

Object-Oriented Programming (CS1004)

Assignment # 01

Due Date: Friday 23rd February 2024 (3pm)

Department of Computer Science

Q#1: Create two matrices of user defined size dynamically. Perform the following operations on matrices.

- Addition
- Subtraction
- Multiplication
- Transpose

For each operation write a separate function. There should be a separate function for,

- Creation of Matrices
- Input from Matrices
- All the four operations on matrices
- Printing the Matrices (Initially entered matrices + resultant matrix)

At the end, deallocate the dynamically allocated matrices.

Q2: Create a menu-driven program which will have three of the following functionalities,

1. Add new number
2. Delete a number
3. Print the array
4. Print sum of array
5. Exit Program

Initially, create a dynamic array of size 5 and give random values from 0 - 10 (using rand function) in the array.

- The function `add_new_number` should take one number from user and insert it into array **by increasing size of array**. The size of the array should be increased by using a `resize` function which has been briefly explained below,

Create a function called "ResizeArray" to be used whenever a new number is to be added in your array. The user should not be aware that the size of the array is changing. Rather, he/she should simply be allowed to keep adding new numbers until he/she is done, and `ResizeArray` should be called (transparently to the user) whenever a user likes to enter new number. Each call to `ResizeArray` should increase the size of the existing array by one.

Similarly, `delete a number` should take input from user, search it in the array and delete it from it (Remember, by deletion, it means that you must decrease the size of array by one as well). If the number does not exist in the array, simply display an error message.

Q3: Design a C++ program that define a 2-Dimensional array with different number of values in each row. You need to fulfil all the requirement as given below,

- a. You must use double pointer to define and access the elements of array
- b. The system asks how many rows **n** the user want to define
- c. The system asks how many elements should have for each row [store those numbers in 1D array (DMA)]

- d. Define that rows with required amount of values in each row (already stored in 1D array name cols)
- e. Input values for each row one by one in 2D array
- f. Print all the values row wise from 2D array
- g. Delete the 2D array
- h. Delete the pointer array

For example, if user enter n=3 then you should have 3 rows in total, then enter cols = [5, 3 and 4].

The structure of your array should be like

*ptr[0]	→	4	87	32	87	32
*ptr[1]	→	54	87	233		
*ptr[2]	→	43	91	61	98	

Guidelines

- A single violation of guideline will lead to Zero mark in your assignment.
- You will have maximum marks if you have done the entire task.
- Deadlines should be kept in mind no extension in assignment dates.
- This is an individual assignment. PLAGARISM IS NOT ACCEPTABLE!
- Follow the instructions as it is, otherwise your assignment would not be accepted at all.
- Assignment should be submitted in a zip file named as 23P-9307_M_saif.
- The zip file should contain all .cpp files.