

Introduction to Programming and Data Structures  
Ph.D. Coursework: First year, First Semester (Session: 2024-25)  
**Warm-up problem set**

Maximum Marks: 100

Submission Deadline: **2024-Aug-26**

**Problem number #AP0101:**

**Matrix Multiplication:** Given two matrices stored in two separate files `matrix_a.txt` and `matrix_b.txt`, Write a C program to

- Multiply two matrices and Display the result in the terminal
- Compute the Transpose of that result matrix and Display the result in the terminal
- Finally, store the transposed matrix in a file `matrix_c.txt`,

Use functions, and do all possible operations outside from the main program.

[40]

**Problem number #AP0102:**

Write a program in C that:

- Given  $n$ , allocates memory for a one-dimensional `float` array of length  $n$ .
- Given two numbers  $a$  and  $b$ , together with the previously allocated memory, generates random `float` numbers between  $a$  and  $b$ .
- Sorts the array using any sorting algorithm you know.
- Displays the values of the elements in the array before and after sorting.
- Frees the array when required.
- In the beginning, ask user to give the values of  $n$ ,  $a$  and  $b$

[60]

Note: Weightage will be decided later.