

Programming Fundamentals LAB – BSDSF23

(Both Morning and Afternoon)

Lab 10 – 21-11-2023

Note: YOU may USE Command Prompt or **Mu Editor** 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 of it personally.

Also note, if the computer systems are not equipped with python interpreter, you may use online compiler at the following URL highlighted in yellow. And in case it is also difficult to use for any reason, you need to do the paperwork within the LAB time for all tasks, as discussed in the class sessions. Thanks

<https://www.programiz.com/python-programming/online-compiler/>

Tasks set 1 (15 each)

Recall the user defined type named **vector** as discussed in the class. The code related to the vectors discussed in class is also provided for reference.

1. Create a user defined type named **Matrix22**. **Matrix22** variables associate themselves with 2 by 2 matrices. The components of the vectors are x, y and z, while components of the **Matrix22** are a11, a12, a21, and a22, for a matrix shown at right. In the main function create variables m1, m2, etc for the following matrices. Also, create a function `printMatrix22(m)` to print a matrix **m** as `<?? ??; ?? ??>`. By calling the function created print all the matrices. Note that each **Matrix22** variable has four components named a11, a12, a21, and a22.
2. Create a function that accepts a **Matrix22** as parameter and print its determinant which is value of $a_{11} \cdot a_{22} - a_{12} \cdot a_{21}$. Test the working of the function with a number of appropriate test cases.
3. Create a function that accepts two **Matrix22** as parameters and returns a **Matrix22** which is sum of both parameters. Test the working of the function with a number of appropriate test cases.
4. Demonstrate the working of enumerators through the example of the names of **salah** (namaz) of a day {tahajjud, fajar, ishraaq, chasht, zuhur, asr, magrib, awabeen, isha} by assigning them int values. You must create functions for input and output for **salah** enumerator.

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$$

Tasks set 2 (20 each)

Code for the creation and basic manipulation of two dimensional array code is provided for reference.

5. Create a two dimensional array to store the count of admitted students of six programs and three shifts. The programs are named as AI, CE, CS, DS, IT, and SE and shifts are morning, afternoon, evening, but for arrays they are 0,1,2,...,5 and 0,1, and 2 respectively. Through loops logic, enter data into the array and later just print the array using built in function **print** with array name as its parameter.
6. Compute and print the average count of students of each of the six programs as:

Prg 0: ????.??, Prg 1: ????.??, Prg 2: ????.??,, Prg 5

Thanks, for your patience

If you got time, solve some pending tasks from previous labs