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Assignment #5 Design/Testing

Understanding the Problem

This problem is asking me to create a program that either takes information provided by the user to make a matrix or input information from a text file to create a matrix to use for further evaluation. When the user doesn't request information from a text file as a part of the command line, the user will be prompt to input the number of rows and columns of a matrix. The program will then take that information and create a matrix filled with random numbers calculated by a function in the program. Then once a matrix is create, the program will then find the greatest product of four adjacent numbers in the matrix. The program will then print the greatest product onto the screen, along with the shape the four numbers create and the first numbers starting point of the shape.

Devising a Plan/Design

Create the function that will create the matrix.

Create the function that will initialize a matrix with information from the user.

Create the function that will initialize a matrix with information from a text file.

Create the function that will print out the created matrix.

Create functions that will calculate the greatest four adjacent numbers of the varying shapes.

Create functions that will determine the starting positions of varying shapes.

Create functions that will take the maximum value of each shape and set them to new variables.

Create functions that will determine which maximum value is the greatest, calling the function that inputs maximum values in new variables and determines the varying shapes starting positions, and then will print out the information of that value, such as the value itself, the starting position, and the description of that shape.

Create a function that will contain all of those functions that determined which overall value is the greatest.

Create the main function defining its parameters as (int argc, char *argv[]) and then applying the following:

Create if statements checking the command line declared by the user.

Within the if statement checking for one argument count, prompt the user for the number of rows and columns, that will then error check if the user didn't enter a valid input for each request, that will print an error statement and then end the program.

Call the function that creates the matrix, initializes the matrix, prints the matrix, and provides the greatest product information.

Within the if statement checking for the request of a text file as part of the command line, call the function that creates the matrix, initializes the matrix, prints the matrix, and provides the greatest product information.

Within the if statement that checks for any other type invalid command line, print out an error statement and then end the program.

Testing

While putting this program together, used prior knowledge, information learned from lectures, and additional help from my peers. For example, I took the information that learned from the lectures about how to create arrays and applied that to my program.

Values Inputted	Expected	Actual Meet Expected
./matrix	To prompt the user for the number of rows and columns of a matrix and then print out that size of matrix with random values.	Yes
./matrix –test < test.txt	To print out the matrix with information from a text file.	Yes
./matrix –asdf < test.txt	To print out the error message for an invalid command line and then end the program.	Yes
rows = 4	To continue on with the program.	Yes
rows = i	To print out the error message for an invalid input and then end the program.	Yes
cols = 4	To continue on with the program.	Yes
cols = i	To print out the error message for an invalid input and then end the program.	Yes

Outputs	Is the Output Correct?
Matrix	Yes
Maximum Product	No
Starting Position	No
Shape	No