Faculty of Science

Course: CSCI 2020U: Software Systems Development and Integration
Lab: #6
Topic: 2D Graphics

Overview

In this lab, you'll develop a Java program that draws a bar chart and a pie chart, using JavaFX. It is recommended, but not required, that you use IntelliJ for this lab.

Instructions

You can use any operating system or environment for this laboratory assignment.

You should draw the charts using 2D graphics in Java FX, submission using any other libraries for building charts will not be accepted.

You will create a new directory (or IntelliJ IDEA project) called `lab06`. The following code will store the data that you should use for your bar chart:

Code Listing 1: Sample Data for the Bar Chart

```
private static double[] avgHousingPricesByYear = {
 247381.0,264171.4,287715.3,294736.1,
 308431.4,322635.9,340253.0,363153.7
};
private static double[] avgCommercialPricesByYear = {
 1121585.3,1219479.5,1246354.2,1295364.8,
 1335932.6,1472362.0,1583521.9,1613246.3
};
```

Create a bar chart of these two arrays, each representing one of the two series in the chart. Show the first series with red rectangles, and the second series as blue rectangles. The height of the largest bar should be the maximum height of the window (minus a little space all around the chart, e.g. 50 pixels), and the rest should be proportionally smaller, based on their value.

For the pie chart, you'll use the following data:

Code Listing 2: Sample Data for the Pie Chart

```
private static String[] ageGroups = {
 "18-25", "26-35", "36-45", "46-55", "56-65", "65+"
};
private static int[] purchasesByAgeGroup = {
 648, 1021, 2453, 3173, 1868, 2247
};
private static Color[] pieColours = {
 Color.AQUA, Color.GOLD, Color.DARKORANGE,
 Color.DARKSALMON, Color.LAWNGREEN, Color.PLUM
};
```

Create a pie chart of the purchasesByAgeGroup array, by drawing a series of arcs. The colour of each arc should correspond to the colour at the same index in the pieColors array.

***Note**: See figure 1 for an example of the final product.*

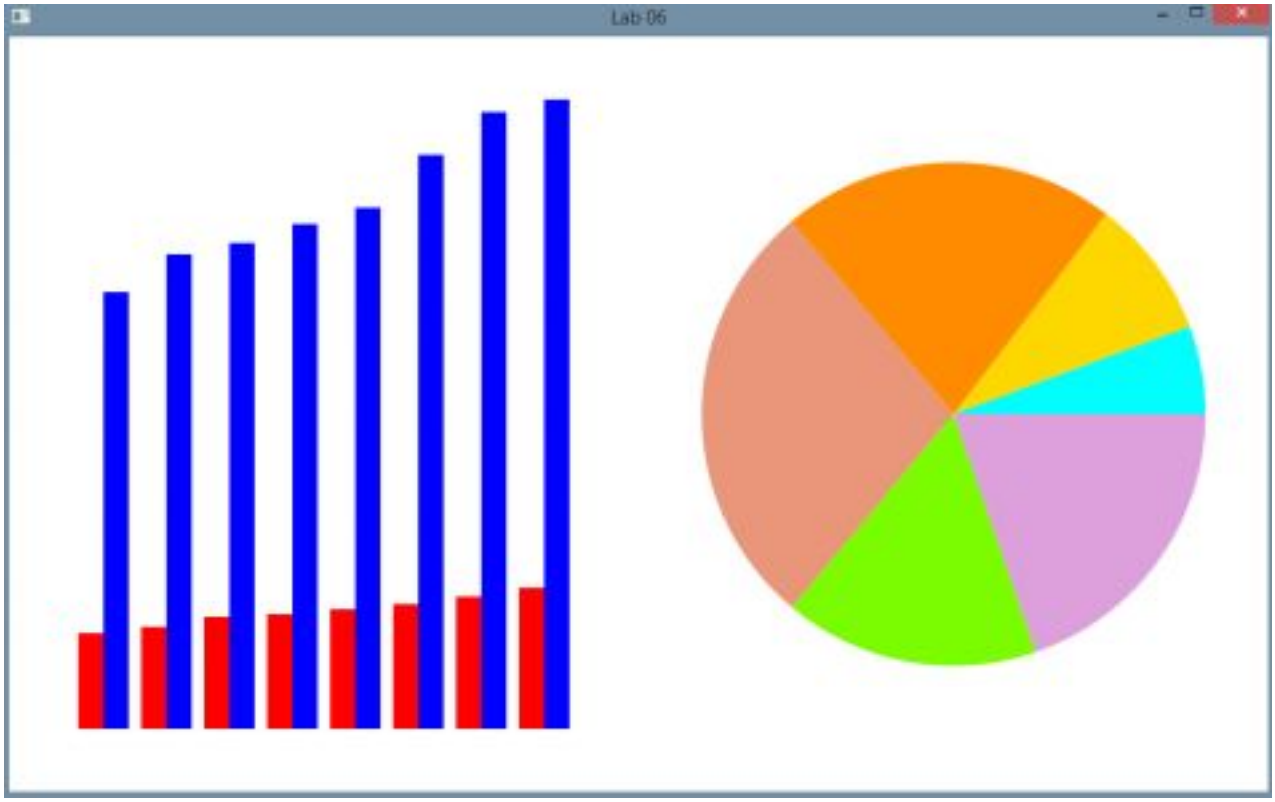

Figure 1: The running application, showing the two charts

Extra Challenge (Optional)

Add an x-axis and y-axis to the bar chart, as well as a legend for the two series. For the pie chart, label each pie slice with the age group and the percentage of purchases. You could also draw an outline around each of the pie slices. The most challenging addition could be to add the ability to *explode* one or more of the pie slices, where if the slices is *exploded*, then it would be offset from the centre of the circle by some number of pixels.

How to Submit

In session *(Preferably)*

- Show your running application to the TA to prove that you have finished this lab.
    - This can happen by your sharing your screen to the TA or direct messaging them with screenshots.
    - If your TA is too busy while helping other students in-session, you may follow the “after lab hours” submission instructions below instead.

After lab hours *(1 week to submit - before your next lab session)*

In one PDF documents attach the following:

- Screenshot of your local directory “lab06” showing the appropriate .java/.fxml files.
- Screenshot of your running application (UI) including the expected output.
- Link of your GitHub repository (if it is a public repository) -- this contains your full source code.
    - Alternatively, attach your project as a `.zip` along with the PDF file.

The TA can provide oral feedback if you do not receive full marks for any lab assignment, but it is most appropriate to ask the TA for this feedback in a timely fashion (i.e. ask now, not at the end of the term).