Programming Fundamentals LAB – BSDSF21

(Both Morning and Afternoon)

Lab 06 – 18-02-2022

YOU may USE Command Prompt to interpret and execute all the PYTHON programs. Use of any IDE, except ***Mu Editor*** is not allowed for this LAB, despite you are expert. Unless and until you convinced me in personal capacity.

Tasks 1 (10 each)

You are allowed to search knowledge / formulae required to solve the following questions.

1. In a company, one of these values have to be associated with the employee of the company as their **designation**. You have to provide the self explanatory python example code as answer that how can we use them.

   CEO, Director, Manager, Clerk, Salesman, Receptionist, Driver, Peon

2. A street hawker is anxious to use his mobile phone for management of his small business. He only sale the **product**s mentioned below along with their prices. Again, like previous sub task, you have to provide the self explanatory python example code as answer that how can we use them.

   Pastry 80, Cream roll 70, Chicken petty 50, Cake rusk 25, French fries 100

3. **Rational numbers** are pair of integers p and q to represent a ratio as p/q. The q should not be 0 is the condition. You have to provide the self explanatory python example code as answer that how can we use the **rational number**.

4. A **2 X 2 matrix** is nothing but arrangement of four values in two rows and two columns. These four values can be written as a_{11}, a_{12}, a_{21}, and a_{22}. You have to provide the self explanatory python example code as answer that how can we use **2 X 2 matrices**.

Tasks 2 (30 each)

5. Write a python program that defines a type **Vector** to represent a vector in three dimensions. Later, create following functions and also code in main function to demonstrate the usage of **Vector** type.

```
createVector(x, y, z)     # returns a vector with x,y,z as components
reverseVector(v)          # returns a vector with components: -vx -vy -vz
addVectors(v1, v2)        # returns a vector v1+v2
dotProd(v1, v2)           # returns a number v1x·v2x + v1y·v2y + v1z·v2z
crossVector(v1, v2)       # returns a vector as cross product: v1 X v2
magnitute(v)              # returns a number as magnitude of v
```

Tasks 3 (10)

6. Write and test a function that accept letter grades of a student in its 7 parameters. The seven subjects listed below. The function computes and returns the grade point average (GPA) of the student. The formula to compute the GPA is: multiply the points corresponds to each grade with the credit hours of the corresponding subject, then add all the values obtained and divide them with sum of credit hours of the all subject. (Skip the W grade case for the time being)

Sr No	Subject	Credit Hours
1	PF	3
2	PF Lab	1
3	PST	2
4	IICT	2
5	IICT Lab	1
6	ECC	3
7	QT	0.5

Grade	Point
A	5
B	4
C	3
D	2
E	1
F	0
W	--

7. Write functions to compute the sum, average, and count of above average numbers for an array of numbers. Also, write the main function to demonstrate the usage of the functions.

Thanks, for your **patience**