DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

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Experiment 1

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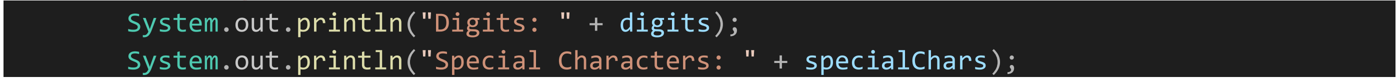
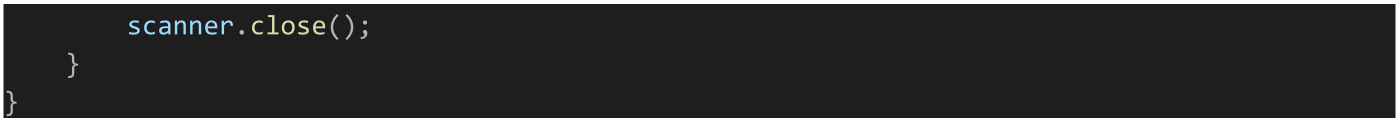
Branch: CSE **Section/Group:614(B)**
Semester: 6 **Date of Performance:01/03/25**
Subject Name: Java **Subject Code: 22CSH-359**

Q1:-String Analysis

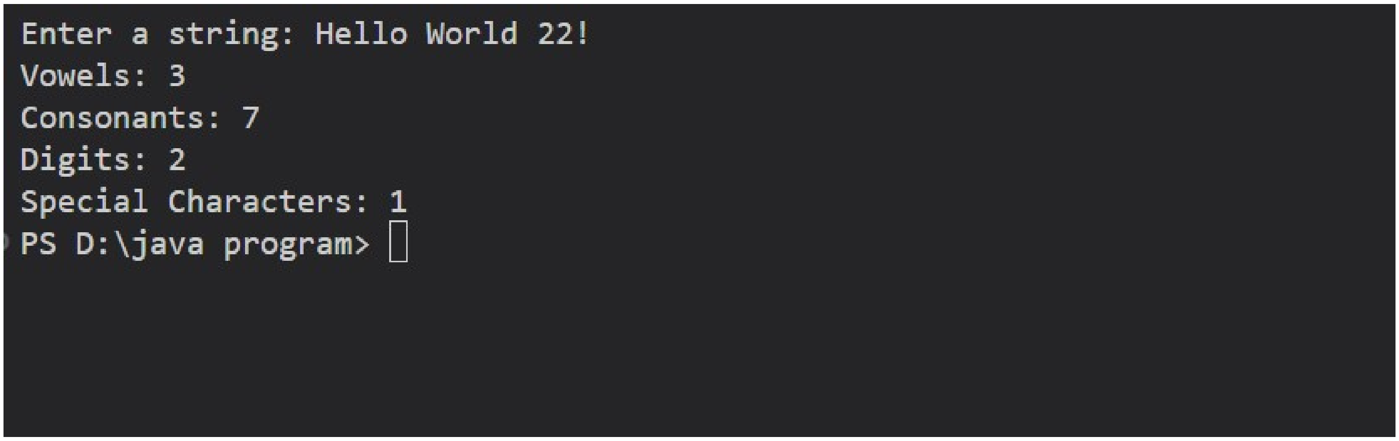
```java
import java.util.Scanner;

public class workseet{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        // Counters
        int vowels = 0, consonants = 0, digits = 0, specialChars = 0;

        // Convert to lowercase for easy comparison
        input = input.toLowerCase();

        for (int i = 0; i < input.length(); i++) {
            char ch = input.charAt(i);

            if (ch >= 'a' && ch <= 'z') {
                if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
                    vowels++;
                } else {
                    consonants++;
                }
            } else if (ch >= '0' && ch <= '9') {
                digits++;
            } else if (ch != ' ') {
                specialChars++;
            }
        }

        // Output
        System.out.println("Vowels: " + vowels);
        System.out.println("Consonants: " + consonants);
```



```
        System.out.println("Digits: " + digits);
        System.out.println("Special Characters: " + specialChars);
```

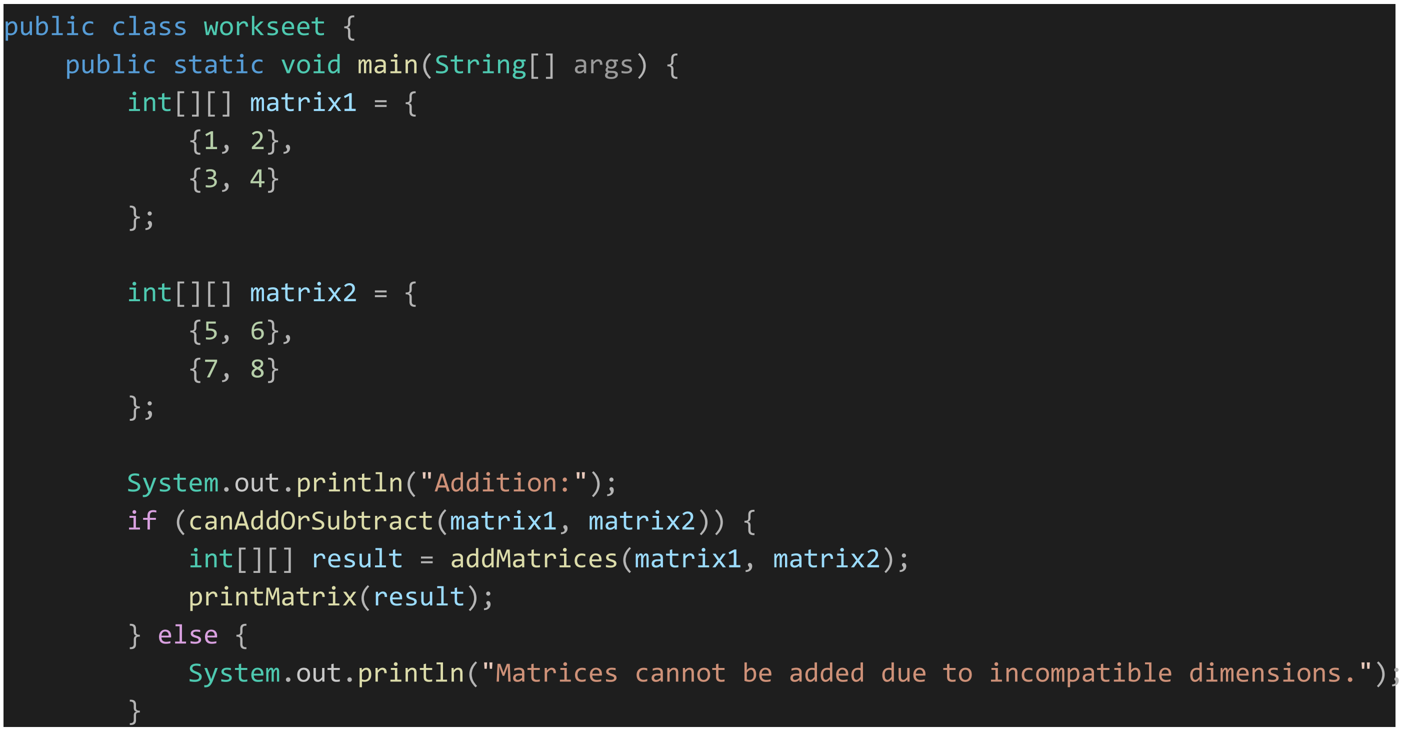


```
        scanner.close();
    }
}
```

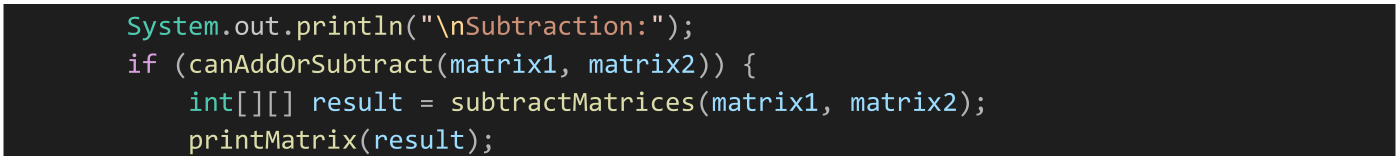


```
Enter a string: Hello World 22!
Vowels: 3
Consonants: 7
Digits: 2
Special Characters: 1
PS D:\java program> 
```

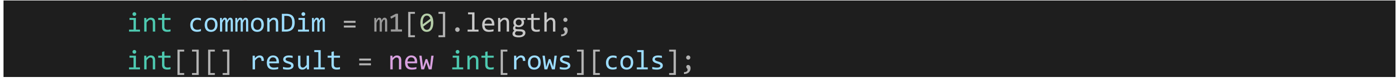
Q2:- Matrix Operations



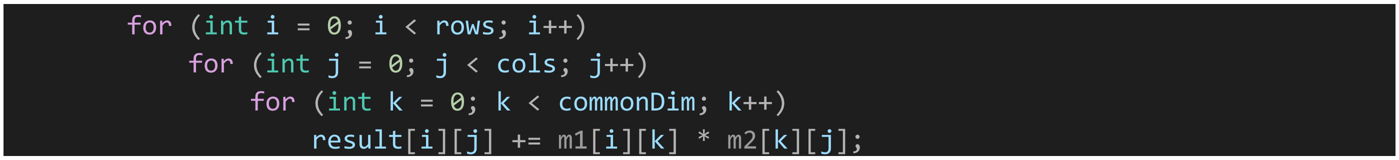
```
public class worksheet {
    public static void main(String[] args) {
        int[][] matrix1 = {
            {1, 2},
            {3, 4}
        };

        int[][] matrix2 = {
            {5, 6},
            {7, 8}
        };

        System.out.println("Addition:");
        if (canAddOrSubtract(matrix1, matrix2)) {
            int[][] result = addMatrices(matrix1, matrix2);
            printMatrix(result);
        } else {
            System.out.println("Matrices cannot be added due to incompatible dimensions.");
        }
```



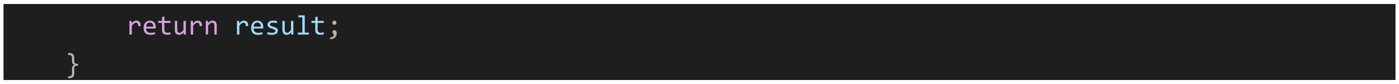
```
        System.out.println("\nSubtraction:");
        if (canAddOrSubtract(matrix1, matrix2)) {
            int[][] result = subtractMatrices(matrix1, matrix2);
            printMatrix(result);
        } else {
            System.out.println("Matrices cannot be subtracted due to incompatible dimensions.");
        }

        System.out.println("\nMultiplication:");
        if (canMultiply(matrix1, matrix2)) {
            int[][] result = multiplyMatrices(matrix1, matrix2);
            printMatrix(result);
        } else {
            System.out.println("Matrices cannot be multiplied due to incompatible dimensions.");
        }
    }

    public static boolean canAddOrSubtract(int[][] m1, int[][] m2) {
        return m1.length == m2.length && m1[0].length == m2[0].length;
    }

    public static boolean canMultiply(int[][] m1, int[][] m2) {
        return m1[0].length == m2.length;
    }

    public static int[][] addMatrices(int[][] m1, int[][] m2) {
        int rows = m1.length;
        int cols = m1[0].length;
        int[][] result = new int[rows][cols];

        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                result[i][j] = m1[i][j] + m2[i][j];

        return result;
    }

    public static int[][] subtractMatrices(int[][] m1, int[][] m2) {
        int rows = m1.length;
        int cols = m1[0].length;
        int[][] result = new int[rows][cols];

        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                result[i][j] = m1[i][j] - m2[i][j];

        return result;
    }

    public static int[][] multiplyMatrices(int[][] m1, int[][] m2) {
        int rows = m1.length;
        int cols = m2[0].length;
```



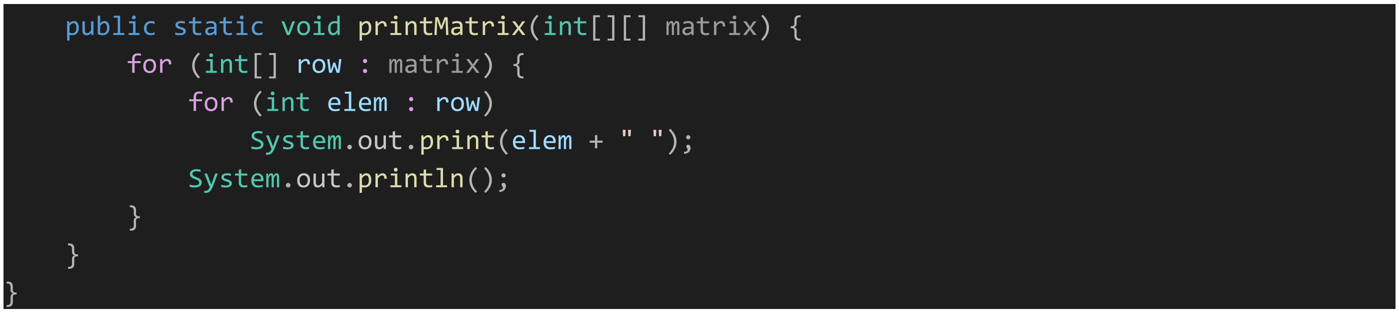
```
        int commonDim = m1[0].length;
        int[][] result = new int[rows][cols];
```



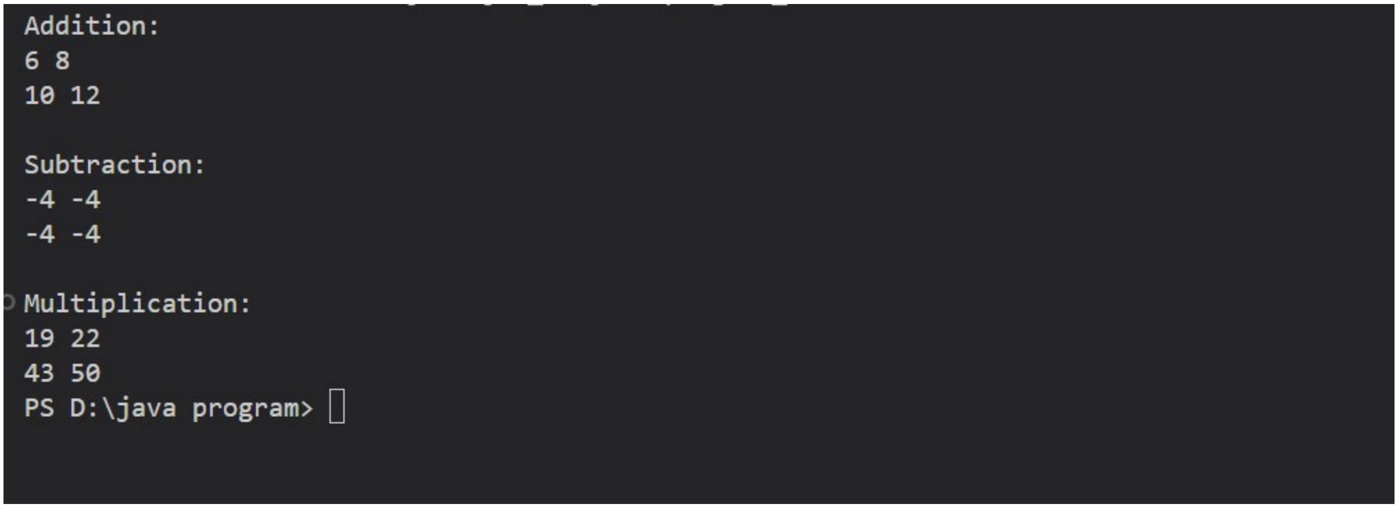
```
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                for (int k = 0; k < commonDim; k++)
                    result[i][j] += m1[i][k] * m2[k][j];
```



```
        return result;
    }
```



```
    public static void printMatrix(int[][] matrix) {
        for (int[] row : matrix) {
            for (int elem : row)
                System.out.print(elem + " ");
            System.out.println();
        }
    }
}
```



```
Addition:
6 8
10 12

Subtraction:
-4 -4
-4 -4

Multiplication:
19 22
43 50
PS D:\java program>
```