Test Plan

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CMSC115

Chapter 8, Project 3

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**Program Goals & Objectives**

This program allows users to identify and display the location of the largest element within a two-dimensional numeric array. The program ensures proper data entry and program operation by guiding the user to input a valid set of dimensions and elements.

**Program Functional Requirements**

1. The program must prompt the user for the number of rows until a valid positive integer is entered.
2. The program must prompt the user for the number of columns until a valid positive integer is entered.
3. The program must accept user input for each element of the two-dimensional array.
4. The program must scan the entirety of the array to determine the largest numerical value.
5. The program must record the exact position (row and column) of the first occurrence of the largest value.
6. Lastly, the program must display the largest value, along with its row and column location, in a clear and easily understandable format.

**Program Pseudocode**

START

Display a welcome message and instructions

Prompt the user to enter the number of rows

While the entered number of rows is not greater than zero

Prompt the user again until a valid positive number of rows is provided

Prompt the user to enter the number of columns

While the entered number of columns is not greater than zero

Prompt the user again until a valid positive number of columns is provided

Initialize a two-dimensional array with the given dimensions

For each row

For each column in that row

Prompt the user to enter the element for that position

Locate the largest element in the array and record its position

Display the largest element and its location (row and column)

END

**Program Flowchart**

**A diagram of a flowchart

Description automatically generated**

**Table 1 – Traceability Matrix**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case | Input/Output | Expected Result | Actual Result | Outcome  (Pass/Fail) |
| 1a | === Largest Array Element Finder ===  This program will help you find the largest value in a 2D array  Enter the number of rows (positive number): 3  Enter the number of columns (positive number): 3  Enter the array elements row by row:  Row 1:  Element [1,1]: 5  Element [1,2]: 90  Element [1,3]: 24  Row 2:  Element [2,1]: 10  Element [2,2]: 99  Element [2,3]: 100  Row 3:  Element [3,1]: 1  Element [3,2]: 4  Element [3,3]: 8 | Your array:  [ 5.00 90.00 24.00 ]  [ 10.00 99.00 100.00 ]  [ 1.00 4.00 8.00 ]  Results:  ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━  Largest value: 100.00  Location: Row 2, Column 3  ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ | Your array:  [ 5.00 90.00 24.00 ]  [ 10.00 99.00 100.00 ]  [ 1.00 4.00 8.00 ]  Results:  ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━  Largest value: 100.00  Location: Row 2, Column 3  ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ | Pass |
| 2a | === Largest Array Element Finder ===  This program will help you find the largest value in a 2D array  Enter the number of rows (positive number): a | Please enter a valid number: | Please enter a valid number: | Pass |
| 3a | === Largest Array Element Finder ===  This program will help you find the largest value in a 2D array  Enter the number of rows (positive number):  (Numerous presses of the enter key) | Should handle the misuse of repeated enter key entries | Nothing happens | Fail |