

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

The screenshot shows the Eclipse IDE interface with three tabs open: MainCollectionSet.java, StudentResultSystem.java, and ArrayDataAnalysis.java. The ArrayDataAnalysis.java tab is active, displaying Java code for analyzing student marks. The code includes sections for formatted output and class-wise marks (2D array). In the Eclipse toolbar, the 'Run' button is highlighted. To the right, the 'Console' view shows the application's output. It starts with 'Enter number of students: 2', followed by 'Enter marks of student 1: 84' and 'Enter marks of student 2: 96'. The program then displays the analysis results: 'Total Marks : 180', 'Average Marks : 90.0', 'Highest Marks : 96', 'Lowest Marks : 84', and 'Sorted Marks : 84 96'. Finally, it shows 'Class-wise Marks (2D Array)' with three classes having marks [80, 85, 90], [70, 75, 78], and [88, 92, 95] respectively. An error message 'Accessing invalid index: Error: Array index is out of bounds!' is also visible in the console.

```
// ----- 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();
}
```

```
<terminated> ArrayDataAnalysis [Java Application] C:\eclipse\plugins\org.eclipse.jdt.core\org.eclipse.jdt.core_3.12.0.v20190311-1400.jar
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!
```