**Lab 12**

**Pointers and Dynamic Memory Management in C**

Marks:5

**Question 01:**

Write a program that creates an array of the size mentioned by user and ask user to fill in its elements. Ask user how many more elements he/she wants to enter in the array. Then insert as many elements as user mentions and then sort the newly created array and display it. You have to perform all this through dynamic memory allocation.

**Question 02:**

Create a function which dynamically allocates matrix with ‘r’ rows and copies array ‘A’ into newly created matrix. If the size of array is equal to the size of matrix, its fine. Otherwise, if either of them is smaller than the other, then fill the remaining spaces with zero and display both the array and matrix at the end.

**Question 03:**

Write a program that dynamically allocates 2 matrices A and B of order (nxn).matrix A will be inputted by the user. Matrix B will be form as:

* First element of matrix B is the sum of first and last element of matrix A
* Second element of matrix B is the sum of second and second last element of matrix A and so on.

|  |  |  |  |
| --- | --- | --- | --- |
| A | 1 | 2 | 3 |
| 7 | 8 | 9 |
| 4 | 5 | 6 |

|  |  |  |  |
| --- | --- | --- | --- |
| B | 7 | 7 | 7 |
| 16 | 16 | 16 |
| 7 | 7 | 7 |

**Question 04:**

a- Get two matrices of dynamic size from the user and display their sum.  
b- Get two matrices of dynamic size from the user and display their product. (Note: Proper message should be shown to user if product of given two matrices is not possible)

**Question 05:**

Write a program that takes data of N students (student IDs and marks of 5 subject) and output a table of n rows and 3 columns the first column should display student Id, second and third column should display the average marks and percentage of each student respectively. All work should be done using dynamic memory allocation.