Test Plan

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CMSC115

Chapter 9, Project 3

December 10, 2024

**Program Goals & Objectives**

**This program identifies the exact index location of the largest element within a user-specified two-dimensional array. After the user specifies the array’s dimensions (rows and columns) and inputs its numerical elements, the program determines the greatest integer value present within the array. It then reports this value alongside its exact position (row and column index), utilizing a dedicated Location class to that stores those details.**

**Program Functional Requirements**

1. The program must prompt the user to enter the dimensions (rows and columns) of the two-dimensional array.
2. The program must prompt the user to the numerical values of each element of the array.
3. The program must examine the entire array to locate the largest numerical value within the array.
   1. Fulfilment of this task must be accomplished via the Location class which stores the position (row, column) and value of the largest element found.
4. The program must display the largest element’s value and its location in the array.

**Program Pseudocode**

START

INPUT number of rows and columns

INPUT array elements into 2D array

SET maxValue to first element at array[0][0]

SET maxRow to 0

SET maxColumn to 0

FOR each row in array

FOR each column in array

IF current element > maxValue THEN

UPDATE maxValue to current element

UPDATE maxRow to current row index

UPDATE maxColumn to current column index

END IF

END FOR

END FOR

OUTPUT "The largest element is " + maxValue

OUTPUT "Located at position (" + maxRow + "," + maxColumn + ")"

END

**Program Flowchart**

**A diagram of a diagram

Description automatically generated**

**Table 1 – Traceability Matrix**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case | Input/Output | Expected Result | Actual Result | Outcome  (Pass/Fail) |
| 1a | Enter the number of rows and columns of the array: 2 2  Enter the array:  2 3  9 2 | The largest element is 9.0, located at (1,0) | The largest element is 9.0, located at (1,0) | Pass |
| 2a | Enter the number of rows and columns of the array: 0 0 | Handle invalid input appropriately | ArrayIndexOutOfBoundsException | Fail |
| 3a | Enter width for rectangle:  12  Enter height for rectangle:  -10 | Invalid input when height is negative | Rectangle Properties:  Width: 12.0  Height: -10.0  Area: -120.0  Perimeter: 4.0 | Fail |