To start the python interpreter: Select “Python 3.4” from the Windows program menu and select “IDLE (Python GUI)”.

The prompt “>>>” is called the primary prompt. You can type python expressions at this prompt.

Note that the “#” symbol is the python comment symbol. You don’t need to enter the comments into the interpreter. The comments are just meant to help you.

Try the following commands in the python interpreter (Don’t type the >>>)

*>>> print (“Hello World”)*

This simply tells the python interpreter to print the characters “Hello World” (without the quotation marks).

A collection of characters enclosed in a set of quotation marks is called a ***string*.** So the previous command told python to print the string **Hello World**.

Python can also perform calculations. For example, type of the following:

*>>> print (4+5)*

This command tells python to perform the calculation 4+8 and the print it.

Python can also do subtraction. Type the following:

*>>> print (80-18)*

The symbols for multiplication and division are \* and /, respectively.

Try the following examples:

*>>> print (18\*2)*

*>>> print (25/5)*

% is called the modulo operation: It finds the remainder after division of one number by another number

*>>> 45%5*

Produces 0

You can use more than one arithmetic operator and mix arithmetic operators.

*>>> print (3+4+5)*

*>>> print (8-2\*3)*

Notice that 8-2\*3 produces the answer of 2. This is because python performs mathematical operations according to the order of operations. According to the operations multiplication must be done before subtraction.

According to the order of operations, mathematical operations are done in the following ordering:

1. Parenthesis
2. Exponentiation
3. Multiplication, division, Modulo operator (remainder)
4. Addition, Subtraction

You can change the order of evaluation by placing mathematical expressions in parenthesis. For example:

*>>> print (8-2)\*3*

This statement forces the expression 8-2 to be evaluated first and then the multiplication is performed.

Exponentiation is accomplished using the \*\* operator. For example to calculate we can calculate 5\*5\*5 using either of the following methods

*>>> print (5\*5\*5)*

*>>> print (5\*\*3)*  # 5 to the 3rd power

Make sure you fully understand how Python calculates the answers to the following examples:

*>>> print (3\*4-3)*

*>>> print ((3\*4)-3)*

*>>> print (10/(6-2))*

*>>> print (8+5-3)*

*>>> print ((8+5)-3)*

*>>> print (8+(5-3))*

*>>> print ((8\*2)-(3+3))*

*>>> print ( (4+2)\*\*(4-2))*

Type in the following (notice the quotation marks):

*>>> print (“17+3”)*

You might think that Python would print 10. However, once you put the arithmetic expression in quotation marks it becomes a string and Python does not evaluate strings. Therefore Python simply prints “7+3” (without the quotes).

You can tell Python to print both strings and arithmetic expression on the same line but you must separate them with a comma. For example:

*>>> print("17+6=",17+6)*

*>>> print (17\*2\*3, " answer for 17x3x2")*

## Variables in Python

A variable is just a name assigned to a particular value or string.

For example if we want to store the current year in a variable name **year** then we type the following:

*>>> year=2016*

This tells Python to associate the value 2004 with the name **year**.

We can use the variable **year** just as if it were any other value.

Try the following examples.

*>>> print (year)* # notice that we DO NOT put year in quotes

*>>> print (“year”)* # notice that we put year in quotes

*>>> print (year+4)*

*>>> print ("I am a Freshman this year” , year)*

*>>> print ("I will be graduating in", year+4)*

You can overwrite variables with new values:

*>>> year=2015* # the variable **year** now refers to 2015

*>>> year=2016* # the variable year now refers to 2016

You can assign expressions to variables. Python evaluates the expressions and the resulting value is assigned to the variable.

Try the following examples:

*>>> a=1+3* # the variable **a** now refers to the value 4

*>>> b=5+8* # the variable **b** now refers to the value 13

*>>> c=a+b* # the variable **c** now refers to the value 17

*>>> c=c+1* # the variable **c** now refers to the value 18

The last example (**c=c+1**) requires some explanation. The variable **c** is assigned a value of one more than the old value of the variable **c**. Remember that Python first evaluates the right hand side of the equal sign and then assigns the value to the variable. Therefore, the old value of **c** was 17 and we want Python to add one to it. The new value of **c** is (17+1) which is equal to 18.

Python will remember variable values only while Python is running on your computer. Once you quit the Python interpreter, Python no longer remembers variable values.

To get around this problem we can save the instructions in a file. To quit Python, select “Exit” from Python’s “File” pull-down menu.

### Lab Assignment Questions

***Questions 1 - 10 needs to be worked on Python prompt.***

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1) What is output from the following Python statement?

**print (15\*2)**

**30**

2) What is the output from the following Python statement?

**print (“15\*2”)**

15\*2

3) Why does the Python interpreter produce different answers for questions 2 and 3?

Because question two was written with quotations so to the computer it is read as a string while question one asked for an answer.

4) What is the output from the following Python statement?

**print (17-3\*3)**

8

5) Why is the output for question 4 different from the output of the following Python statement?

**print ((17-3)\*3)**

Because there are parenthesis and python recognizes the PEMDAS operations

6) What is a variable?

A name assigned to a certain value or string

For Questions 7-10 assume the following variable definitions:

**B=20**

**C=30**

**D=40**

7) What is the output of the following Python statement?

**print (B+C-D)**

**10**

8) Write the Python print statement to divide variable D by variable B.

Print (D/B)

9) What is the final value assigned to variable C after the following Python statements are executed?

B=2

**B=B+10**

**C=5**

**D=B+15**

**C=B+D**

10) Write the Python print statement to multiply variable C by variable B and add square of variable A=5.

Print ((C\*B)+(A\*A))

***The following programs needs to be written in a file and executed.***

1. Write a program that evaluate and prints the following expression into Python code: 1.4/1.2+4.6×2.01.5−2.3
2. Write a program that computes and prints the square and cube of 10.
3. Write a program to find the hypotenuse (using Pythagoras theorem) and compute the area and perimeter of a right angle triangle where the smaller sides of the triangle are 3 and 4.

4. Write a program that computes and print the perimeter and area of a square when the user inputs it one side.