

# **Project Four - UPDATED!**

Due: 11:55p 9/24/2013

## **Objective:**

1. Become familiar with the use of multidimensional arrays in Java
2. Develop familiarity with development of static methods

## **Description:**

Write a program that finds the greatest product of four consecutive numbers in any direction (up, down, left, right, or diagonal) in the 20x20 matrix or grid of numbers.

## **Input:**

~~Since the concept of file I/O has not been introduced yet,~~ All data can be obtained by the way of the standard input (keyboard) prompt in an interactive fashion. You can then feed the data to your program from a file by using ~~file redirection~~ a command line argument consisting of the input file name. The input file will contain the matrix of numbers. The data will be presented from the top left of the table to bottom right.

## **Output:**

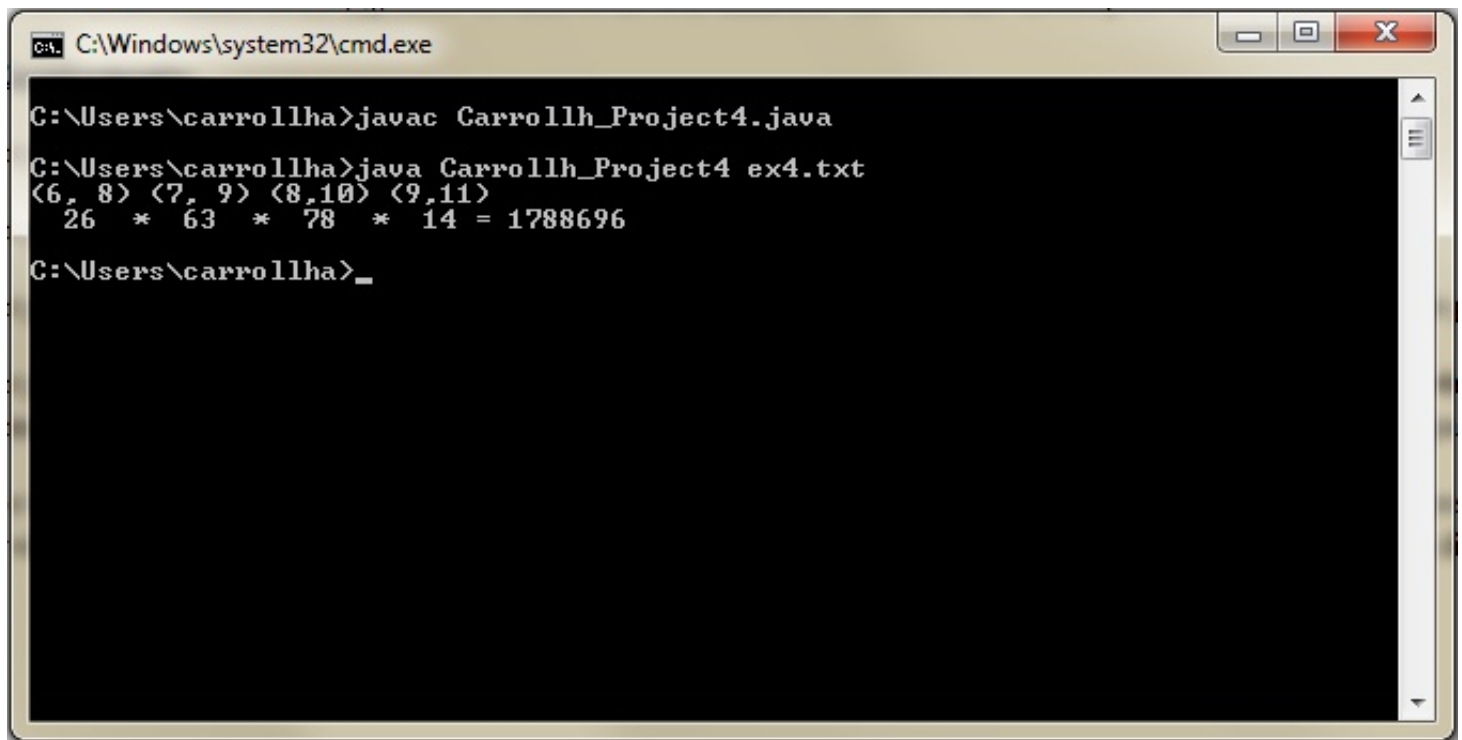
The final results should consist of the (i,j) index of each of the four numbers. The next line should print the numbers and the final product of the four.

## **Specific Requirements:**

1. Your program should contain at least one two dimensional array
2. Your program should adhere to standard programming practices and should not use any global variables
3. Your program should contain at least ~~three~~ TWO static methods. ~~One for accepting the data from keyboard,~~ one for printing the final results to console and one other function that is used during your calculations
4. Your program must be prepared to work for ~~an n x 20~~ a 20x20 matrix of data. ~~The value of n needs to be passed to the program via the~~ command line argument. The example below is for a 20x20 matrix and the command line argument would consist of ~~"a.out 20"~~ "java ProgramName ex4.txt". Inside your program you can then refer to the passed in argument as "args[0]".
5. Since this project is intending for you to use the command line compiler, javac, you should assume the input file will reside in the same folder as your class file. This will not be the case in Eclipse. If you wish to test it in Eclipse, you will need to add a command line argument to the project, and place your test file in the project's base folder, as discussed in class.

Sample Input:

08 02 22 97 38 15 00 40 00 75 04 05 07 78 52 12 50 77 91 08  
49 49 99 40 17 81 18 57 60 87 17 40 98 43 69 48 04 56 62 00  
81 49 31 73 55 79 14 29 93 71 40 67 53 88 30 03 49 13 36 65  
52 70 95 23 04 60 11 42 69 24 68 56 01 32 56 71 37 02 36 91  
22 31 16 71 51 67 63 89 41 92 36 54 22 40 40 28 66 33 13 80  
24 47 32 60 99 03 45 02 44 75 33 53 78 36 84 20 35 17 12 50  
32 98 81 28 64 23 67 10 **26** 38 40 67 59 54 70 66 18 38 64 70  
67 26 20 68 02 62 12 20 95 **63** 94 39 63 08 40 91 66 49 94 21  
24 55 58 05 66 73 99 26 97 17 **78** 78 96 83 14 88 34 89 63 72  
21 36 23 09 75 00 76 44 20 45 35 **14** 00 61 33 97 34 31 33 95  
78 17 53 28 22 75 31 67 15 94 03 80 04 62 16 14 09 53 56 92  
16 39 05 42 96 35 31 47 55 58 88 24 00 17 54 24 36 29 85 57  
86 56 00 48 35 71 89 07 05 44 44 37 44 60 21 58 51 54 17 58  
19 80 81 68 05 94 47 69 28 73 92 13 86 52 17 77 04 89 55 40  
04 52 08 83 97 35 99 16 07 97 57 32 16 26 26 79 33 27 98 66  
88 36 68 87 57 62 20 72 03 46 33 67 46 55 12 32 63 93 53 69  
04 42 16 73 38 25 39 11 24 94 72 18 08 46 29 32 40 62 76 36  
20 69 36 41 72 30 23 88 34 62 99 69 82 67 59 85 74 04 36 16  
20 73 35 29 78 31 90 01 74 31 49 71 48 86 81 16 23 57 05 54  
01 70 54 71 83 51 54 69 16 92 33 48 61 43 52 01 89 19 67 48



A screenshot of a Windows command prompt window. The title bar at the top reads "C:\Windows\system32\cmd.exe" and includes standard minimize, maximize, and close buttons. The command prompt has a black background with white text. The user has entered the following commands and received the following output:

```
C:\Users\carrollha>javac Carrollh_Project4.java
C:\Users\carrollha>java Carrollh_Project4 ex4.txt
<6, 8> <7, 9> <8,10> <9,11>
26 * 63 * 78 * 14 = 1788696
C:\Users\carrollha>_
```

The output shows four coordinate pairs on one line and a multiplication result on the next line. The prompt at the bottom is followed by an underscore character.