Programming I (Python)
Assignment 1

1. Warm up – Using the command line terminal (opened using *ctrl-alt-t*) perform the following:

   (a) Create a directory named after your roll number in the home folder (`mkdir <roll-number>`)

   (b) Go to that directory. (`cd <roll-number>`)

   (c) Within this, create a directory `python`. Within that, create another directory named `assignments`. Within that, create another directory `a1`.

   (d) Go to the directory (`cd python/assignments/a1`)

   (e) Open a new text file named theory.txt in gedit. (`gedit theory.txt`)

   (f) Write something within theory.txt and save it. (using *ctrl-s* within the editor)

   (g) Copy the file theory.txt to another file. (`cp theory.txt theory2.txt`)

   (h) Open a second tab on the command terminal. (`ctrl-shift-t`)

   (i) Open the Python interpreter here. (`python`)

   (**file:** `theory.doc` or `theory.pdf`)

2. Discuss the following:

   (a) Interpretation vs Compilation

   (b) Python vs C (What are to be the positive and negative aspects of these languages according to you)

   (**file:** `theory.doc` or `theory.pdf`)

3. Consider the following piece of Python code:

   1. a = 10
   2. b = 4
   3. c = 3. 4
   4. d = a / 10
   5. e = b * c
   6. a = a * e
   7. s = "IIITB"
   8. t = a + s

At the end of each line of the above code, investigate the type of the variable defined in that line. For each line, what can be said about the typing rules of Python from these observations.

(**file:** `theory.doc` or `theory.pdf`)

4. Write a program which takes two numbers as input representing the two perpendicular sides of a right angled triangle, and prints out the length of the hypotenuse.

(**file:** `Q4.py`)

5. Write a program that receives the month and date of birth as input and prints the corresponding Zodiac sign (Look up the table online). (Should handle the situation where the case (lowercase, uppercase) of the entered birth month does not affect the answer)

(**file:** `Q5.py`)

6. Once upon a time, three friends – Abhiraj, Leon and Vigyan – go for a weekend outing. They decide upfront that they will split the expenses equally. Abhiraj buys the movie tickets online (Rs. 990). Leon pays the bus tickets (Rs. 140) and also purchases the popcorns in the interval (Rs. 150). Vigyan pays for the meal after the movie (Rs. 1100). Write a Python program to work out (and print) the due amount on each friend (note that the due could either be positive or negative).

(**file:** `Q6.py`)

7. Consider a currency system in which there are notes of seven denominations, namely Rs 1, Rs 2, Rs 5, Rs 10, Rs 50 and Rs 200. If an amount Rs N is entered through the keyboard, write a program to compute the smallest number of notes that will combine to give Rs N.

(**file:** `Q7.py`)

8. Build a calculator program that provides the facility to do the following simple arithmetic computations on two numbers:

   1. Add
   2. Multiply
   3. Average.

   Provide a text based menu which provides the above choices as numerical inputs. Once selected, the program accepts the two numbers one by one, and exits after printing out the result based on the chosen operation.

   (**file:** `Q8.py`)