

## Lab Tasks 7 Exercise

1. Write a program that reads a 5x5 array of integer and then prints the row sum and column sum of that array.

Input Array:

```
Enter row 1: 8 3 9 0 10
Enter row 2: 3 5 17 1 1
Enter row 3: 2 8 6 23 1
Enter row 4: 15 7 3 2 9
Enter row 5: 6 14 2 6 0
```

Output:

```
Row total:      30 27 40 36 28
Column total:   34 37 37 32 21
```

2. Take Two numbers from user and divide both numbers but do not use the division operator.
3. Given an array of integers of size N and an integer “d”, the task is to rotate the array elements to the **left** by d positions. Note: Solve the question without declaring another array. (The input array itself must be modified).

Input: {1, 2, 3, 4, 5, 6, 7}, d = 2

Output: {3, 4, 5, 6, 7, 1, 2}

4. Take a number from user and count the sum of their digits.

Input: 206

Output: 8

Input: 4569

Output: 24

5. Take a 2D array(Matrix) as input from user and check that array is symmetric or not. If array is symmetric then print “**Array is Symmetric**” with array if not, then print “**array is not symmetric**” with given array.

Note: A symmetric matrix is a matrix that is equal to its transpose. Where elements in first row are equal to elements in first column and so on.

Formal Definition:  $A_{ij} = A_{ji}$ .

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

6. Print the following pattern on C console:



**Note: Perform the above task using loops**

7. Take an array with N elements as input, and then output the frequency of each element present in the array. Example:

**Input:** {2, 4, 2, 3, 5, 5, 4, 4}

**Output:**

Frequency of 2 = 2

Frequency of 4 = 3

Frequency of 3 = 1

Frequency of 5 = 2

8. Take 2 2x2 matrices as input in a 2D array. Then, multiply the 2 matrices and print the final output matrix. Use the following image as a guide:

## 2 × 2 Matrix Multiplication



$$\begin{bmatrix} a_1 & b_1 \\ c_1 & d_1 \end{bmatrix} \times \begin{bmatrix} a_2 & b_2 \\ c_2 & d_2 \end{bmatrix} = \begin{bmatrix} a_1a_2 + b_1c_2 & a_1b_2 + b_1d_2 \\ c_1a_2 + d_1c_2 & c_1b_2 + d_1d_2 \end{bmatrix}$$

9. Take an array with N elements as input, and sort the array into ascending order and then print the sorted version.

**Input:** {6, 3, 2, 7, 1, 5}

**Output:** {1, 2, 3, 5, 6, 7}

10. Junaid wants to keep track of all mobile phone bills in his X company branches. Let Y be the number of company mobile phones in each branch. Create a 2D array for bill amount, where keep track of branch ID in row subscript, mobile phone IDs in column subscript. Ask users to enter a bill for all mobile phones in all branches. Your program should print the following:

- Total bill for all branches
- Total bill for each branch
- Branch ID where maximum bill arrived
- Branch and Mobile Phone IDs where bill is highest of all mobile phones.

11. Given an unsorted array A of size N that contains only non-negative integers, find a continuous sub-array which adds to a given number S. In case of multiple subarrays, return the subarray which comes first on moving from left to right.

**Input:**

Enter Number S = 12

Array: {1, 2, 3, 7, 5}

**Output:**

The Elements from Index 1 to 3 when summed results in the output of 12.

12. You are given an n x n integer matrix grid. Generate a matrix "maxLocal" of size (n - 2) x (n - 2) such that: maxLocal[i][j] is equal to the largest value of the 3 x 3 matrix in grid centered around row i + 1 and column j + 1.

In other words, we want to find the largest value in every contiguous 3 x 3 matrix in grid. Return the generated matrix.

**Example 1:**

9	9	8	1
5	6	2	6
8	2	6	4
6	2	2	2

9	9
8	6

**Input:** grid = [[9,9,8,1],[5,6,2,6],[8,2,6,4],[6,2,2,2]]

**Output:** [[9,9],[8,6]]

**Explanation:** The diagram above shows the original matrix and the generated matrix.

Notice that each value in the generated matrix corresponds to the largest value of a contiguous 3 x 3 matrix in grid.