TASK 5

1.Source code

```java
import java.util.Scanner;

/*
 * Task 5: Arrays & Basic Data Analysis Program
 */

public class ArrayDataAnalysis {

    // Method to calculate sum
    static int calculateSum(int[] arr) {

        int sum = 0;

        for (int num : arr) {

            sum += num;

        }

        return sum;

    }

    // Method to find maximum value
    static int findMax(int[] arr) {

        int max = arr[0];

        for (int num : arr) {

            if (num > max)

                max = num;

        }

        return max;

    }
```

```java
// Method to find minimum value
static int findMin(int[] arr) {

    int min = arr[0];

    for (int num : arr) {

        if (num < min)

            min = num;

    }

    return min;

}
// Manual sorting (Bubble Sort)
static void sortArray(int[] arr) {

    for (int i = 0; i < arr.length - 1; i++) {

        for (int j = 0; j < arr.length - 1 - i; j++) {

            if (arr[j] > arr[j + 1]) {

                int temp = arr[j];

                arr[j] = arr[j + 1];

                arr[j + 1] = temp;

            }

        }

    }

}
public static void main(String[] args) {

    Scanner sc = new Scanner(System.in);

    System.out.print("Enter number of elements: ");

    int n = sc.nextInt();
```

```java
int[] numbers = new int[n]; // 1D array

// Input values

for (int i = 0; i < n; i++) {

    System.out.print("Enter element " + (i + 1) + ": ");

    numbers[i] = sc.nextInt();

}

// Data analysis

int sum = calculateSum(numbers);

double average = (double) sum / n;

int max = findMax(numbers);

int min = findMin(numbers);

// Sorting

sortArray(numbers);


// Output

System.out.println("\n--- Data Analysis Result ---");

System.out.printf("Sum: %d%n", sum);

System.out.printf("Average: %.2f%n", average);

System.out.printf("Maximum: %d%n", max);

System.out.printf("Minimum: %d%n", min);


System.out.print("Sorted Array: ");

for (int num : numbers) {

    System.out.print(num + " ");
```

```java
        }

        // 2D Array demonstration
        int[][] matrix = {
            {1, 2, 3},
            {4, 5, 6}
        };
        System.out.println("\n\n2D Array Elements:");
        for (int i = 0; i < matrix.length; i++) {
            for (int j = 0; j < matrix[i].length; j++) {
                System.out.print(matrix[i][j] + " ");
            }
            System.out.println();
        }
        // Exception handling demonstration
        try {
            System.out.println("\nAccessing invalid index:");
            System.out.println(numbers[n]); // Invalid index
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("Exception caught: Array index out of bounds.");
        }
        sc.close();
    }
}
```

2.Output

```
Enter number of elements: 5
Enter element 1:
10
Enter element 2: 5
Enter element 3: 20
Enter element 4: 8
Enter element 5: 15

--- Data Analysis Result ---
Sum: 58
Average: 11.60
Maximum: 20
Minimum: 5
Sorted Array: 5 8 10 15 20

2D Array Elements:
1 2 3
4 5 6

Accessing invalid index:
Exception caught: Array index out of bounds.
```