



Lab 8 - Assignment 4

Due: 11:59 pm, Saturday, November 12

1. Problem 1

Write a program that randomly fills in 0-9 into an $n \times m$ matrix, prints the matrix, and finds the rows and columns with the largest value. You can use different approaches to solve this problem. For example, you can use two-dimensional arrays to store randomly generated data and `ArrayList` for saving the indices.

Note that we provide “[lab8_reference.pdf](#)” document to review two-dimensional array. It is also on the Canvas. If you are not familiar with this topic, please study this document as well.

Expected results:

Enter the number of rows: 4
Enter the number of columns: 6

The array content is:

```
7 9 6 0 4 3
0 4 8 4 8 2
2 1 1 4 5 2
7 3 5 9 6 0
```

The index of the largest row: 3
The index of the largest column: 4

2. Problem 2¹

Write a program that uses a bar chart to display the percentages of the overall grade represented by project, exams, assignments, and the attendance, as shown in Figure 1. Suppose that `project` takes 35 percent and is displayed in blue, `exams` take 30 percent and are displayed in green, `assignments` take 30 percent and are displayed in red, and the `attendance` takes 5 percent and is displayed in orange. Please use the JavaFX `Rectangle` class to display the bars.

¹ You might encounter errors when opening the project in Eclipse. It is because the project can't find the referenced `Application` Class. Please reference to “[Lecture 15: GUI Basics - 1](#)” for the details to setup your JavaFX environment.

Expected result:

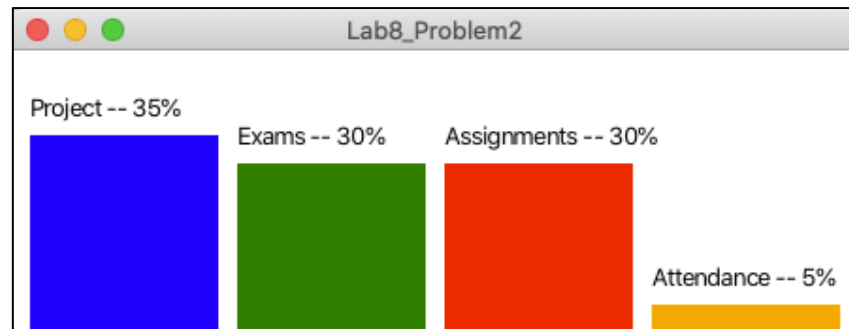


Figure 1: The expected result of Problem 2

3. Problem 3 (Extra Credit: 20 points)

Write a program that displays a 10-by-10 square matrix, as shown in Figure 2. Each element in the matrix is either **0** or **1**, randomly generated. Display each number centered in a text field. Use **TextField**'s **setText** method to set value **0** or **1** as a string.

Lab8_Problem3 - Extra Credit										
1	0	1	1	1	0	1	1	1	1	
1	0	1	1	0	1	1	0	1	1	
0	0	0	0	0	1	0	0	1	0	
1	1	0	0	0	1	1	1	1	0	
1	1	0	0	0	0	1	0	1	1	
0	1	1	0	0	1	0	0	1	1	
0	0	1	1	1	0	1	0	0	0	
0	1	0	1	0	0	1	1	0	1	
0	1	1	1	1	0	0	0	1	0	
0	1	0	0	0	1	1	1	1	1	

Figure 2: The expected result of Problem 3

4. Submission Requirement:

This is an individual assignment, and each student needs to submit his/her solution to the Canvas. The submission needs to be a .zip file containing following data:

3.1 A document (either .doc or .pdf format) that describes:

- Problem description: a short description of the issue you are solving
- Analysis:
 - What design/solution/algorithm you use to solve the problem?
 - What are the difficulties you encountered?
 - What did you learn from this assignment?
 - ...
- Source code: copy & paste your source code to the report (i.e., all .java files)
- Screenshots of sample runs: show that the code has been reasonably tested

Note that each problem should have its own section with subtitles for the required sections.

3.2 The project with source codes:

- Source project: The Eclipse Java project that has all of your changes.