

# CS143-Introduction to Problem Solving and Programming

## 2D Arrays

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1. Trace the following program for the input list (5 9 3 2 17 6 1 9 10):

```
#include<stdio.h>
void main()
{
    int n, i, j, t, x[3][3];

    for (i = 0; i < 3; i++)
        for (j = 0; j < 3; j++)
            scanf("%d", &x[i][j]);

    for (i = 0; i < 3; i++)
        for (j = 0; j < 3; j++)
            if (x[i][j] < 5)
                x[i][j] = 2*x[i][j]-1;
            else x[i][j] = (x[i][j]/2)+2;

    for (i = 0; i < 3; i++)
    {
        for (j = 0; j < 3; j++)
            printf("%d", x[i][j]);

        printf("\n");
    }
}
```

2. Write a program to do the following:
- Define a two-dimensional array of type integer with 3 rows and 4 columns.
  - Read the values of the array from the user.
  - Calculate and print out the sum of each row, each column, and the total sum of all elements.
3. Write a program that calculates the summation of two arrays of size  $m \times n$  each.
4. Write a program that multiplies an  $m \times n$  array with an  $n \times k$  array.

5. Write a program to read the scores of 3 tests for N students. For each student, calculate and print the average score of the 3 tests and assign a letter grade based on that average, then find the number of students that acquire each grade. (Use arrays and functions in your solution).

<b>Numeric Grade</b>	<b>Letter Grade</b>
90-100	A
80-89	B
70-79	C
60-69	D
0-50	F