Lab 10: Introduction to python (Operators, statements, loops, file handling, lists, dictionaries, sets)

Total marks: 60 marks (15+9+5+6+25)

Deadline: Saturday before 11:59 pm (sharp)

Submission instructions

1. Submit your file in a .zip or .rar format. Name your file with your Roll number (e.g. BSEF19M009.zip or BSEF19M009.rar)
2. Make a separate folder for each lab task (e.g. task1, task2…). All the .py files must be in respective folder with a screenshot of the output of a program of the respective task.
3. Every .py file must contain your name and roll number(In comments) at the top of each program
4. Don't enclose your code in comments otherwise it will not be evaluated.

Instructions: (MUST READ)

- **No compensation or makeup lab.**
- **Don't discuss with peers. Changing variable names/ changing for to while loop will not help you in hiding cheating attempt!**
- **You are not allowed to ask TA to verify/ prove your cheating case! Any such complaint from TAs will result in serious consequences. Don't expect any positive response from TAs in such regard.**
- **Cheating cases will be given ZERO first time. Second attempt to cheat will result in deduction in sessionals. I'll report the regular cheating attempts to Discipline committee without any prior warning.**
- **You are not allowed to consult Internet. Plagiarism cases will be strictly dealt.**
- **You can ask relevant queries (in case you are stuck somewhere or a very VALID query regarding some error) from TAs only between 9 am – 12pm slot.**
- **You are not allowed to ask TAs about problem statement (e.g. what to write in constructor/how many classes should be made/what to write in header file etc..These are all INVALID queries). Understanding the problem statement is a part of that question. Do whatever you are asked and what you understand.**
- **You must submit the lab solution BEFORE 11:59 pm. Even a few minutes late submissions will not be considered. Make sure to do proper management of time/Internet connectivity/power failure or whatever issue is possible!**

Task 1: Simple I/O, statements, loops — 5x3=15 marks

1.Print the square of all numbers from LOW to HIGH. Take low and high value from user in input.
2. Take a number as an input from the user. Find if the number is even or odd.
3. Write a program that reads in five integers from user and determines and prints the largest and the smallest integers in the group using relational operators.
4. Write a program that reads in two integers and determines and prints if the first is a multiple of the second. (Hint: Use the modulus operator. For multiple, one number must be divisible to the other number.). You might need to use simple if else statement to print if the number is a multiple or not.
5. Print the following pattern. You must use loops. The number of loops must not be not exceed 2!

1	2	3	4	5	6
1	3	5	7	9	11
1	4	7	10	13	16
1	5	9	13	17	21
1	6	11	16	21	26
1	7	13	19	25	31

Task 2: Strings and slicing — 3x3=9 marks

Given the immutability of strings do the following:

1) Create a string by taking input from the user (take at least 10 length input). Use "." as a delimiting character to stop taking input.
2) Take another substring subs as an input. Find and replace the contents of a string from index 4 to 9 (inclusive) with three times the substring subs. You must use slicing and single statement to fulfil that.
3) Change the string such that subs is appended between index 3 and 4. You might need to use slicing here as you cannot update the index of string because of its immutability.

Task 3: Lists and inputs — 5 marks

1) Take four inputs from the user. You must use ONLY a SINLGE line with input function to take comma separated inputs. Use split function and make sure that the program does not crashes if the user unknowingly enters more than four values. The values MUST be stored in a list.
2) Parse the list, extract four values, and then type cast these values to integers.

3) Prepare two fractions F1 and F2 using Fraction module.
4) Perform the following operations and print the results also
    a. Add (F1+F2)
    b. Subtract (F2-F1)

Task 4: Lists and comprehensions **3x2=6 marks**

1) Take space separated 10 values from the user (in a list). Assume that the user will always enter 10 single digit integers.
2) Using a single statement and comprehension, triple each value and concatenate it to the existing list.

Task 5: Dictionaries and file handling **5x5=25 marks**

Write a program that

1) Creates a new text file and fill its contents with the data as:
    a. Write 10 lines. Each line of a file must contain two entries separated by comma (,)
    b. The two entries must be generated randomly. The first entry must be a random number between 0 and 1. The second entry must be a random number lying in a range [10-50]
2) Read the file created in step 1 and prepare a dictionary with all the file contents. Display that dictionary too.
3) Take two inputs from the user; key (k) and value to update (val). Update the dictionary structure by changing the value associated with k to val. Print the updated structure too.
4) Create a new dictionary dictNew using comprehension syntax (you must use comprehension otherwise zero will be granted). The new dictionary must be designed using same principle as used above i.e. they key must be a random number between 0 and 1 and value must be a random number lying in a range [10-50].
5) Iterate and compare the two designed dictionaries such that
    a. If the value of older dictionary is greater than they value of new dictionary; provided that the keys must be same, then, 1) print message (“New Dictionary is smaller”) and 2) create and open a file in binary mode and write the same message in it.
    b. Otherwise, 1) print message (“New Dictionary is greater”) and 2) create and open a file in binary mode and write the same message in it.