Project #2 (100 points)

Due: See D2L Discussion Forum

Part I

Write a Java application that displays a Swing GUI that contains 9 text input fields in a 3 x 3 grid with one command button to calculate if the input text fields form a *magic square*. A magic square is a *N x N* matrix of numbers in which every number from 1 to N^2 must appear just once, and every row, column, and diagonal must add up to the same total – for example:

6	7	2
1	5	9
8	3	4

After the user fills in the text fields, the user will click on a button to verify that the data that was input is indeed a *magic square* and display some type of message to tell the user whether it is a magic square. The text fields themselves will be stored in an array of text fields. ***Validation of the input must be done to verify that an integer has been input.***

Additional validation for each input is that hat each integer is only used once and that no number is larger then N^2. *You will do this validation in a single method where you will pass in the array containing the user's input and will return a boolean value whether the input is valid or not.* In addition, you must create a class that extends JTextField which will be used as part of your GUI.

The form must have 4 buttons:

1. Clear form → Clears the form
2. Exit → Exits the application
3. Check Magic Square → Verifies if displayed numbers are a magic square

Part II

Add another command button that will "get the next record from an input file and decide if the values read from the text file are indeed a *Magic Square*." The GUI will have a text field where the user can type in the "complete" file name for the text file that has the input for this game. The program will echo check the input record to the text fields on the GUI so that the user can verify that the data read in from the file matches the data that is on the GUI. If the user selects the button again, and there are no more records to be read, display an appropriate message via a popup dialog box that there are no more records to be read. If the user selects the

button again, start over from the beginning of the text file. Each record will consist of an attempt at a magic square.

Part III

Change the validation method to verify completely that all the data input were valid data (i.e. only numbers from 1 to N^2). The validation method will not return Boolean anymore but will **throw an exception** to the calling method that contains an appropriate error message for the data that is invalid. Only the first invalid data found must be reported. The calling method will "catch" the exception and output the "thrown" message to a pop up dialog box. All "error" messages must be reported by throwing an exception. The user must be "*informed"* which input field is invalid and why it is invalid.

Always remember, this is an object-oriented programming class. There will be a D2L Discussion area where any specification questions are asked and answered. We may NOT have covered all the information necessary to complete this project so you may request information on the D2L discussion area for this project. I will let students attempt to answer any questions first before I get involved. ***You have enough information right now to get started.*** **Your participation in the Discussion Forum is worth 10 points.**

All files necessary to meet the specifications listed must be included in a zip file that is uploaded to the D2L Dropbox for Project 2. Included in these files are the source file "hardcopies" that you want me to grade and your text file of magic numbers that you used to test your program.

If there are parts of your code that does not work, you must specify that in the comments area of the application driver.