

TASK 5: Arrays & Basic Data Analysis Program

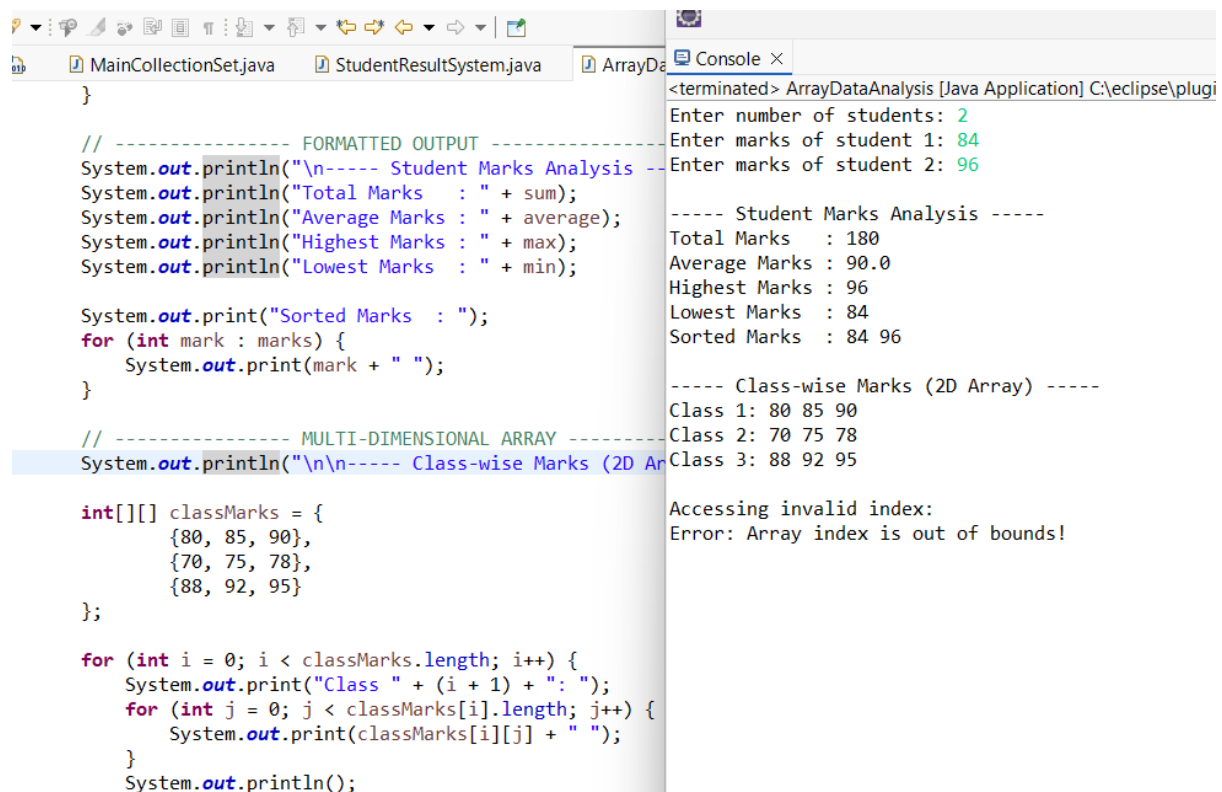
📌 Objective

To understand and implement **arrays in Java** for storing numerical data and performing **basic data analysis operations** such as **sum, average, maximum, minimum, sorting**, and **exception handling** using efficient loops.

Tools Used- Eclipse

📁 Concepts Covered

- Single-Dimensional Arrays
- Multi-Dimensional Arrays
- Loop Traversal (for, nested for)
- Manual Sorting (Bubble Sort)
- Exception Handling (ArrayIndexOutOfBoundsException)
- Formatted Output
- Code Readability & Comments



```
// ----- FORMATTED OUTPUT -----
System.out.println("\n----- Student Marks Analysis -----");
System.out.println("Total Marks : " + sum);
System.out.println("Average Marks : " + average);
System.out.println("Highest Marks : " + max);
System.out.println("Lowest Marks : " + min);

System.out.print("Sorted Marks : ");
for (int mark : marks) {
    System.out.print(mark + " ");
}

// ----- MULTI-DIMENSIONAL ARRAY -----
System.out.println("\n\n----- Class-wise Marks (2D Array) -----");

int[][] classMarks = {
    {80, 85, 90},
    {70, 75, 78},
    {88, 92, 95}
};

for (int i = 0; i < classMarks.length; i++) {
    System.out.print("Class " + (i + 1) + ": ");
    for (int j = 0; j < classMarks[i].length; j++) {
        System.out.print(classMarks[i][j] + " ");
    }
    System.out.println();
}
```

Console Output:

```
<terminated> ArrayDataAnalysis [Java Application] C:\eclipse\plugi
Enter number of students: 2
Enter marks of student 1: 84
Enter marks of student 2: 96

----- Student Marks Analysis -----
Total Marks : 180
Average Marks : 90.0
Highest Marks : 96
Lowest Marks : 84
Sorted Marks : 84 96

----- Class-wise Marks (2D Array) -----
Class 1: 80 85 90
Class 2: 70 75 78
Class 3: 88 92 95

Accessing invalid index:
Error: Array index is out of bounds!
```

💡 Practical Example

🎯 *Student Marks Analysis System*

We store marks of students in an array and perform:

- Total Marks
- Average Marks
- Highest & Lowest Marks
- Sorting marks in ascending order
- Displaying marks of multiple classes (2D array)

📊 Sample Output

pgsql

📄 Copy code

```
----- Student Marks Analysis -----  
Total Marks   : 420  
Average Marks : 84.0  
Highest Marks : 95  
Lowest Marks  : 70  
Sorted Marks  : 70 75 78 80 85 88 90 92 95  
  
----- Class-wise Marks (2D Array) -----  
Class 1: 80 85 90  
Class 2: 70 75 78  
Class 3: 88 92 95  
  
Error: Array index is out of bounds!
```