IC 152 Assignment 7
Default arguments in Functions and

All other submission instructions are the same as previous assignments. Submit two files: pdf for algorithms, explanations, proofs, and python files for code.

Through Q4 in the previous assignment you should have now learned the importance of writing algorithms first using pen and paper (i.e. separate logic from coding), and then write the python code.

Following assignment is having some questions where you are asked to first write the algorithms. **There are 2 marks for each algorithm written on pen and paper, so make sure you do not miss taking notebook to lab**.

1. Write the algorithm for following code using pen and paper. Then run the following code:

```
#function definition:-
def doubleInput(x):
    print("id(x) in function: ", id(x))
    return x*2

#main program:-
x = 6
print("id(x) in main, 1st:", id(x))

x = doubleInput(x)

print("id(x) in main, 2nd:", id(x))
```

   Write down your observations and show them along with your group's algorithm to TA during viva.

2. Modify above code to take x as a list of integers and return a list with a square of elements in the original list x. Do you observe any changes in id with respect to the previous question? Write down the changes and show them to TA during viva.

3. Write the algorithm and a python function f(p,b) that takes perpendicular p and base b of a right angled triangle and returns its hypotenuse h.

   a. First write the algorithm. Show your group's algorithm to TA during viva.
   b. Write the python code and run it for different cases.
   c. Modify the above program in question 3 for b = 5 as default value of base, when it is not given by the user?

4. Create a list l = [0, 2, 1, 2, 0, 5, 5, 0, 1, 3, 2, 0, 1, 2, 0] in python. Write a python code (**using sorting** and a loop) to print the frequency table for the values in list l in a nice format as shown in the example below:-

   E.g. If l = [1,2,1,2,1], following should get printed:-

V	F
1	3
2	2

   a. First write the algorithm. Show your group's algorithm to TA during viva.
   b. Then write the python code.

5. Write the algorithm and python code to print the frequency table of following data, use bin size of 10:-

   171, 174, 178, 181, 183, 183, 183, 184, 187, 188, 191,
   196, 196, 199, 200, 200, 200, 202, 204, 204, 205, 206,
   191, 191, 191, 192, 193, 193, 193, 194, 194, 195
   206, 211, 212, 213, 213, 216, 220, 221, 221, 227

   a. First write the algorithm. Show your group's algorithm to TA during viva.
   b. Then write the python code.

6. Update q4 and q5 code to print relative frequencies.