



CSE122 Computer Programming

Sheet 8: 2D Arrays

- 1- Write a program that reads 10 student names into array of strings then prints them again as follows: -

```
Ahmed Said  
Mark Munir  
Mahi Hani  
..
```

- 2- Write a program that sorts a list of names.
- 3- Write a program that adds and subtracts two 3x3 matrices, A and B, and stores the results in C. You should implement the following functions:

```
void addm(float A[][3], float B[][3] , float C[][3]);  
void subm(float A[][3], float B[][3] , float C[][3]);
```

- 4- Write a function to print a matrix of size $N \times M$, where N and M are constant values.
- 5- Write a complete program that does the following tasks:
- Multiplying two matrices and put the result in a third one.
 - Transposing a matrix.
- 6- Write a program that computes the sum of diagonal elements of a

square matrix.

7- Let A be an $N \times N$ square matrix array. Write algorithms for the following:

- Find the number of non-zero elements in A.
- Find the product of the diagonal elements ($a_{11}, a_{22}, a_{33}, \dots, a_{nn}$).

8- Define a 100×100 2D array and fill it with random values between 1 and 1000, then search and count the number of values that satisfy following condition:

All 8 neighbors' values are less than the center value

$$\begin{bmatrix} \dots & \dots & \dots & \dots & \dots \\ \dots & 1 & 3 & 6 & \dots \\ \dots & 3 & 7 & 5 & \dots \\ \dots & 3 & 3 & 4 & \dots \\ \dots & \dots & \dots & \dots & \dots \end{bmatrix}$$

Accepted

$$\begin{bmatrix} \dots & \dots & \dots & \dots & \dots \\ \dots & 2 & 9 & 9 & \dots \\ \dots & 5 & 3 & 8 & \dots \\ \dots & 6 & 4 & 7 & \dots \\ \dots & \dots & \dots & \dots & \dots \end{bmatrix}$$

Rejected

Hint: rand() function returns a random number from 0 to RAND_MAX.
