org, or use Google.
* In order to find a sub-string or part of a string you can use the [] or [:] syntax. ("foo"[0] is ‘f’, "food"[-1] is ‘d’, and "foodmonster"[4:9878] is "monster")
* You can use variables to store and reuse data.
* You can save programs in files so that it is easy to re-run the same code.
* Lists can be used to store multiple items.