CSC 161 LAB 5-1 ARRAY SEARCHING GROUP PROJECT

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Your are going to write a program that allows a user to create an array filled with $R \times C$ random integer values by pressing a button with text NEW RANDOM ARRAY. There will be another button with text SORT: clicking on this button will sort the array.

The values in the array will be displayed in a grid of un-editable text fields that has R rows and C columns. Whenever a new array is created, the grid of text fields is updated, and whenever the array is sorted the grid of text fields is again updated.

In addition, there will be a single *number* text field into which a user can type a number X at any time. Whenever this happens, the program will display the row and column in the grid in which X appears. If no value in the grid is equal to X, the number -1 will be displayed for the row and column of X. The row and column of X will be displayed in two un-editable text fields: the *row* textfield and the *column* text field.

1. VARIABLES NEEDED

Here are the most important variables you will need.

```
final int ROWS = 5;
final int COLS = 6;
final int COLUMN_COUNT = 3;

int [] numbers = new int[ROWS*COLS];
TextField [][] numberTFs = new TextField[ROWS][COLS];

int number = 0;  // Number entered by user
TextField numberTF = new TextField();

// Used to display row and column of number entered
TextField rowTF = new TextField();
TextField columnTF = new TextField();

// Buttons to create new random array or sort the array
Button randomizeButton = new Button("New Random Array");
Button sortButton  = new Button("Sort Button");
```

You should determine what other variables you need and add them as needed.

2. PANEL FOR THE GRID OF TEXT FIELDS AND THE TWO BUTTONS

You will need a top level **VBox** to use as the root of the scene graph. Create another **VBox** to hold a label, the grid of text fields, and the two buttons. Add everything

to the top level `VBox`. You set the initial text in the text fiels to all zeros. You should have something like this
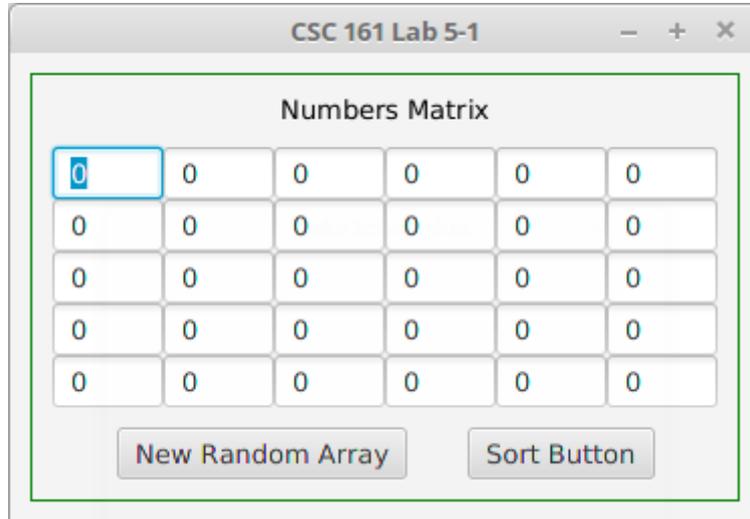

You must have a border around the panel as shown here. In addition, everything should remain centered even if the GUI is resized, as shown here:
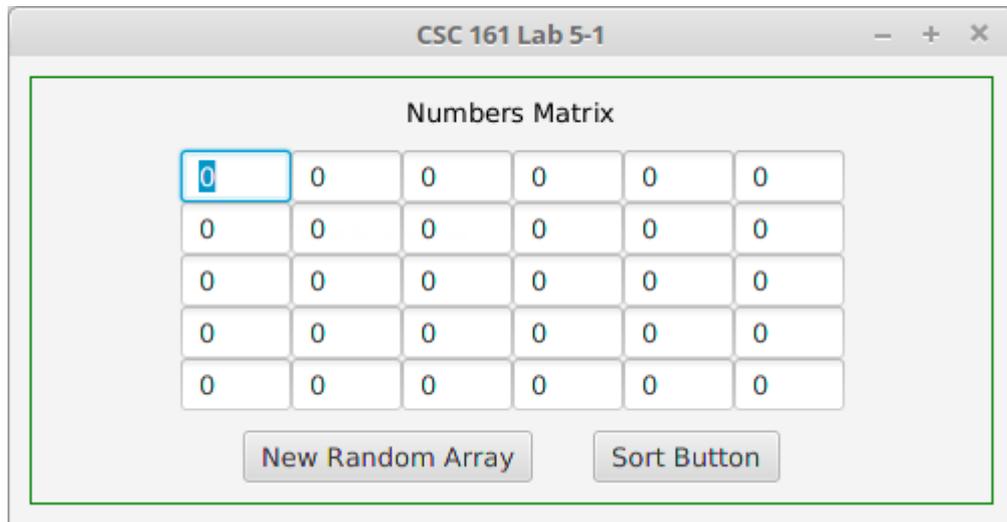

3. Add Event Handlers for the two buttons

Begin by adding an event handler for the random array button. This handler will fill the integer array with randomly-generated integers in the range 0..99 and then set the text fields to display the values in the array. The values in the text fields are filled in in order of increasing rows, and within each row, in order of increasing column.
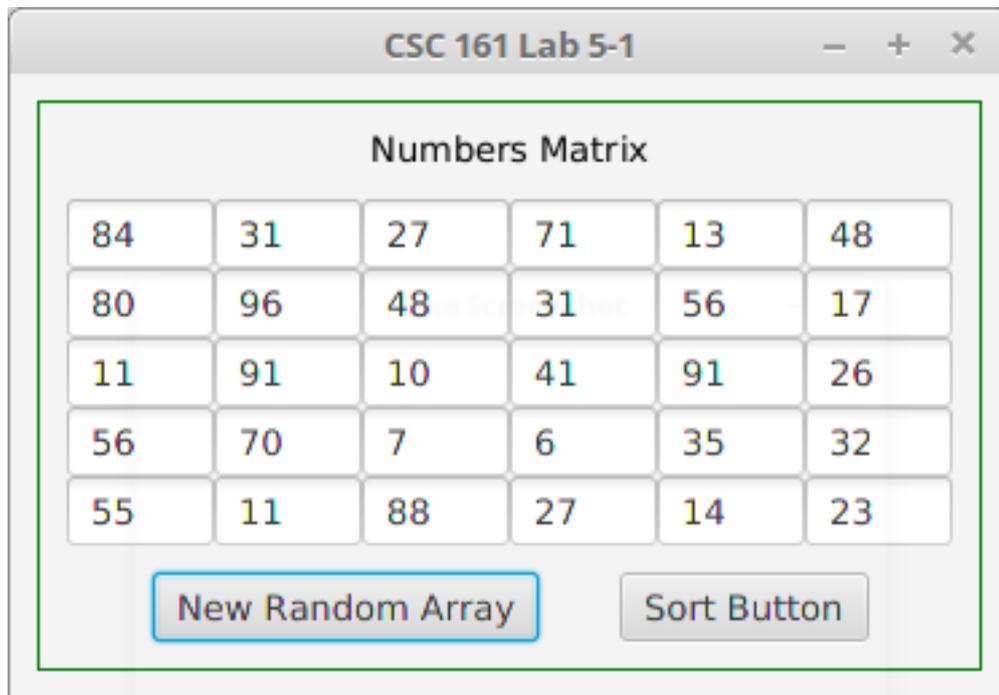
Next, add an event handler for the sort button. Pressing the sort button will sort the numbers array and then set the sorted values into the text fields in the grid:
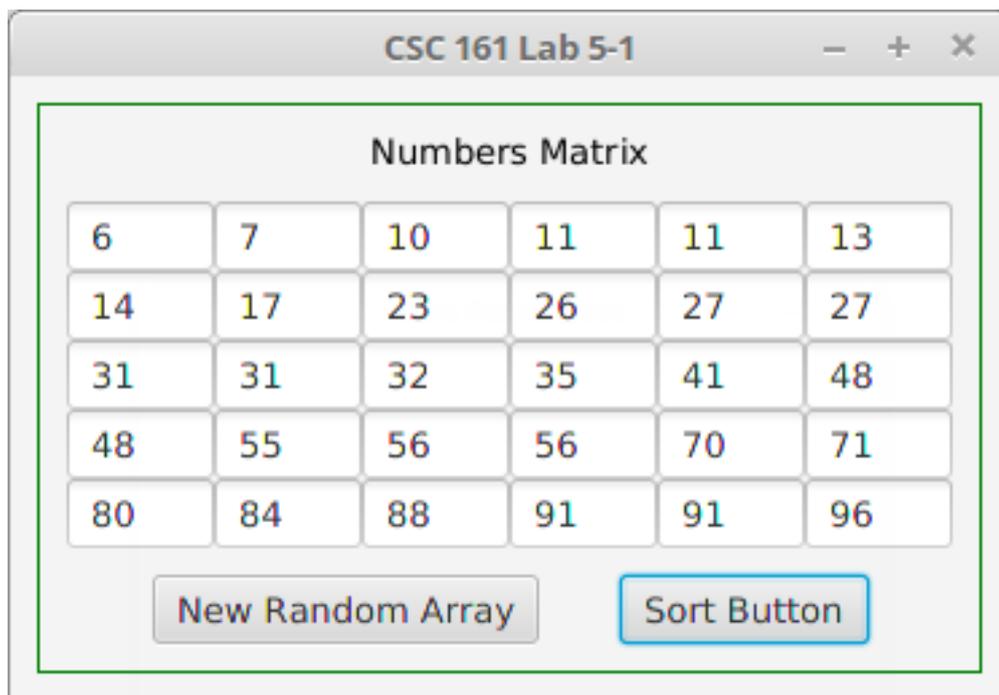
4. Panel for Entering a Search Number and getting Results

Add HBox and VBox panels as needed to achieve the effect shown in the screen shot below. This part of the user interface will contain the text field for entering a number to search for, as well as the two un-editable text fields that will display the row and column of the number within the matrix.
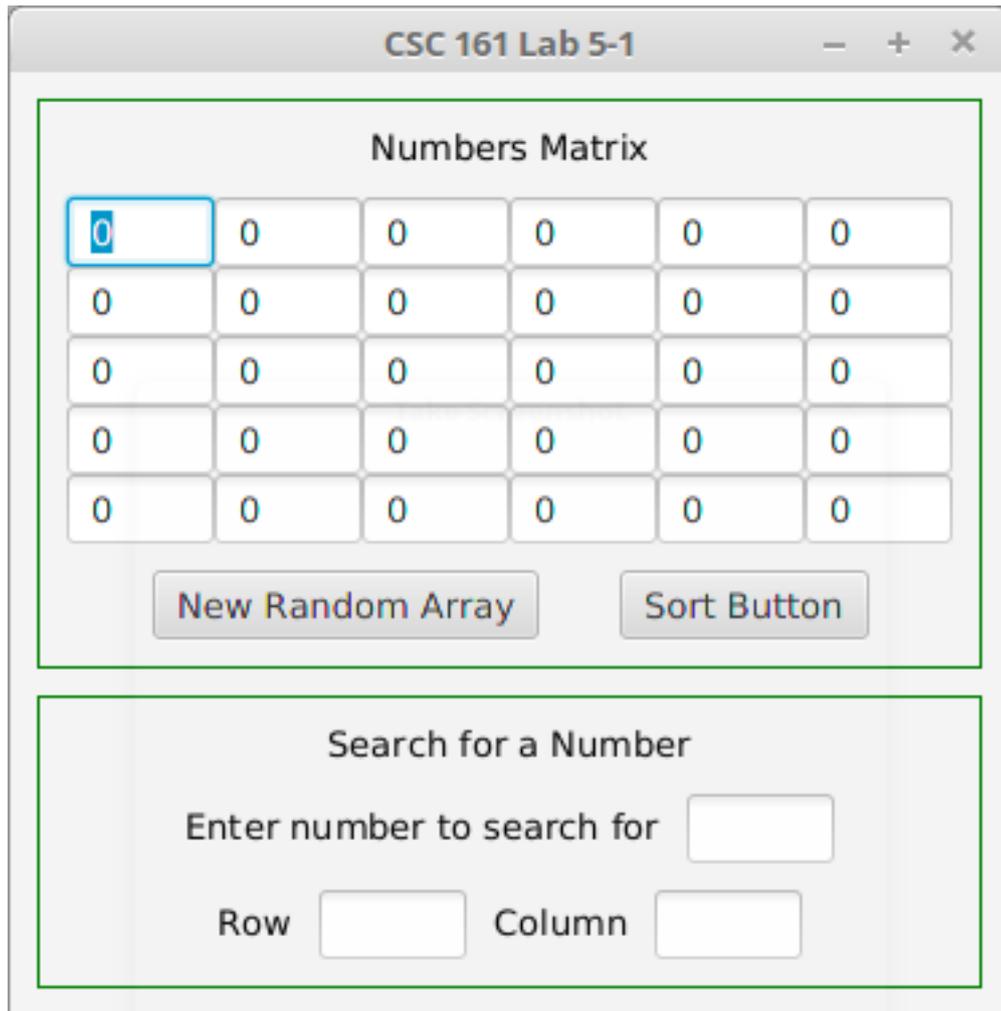
5. Add the Event Handler for the Number Entry Text Field

Add an event hander for the number entry text field. Each time the user enter a number and presses the enter key, the handler will search the grid of text fields for the entered number and display the results in the row and column text fields. This is illustrated in the series of screen shots below.

Before sorting:

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Numbers Matrix

40	74	31	96	47	9
26	0	54	37	7	51
88	44	21	65	47	13
88	99	34	97	68	30
6	77	19	81	42	40

[New Random Array]   [Sort Button]

Search for a Number

Enter number to search for   34

Row   3   Column   2

After sorting:

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Numbers Matrix

0	6	7	9	13	19
21	26	30	31	34	37
40	40	42	44	47	47
51	54	65	68	74	77
81	88	88	96	97	99

New Random Array   Sort Button

Search for a Number

Enter number to search for   34

Row   1   Column   4

Search for a number that is not in the grid:

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Numbers Matrix

0	6	7	9	13	19
21	26	30	31	34	37
40	40	42	44	47	47
51	54	65	68	74	77
81	88	88	96	97	99

New Random Array   Sort Button

Search for a Number

Enter number to search for   35

Row   -1   Column   -1

6. Due Date

Wednesday of Week 5.