CS102A Course Project, Fall 2018: Plotting with Dancing Bars

November 2018 @SUSTC

The goal of the project is to finish 3 programs (Task A, B, C) to plot simple barcharts(histograms), grouped-barcharts, stacked-barcharts and barchart animations with given tools.

Task A (Enhancing HistogramA): Given `HistogramA.java` and `HistogramATest.java`, use two given tools, `javax.json` (glassfish implementation `javax-json-1.1.4.jar` is given, refer https://www.oracle.com/technetwork/articles/java/json-1973242.html) and `Stddraw` (`Stddraw.java`, `Stddraw.html` are given), to draw a color histogram with annotations and scales by reading a Json-formatted file with data and specific drawing formats.

Based-on the given programs, add the following features:

A.1 All the parameter values in the formats part and the minvalue setting of the data part could be either customized by the given values or by default values.

A.2 Optimize the setting values of the default parameters in order to get a professional outlook for the histogram using default values. (Refer RGB color selection: `https://www.rapidtables.com/web/color/RGB_Color.html`)

A.3 Complete `plotRightRuler();`

A.4 To achieve better outlook, various types of fonts and location setting for all kinds of texts in the higtogram should be customized by the given parameters in the input Json file and should also work with default values.

Three sample output of `HistgramA` are given in the project reference.

Task B (Grouped-Barcharts and Stacked-Barcharts): Based on the Task A, write a program to read a Json formatted data and drawing specific requirements file and draw color multi-dimensional (grouped) histograms or stacked barchats (drawing categories based on the input parameter) with scales, annotations and lengends. Four sample drawing barcharts are given as examples in the project reference.

Task C (Dancing Bars -- Animation of Dynamic Barcharts): View the given video, write a program to implement an animation of dynamic barcharts with sorted data according to the data and drawing parameters reading from a Json file.

Tips: 1) Use `StdDraw's show(), pause(), enabledoublebuffering(), disabledoublebuffering ()` to implement animation. 2) Between two sets of data, linear interpolation can be used to calculate multiple sets of intermediate evolution data, each time show a set (if necessary, sort or adjust the order), pause a number of milliseconds, and continue to draw the next set of data.

To ensure the continuous visual effect of the animation, you may calculate the data for all groups (including interpolation groups) first, and then draw them seperately in a sequence to the canvas.

All the data used in plotting should be came from real world and it is recommended to use the latest domestic and international statistics data published by the National Bureau of Statistics (`http://data.stats.gov.cn/index.htm`).

For Task A, at least 4 sets of data are required. For Task B, at least 4 sets of data are required (at least 2 sets for grouped barcharts, and at least 2 sets for stacked barcharts). For Task C, at least 2 sets of data are required for barchart animations.

The project is a team work for every group with 2 or 3 students from the same lab class. The working duration is about one month. The last submitting date and the presentation date would be specified by the instruction of your Lab instructor in your lab class thereafter.

Every group should explicitly describe the contribution rate for the team project work for every group member. The project score for every student is a combination of the team work score gained and one's contribution rate.

Feel free to use the Project Reference Materials attached.

The File List of the Project Reference:

```
+DancingBarsReference>
.   +TaskA_HistogramA>
.   .   -HistogramA.html
.   .   +images>
.   .   .   -HistogramA1.draw.png
.   .   .   -HistogramA2.draw.png
.   .   .   -HistogramA3.draw.png
.   .   .   -HistogramATest_run.png
.   .   +code_HistogramA>
.   .   .   -HistogramA.java
.   .   .   -HistogramA1.json.txt
.   .   .   -HistogramA2.json.txt
.   .   .   -HistogramA3.json.txt
.   .   .   -HistogramATest.java
.   .   .   -javax.json-1.1.4.jar
.   .   .   -StdDraw.java
.   +TaskB_samples>
.   .   -barchart1.png
.   .   -barchart2.jpg
.   .   -barchartStacked3.png
.   .   -barchartstacked4.jpg
.   +TaskC_video>
.   .   -DemoVideo.mp4
.   +tool_javax.json>
.   .   -javax.json_URLs.txt
.   .   -TryJson.ReadMe.txt
.   .   +code_TryJson>
.   .   .   -TryJson.java
.   .   .   -facebook.json
.   .   .   -javax.json-1.1.4.jar
.   +tool_StdDraw>
.   .   -StdDraw.html
.   .   -script.js
.   .   -stylesheet.css
.   .   +code_StdDraw>
.   .   .   -StdDraw.java
```