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Department of Computer Science
Level: 2nd Year LMD Computer Science
Course: Algorithms and Data Structures
Lab Work No. 1
(Two-Dimensional Arrays & Functions)

Exercise 01:

Write the algorithm that swaps the lower triangle with the upper triangle in a two-dimensional array. This produces the array obtained by performing a symmetry with respect to the main diagonal.

Example:

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix} \Rightarrow \begin{bmatrix} 1 & 5 & 9 & 13 \\ 2 & 6 & 10 & 14 \\ 3 & 7 & 11 & 15 \\ 4 & 8 & 12 & 16 \end{bmatrix}$$

Exercise 02:

Write a program with the following functions:

- `int add(int a, int b)` Returns the sum of two integers.
- `int max(int a, int b)` Returns the larger of two integers.
- `float average(int arr[], int n)` Returns the average of an array.

Main Program:

- Read `n` then `n` integers from the user.
- Use `max()` to find the largest number.
- Use `average()` to find the mean.