CS-521 Homework Assignment 1

**Instructions­­**

* Please read the Assignment Directions below.

**Assignment Directions**

Answer the following questions in this document (drawn from pages 78 – 79 in the text)

1. What is a program?

A program is a document that describes the thought process of its writer. It consists of a set of instructions that are executed sequentially, one after the other in the order in which they were typed.

1. Python is an interpreted language. What does “interpreted” mean in this context?

By interpreted we mean that there is a program within Python called the interpreter that takes each line of Python code, one line at a time, and executes that code. This feature allows us to try out lines of code one at a time by typing into the Python shell. The ability to experiment with pieces of code in Python shell helps us to easily try something out and see what happens.

1. What is a Python *comment?* How do you indicate a comment? What purpose do they serve?

Comment is used to explain the higher level of abstraction than the code, to tell what we are trying to do with this code. We add comments to explain the methodology. We indicate a comment by using a pound character(#), followed by our comments. Anything following a pound character is ignored on that line. Comments are one important way to improve readability. It helps others to understand the code we write easier.

1. What is a *namespace* in Python?

A namespace is a collection of currently defined symbolic names along with information about the object that each name references. Python has global namespace variable and local namespace variable.

1. Whitespace:
   1. What is whitespace in Python?   
      Python counts as whitespace the following characters: space, tab, return, linefeed, formfeed and vertical tab.
   2. When does whitespace matter?   
      When whitespace is a leading whitespace, which means the whitespace at the beginning of a line, defines indentation. Indentation in Python has very important meanings for real: to determine the grouping of statements.
   3. When does whitespace not matter?   
      When whitespace is within both expressions and statements, or it is a blank line, it will be ignored.
2. Explain the difference between a statement and an expression. Give an example of both and explain what is meant by a statement having a *side effect.*

**Statement**:   
(1) Definition: A statement performs some task but does not return a value.  
(2) Example: my\_int = 5  
(3) Side effect: A side effect is some change that results from executing the statement. From the example above, the statement assigned the value of 5 to the variable my\_int, after we type the assignment statement, if we type the variable my\_int, it does indeed now have the value of 5.

**Expression**:   
(1) Definition: a combination of values and operations that creates a new value that we call a return value, that is, the value returned by the operations.   
(2) Example: my\_int + 5

1. Mixed operations:
   1. What type results when you divide an integer by a float? A float by an integer?  
      We will both get the type float as our results by dividing an integer by a float and dividing a float by an integer.
   2. Explain why that resulting type makes sense (as opposed to some other type).  
      Because no information is lost when converting an integer to a float, but conversion of a float to an integer would lose the fractional information in the float. Therefore, when presented with mixed types, Python will promote an integer to be a floating point so that both operands are floats and the operation can be performed as floats.
2. Consider integer values of a, b, and c, and the expression (a + b) \* c. In mathematics, we can substitute square brackets, [], or curly braces, {}, for parentheses, (). Is that same substitution valid in Python? Try it.  
   No, below are the results for each situation:  
   **(a + b) \* c** : Python considers braces () as a tuple, Python will times the value of c with the result of adding the value of a with the value of b.   
   For example, if a = 1, b = 2, c = 3  
   (a + b) \* c = (1 + 2) \* 3 = 9  
     
   **[a + b] \* c:** Python considers the square brackets [] as a list. In this expression, Python will form a list with the result of the addition of the value of a and the value of b, and put this result c times in the list.   
   For example, if a = 1, b = 2, c = 3  
   [a + b] \* c = [(1 + 2) , (1 + 2), (1 + 2)] = [3, 3, 3]

**{a + b} \* c**: Python considers curly braces as dictionary or set. This expression will cause error since \* is an unsupported operand for set in Python. However, {a + b} will adds the value of a with the value of b and put the result in a set.  
For example, if a = 1, b = 2  
{a + b} = {3}

1. Assignment:

my\_int = 5  
my\_int = my\_int + 3  
print(my\_int)

* 1. If you execute the three lines of code above, what will be printed?   
     Explain your answer using the rules of assignment.  
     8 will be printed.  
     In the first line, the variable my\_int is assigned with the value of 5;   
     In the secone line, my\_int is assigned with the value of 5 + 3, which is 8;  
     In the third line, the result of the value of my\_int 8 will be printed.
  2. Rewrite the line my\_int = my\_int + 3 using the += symbol  
     my\_int += 3

1. Assignment:  
     
    my\_var1 = 7.0  
    my\_var2 = 5  
    print(my\_var1 % my\_var2)  
     
   If you execute these three lines of code, what will be printed?  
   Since 7.0 % 5 will have the remainder of 2.0, 2.0 will be printed.

**Where to submit?**

Click Assignments in the Navigation Area and then click on the title of the assignment to enter the submission area and upload your response.