评分与评语：

**台州学院**

**电子与信息工程学院实验报告**

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实验课程： Java程序设计基础

实验项目： Experiment 3 Java Arrays

**NOTE：**

**When pasting code, please do not use a black background. Otherwise, when the teacher prints your assignments at the end of the semester, it will be a mess of black.**

实验日期： 2025 年 4 月 13 日

**Project: Locate the largest element**

Problem Description:

(Exercise08\_13) Write the following method that returns the location of the largest element in a two-dimensional array.

**public static int**[] locateLargest(**double**[][] a)

The return value is a one-dimensional array that contains two elements. These two elements indicate the row and column indices of the largest element in the two-dimensional array. Write a test program that prompts the user to enter a two-dimensional array and displays the location of the largest element in the array. Here is a sample run:

<Output>

Enter the number of rows and columns of the array: 3 4

Enter the array:

23.5 35 2 10

4.5 3 45 3.5

35 44 5.5 9.6

The location of the largest element is at (1, 2)

<End Output>

Analysis:

The goal of this program is to identify the location (row and column) of the **largest element** in a **2D array** of double values. The user will input the dimensions and elements of the array, and the program will output the location of the largest value. This is useful for array data analysis when the position of the maximum value is required rather than the value itself.

Design:

Input:

* Number of rows and columns
* Elements of 2D array

Process:

1. Create a method locateLargest that:
   1. Initializes a variable to store the largest value
   2. Loops thru all elements in the 2D array
   3. Compares each element to the current max value
   4. If a larger value is found, updates the max value and stores its location
2. The main method will:
   1. Read the array dimension and elements from user
   2. Call locateLargest
   3. Display the location of the largest element

Output:

* The row and column index of the largest element in the format:  
  The location of the largest element is at (row, column)

Coding:

import java.util.Scanner;  
  
public class Main {  
 public static int[] locateLargest(double[][] *a*) {  
 int[] location = new int[2];  
 double max = *a*[0][0];  
 for (int rows = 0; rows < *a*.length; rows++) {  
 for (int cols = 0; cols < *a*[0].length; cols++) {  
 if (*a*[rows][cols] > max) {  
 max = *a*[rows][cols];  
 location[0] = rows;  
 location[1] = cols;  
 }  
 }  
 }  
 return location;  
 }  
 public static void main(String[] *args*) {  
 Scanner input = new Scanner(System.in);  
 System.out.print("Enter number of rows and cols of the array: ");  
 int rows = input.nextInt();  
 int cols = input.nextInt();  
  
 double[][] array = new double[rows][cols];  
  
 System.out.println("Enter the array: ");  
 for (int i = 0; i < rows; i++) {  
 for (int j = 0; j < cols; j++) {  
 array[i][j] = input.nextDouble();  
 }  
 }  
 int[] location = **locateLargest**(array);  
 System.out.println("The location of the largest element is at (" + location[0] + ","  
 + location[1] + ")");  
 }  
}

Testing: (Describe how you test this program)

**Test Case 1 – Typical Case:**

* A 3×4 array is used, filled with positive decimal values
* The largest element (45.0) is located somewhere in the middle of the array
* This test verifies that the method can scan through all rows and columns and correctly identify the largest element and its position

**Test Case 2 – Increasing Order:**

* A 2×3 array where values increase from left to right and top to bottom (e.g., 1 to 6.
* The largest element is at the last position of the array
* This case tests whether the method can correctly identify the largest value even if it's at the very end of the array