CS-521 Homework Assignment 1

Answer the following 10 questions (and subparts) using information you find in the reading, lecture, and study guide for this week. You can use the textbook’s exact text for your answers, but be sure to mark these with some indicator such as [text] to indicate you are quoting the textbook. Your answers should be short, clear, and reasonably complete.

## Question 1

Python is an **interpreted** language.

1. What does “interpreted” mean in this context?  
   Python has an interpreter that executes each line one at a time.
2. What are some advantages and disadvantages of using an interpreted language vs. a compiled language?  
   One advantage is that you can test things out and see what each line of code does. This makes it very easy for beginners to test things out. One disadvantage is that the execution is typically slower. This is because each line has to be executed individually instead of as a group.

## Question 2

For storing data, Python uses specific data types for each variable.

1. What does being a dynamically-typed language mean?

It means that the type of a certain variable is set when the program runs not when it compiles. This means that the variables can be different types throughout the program.

1. What is the difference between a *primitive* and a *collection* data type?

A primitive data type is one the most basic types of data and can only be one. A collection data type is a group of primitive data (they can be the same or different types).

1. What are the *primitive* and *collection* data types in Python?

Primitive: int, string, Boolean, float, complex

Collection: string, list, tuple, set, dictionary, range

## Question 3

When we import libraries and modules from other places into a Python program, we use the **import** keyword. Imagine we have a library called foo that has a module called spam we want to use.

What is the difference between import foo and from foo import spam?

Import foo will import the entire library of foo. From foo import spam will just import the module spam.

## Question 4

Regarding **whitespace** in Python:

1. What is whitespace? Include examples.  
   White space is any empty or blank space in a program. Some examples include horizontal and vertical tabs, spaces, new lines, etc.
2. When does whitespace matter?  
   Whitespace only matters at the start of the start of a line.
3. When does whitespace not matter?  
   Whitespace does not matter within expressions and statements. Blank lines are ignored as well.

## Question 5

Regarding Python **statements** and **expressions**:

1. What is the difference between a statement and an expression?  
   A statement returns a value but a statement does not.
2. What is an example of a statement and an example of an expression?  
   Statement: y = 5

Expression: x + 5

1. What is meant by a statement having a **side effect**?   
   Something may change (such as a variable) as an effect of the statement running

## Question 6

Thinking about mixed operations in Python:

1. What data type results when you divide an integer by a float?  
   Float
2. What data type results when you divide a float by an integer?  
   Float
3. Why do the resulting data type(s) answered above make sense, as opposed to other data types?   
   This makes sense because no matter where you put a float in a division problem you will always get a float. This is because Python treats all division as not dividing evenly.

## Question 7

Consider this Python program:

*if* x *>* 30:

print("Big!")

*else*:

print("Small!")

If we run this code and the value of x is 20, what will be printed? What will be printed if x is 40?

x = 20: Small!

x = 40: Big!

## Question 8

If I’m writing a Python program, can I create variables named if or else? If not, why not?

No, you may not use those words as variable names. This is because they are key words used in loops and could be confusing if used as a variable name so Python does not allow it.

## Question 9

Consider the following 3-line Python program:

my\_var1 = 13.0  
my\_var2 = 4  
print(my\_var1 % \

my\_var2)

Open your copy of Spyder IDE (or the IDE you’re using) and copy the above program into it.

1. If you run this program, what output is generated?  
   1.0
2. What data type is the output? Why?  
   Float because myvar1 is a float and a float divided by anything is a float.
3. What does the \ character at the end of line 3 do?  
   This character allows us to create a new line but still stay in that same statement. This allows us to take really long statements and put them on multiple lines.

## Question 10

Open your copy of Spyder IDE (or the IDE you’re using). In the IDE, create a new Python script and copy the following lines of code, substituting your name where indicated in the comment. *NB: If you are using Spyder, you may have some default comment lines at the top of the file.* ***You do not need to delete these*** *— it’s fine to leave them in place!*

# CS521 Assignment 1 - <Your Name Here>

my\_int = 4 + 3 \* 3

my\_int = my\_int + 5

print(my\_int)

Once you have copied the code, run the script, and then answer the questions below.

1. What output does the script generate?  
   18
2. What data type is the variable my\_int? When is this data type assigned to it?  
   my\_int is an integer. This is assigned when my\_int is created as the number of 4 + 3 \* 3.
3. Rewrite the **second** line of the code (my\_int = my\_int + 5) using the += operator instead. Once finished, run your script again. **Does the output change? If so, what is the new value?**  
   No the output doesn’t change.

When you have finished, **save this new script** as a file named yourname\_assignment1.py. (Ex.: janedoe\_assignment1.py).

# Submitting your assignment

1. Save the document containing your answers to these questions as a document named yourname\_assignment1\_answers.docx (Ex.: janedoe\_assignment1\_answers.docx)[[1]](#footnote-1).  
   **Note: If you are using an online editor such as Google Docs**, you **must** save your work as a separate file — you may not submit a link to a Google Doc! To do this, click **File**, then **Download** and select **Microsoft Word** format.
2. Create a zip file containing **both** your answers document **and** your Python script from question 10. (The resulting zip file should have two files in it — your answers, and your .py script.) This zip file should be named <your\_email\_prefix>\_hw\_1.zip. (Ex.: jdoe\_hw\_1.zip)
3. In Blackboard, click **Assignments** in the Navigation pane (on the left side) and then click on **Homework Problems 1**. Attach the zip file and click **Submit** to submit your assignment.

1. Your file may have a different extension if you are using a different program to write your answers. [↑](#footnote-ref-1)