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## Programming Fundamentals

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BS (CS) \_Fall\_2025

### Lab\_11 Tasks



### Learning Objectives:

1. Multi-Dimensional Array

# Lab Tasks

## Submission Instructions

1. Name each Task question as **i25XXXX\_Task<NO>** e.g. i250000\_Task1.cpp
2. Compress all **.cpp** files into a **.zip** file, and name it as *ROLLNO\_SEC\_LAB11* e.g. **i25XXXX\_A\_LAB10**.
3. Now you have to submit this zipped file on Google Classroom.
4. If you don't follow the above-mentioned submission instruction, you will be marked **zero**.
5. Plagiarism in the Lab Task will result in **zero** marks in the whole category.

# Zero Tasks

## Q1. Dry Run the code

```
int main() {
    int arr[6];
    int sum = 0;

    cout << "Enter 6 numbers: ";
    for (int i = 0; i < 6; i++) {
        cin >> arr[i];
    }
    for (int i = 0; i < 6; i++) {
        if (arr[i] % 2 == 0) {
            arr[i] = arr[i] / 2;
        }
        else {
            arr[i] = arr[i] * 2;
        }
        sum = sum + arr[i];
    }
    cout << "\nModified Array: ";
    for (int i = 0; i < 6; i++) {
        cout << arr[i] << " ";
    }
    cout << "\nSum of Updated Elements = " << sum;
    return 0;
}
```

## Q2. Dry Run the code

```

int main() {
    int arr[10] = {5, 0, 3, 0, 7, 0, 2, 0, 9, 1};
    int j = 0; // index to track non-zero position
    cout << "Original Array: ";
    for (int i = 0; i < 10; i++) {
        cout << arr[i] << " ";
    }
    for (int i = 0; i < 10; i++) {
        if (arr[i] != 0) {
            arr[j] = arr[i];
            j++;
        }
    }
    while (j < 10) {
        arr[j] = 0;
        j++;
    }
    cout << "\nArray after moving zeros to the end: ";
    for (int i = 0; i < 10; i++) {
        cout << arr[i] << " ";
    }

    return 0;
}

```

## Lab Tasks

**Q3.** Write a program in C++ to create an array of size 5x5. Fill the array with values that user inputs between 1 and 100. Print it in straight and reverse order.

**Q4.** Write a C ++ program to Perform sum of all the elements of the arrays whose row number and column number both are odd. Display the final sum of it.

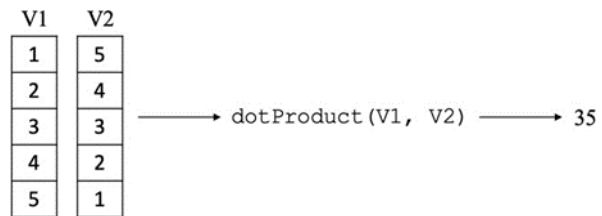
Sample Data:

	Column0	Column1	Column2	Column3	Column4
Row0	1	4	1	6	2
Row1	5		6		5
Row2	8	2	5	5	5
Row3	8		8		4
Row4	7	6	9	1	3

Output: 19

**Q5.** Write a program that is able to calculate the dot product of two vectors.

E.g., If  $v = \{1, 2, 3, 4, 5\}$  and  $v = \{5, 4, 3, 2, 1\}$  then  $\langle v, v \rangle$  is equal to 35



Also calculate the cross product of the two vectors.

**Q6.** Write a program in C++ that:

- Reads a square matrix of size  $n \times n$  from the user.
- Calculates the sum of all rows, columns, and diagonals.
- Checks whether all these sums are equal.
- Displays whether the given matrix is a **magic square** or not.