Assignment 2: Graphs

Overview

Create a custom control that draws a graph of your choice.

Directions

Start by selecting a type of graph you would like to draw. Some options are listed below along with their functional requirements. If there is a different type of chart you would like to work on, check with your instructor for assignment scope.

Submit an application that includes your custom graph, as well as some means of entering data to be displayed in the graph.

Pie Chart

Draw a pie chart given a list of numbers. Numbers do not have be percentages of the pie. For example, if the user entered 10, 20, and 10, the chart would have 3 slices that covered 25%, 50%, and 25% of the pie. Each slice should have a different color, shading, or some easy way of identifying it.

Bonus: Display a legend on the pie chart with each section labelled.

Bar Chart

Draw a bar chart given a list of numbers. The chart should be scaled appropriately for the numbers entered by the user, and a y-axis should be draw to show the scale. The user may enter negative numbers. Each bar should have a different color, shading, or some easy way of identifying it.

Bonus: Draw an x-axis, with each bar labelled beneath (or above for negative numbers).

Line Chart

Draw a line chart that can display multiple lines. The chart should be scaled appropriately for the numbers entered by the user, and a y-axis should be drawn to show the scale. Each line is given by a sequence of numbers, and should be draw with a different color, shading, or other easy way of identifying it.

Bonus: Display a legend identifying each line with a label.

Histogram

Draw a histogram chart with adjustable binning. Data is supplied as a sequence of numbers, and divided into bins of custom size. The height of each bar in the histogram indicates the number of occurrences of numbers that fall in a specific range. The user should also be able to specify the histogram's start and end, as well as the number of bins in the range.

Bonus: Convert your histogram to a Pareto chart by also drawing a line indicating the total data points to the left of a given bin.

Scatter Plot

Draw a scatter plot with custom data point visuals. Each point is given as an (x, y) pair of coordinates, as well as an integer indicating which data set it belongs to (you could also use some UI element to make it easier to divide points into data sets). The graph should display x and y axes that are scaled to the data supplied by the user. Each point should be drawn with a visual style that indicates which data set it belongs to.

Bonus: Display a legend identifying each data set with a label.

Evaluation

This assignment will be graded for both design and functionality.

The design component will be evaluated as follows:

Design Task	Marks
User Experience o **Is the application visually appealing and consistent?** o **Is it easy to understand how to use the application at a glance?** o **Does the UI convey information in a clear way?**	20
Code quality o **Is the code clear and easy to read?** o **Is the style consistent?** o **Are comments used when necessary?**	20
Total	40

Design tasks are worth 20 marks each, but will be assigned a grade of 20, 15, 10, 5, or 0.

20 - Excellent	*15 - Good*	*10 - Fair*	*5 - Poor*

User Experience	Clear, consistent, and appealing visual design. Easy to read, and easy to use.	Mostly clear design, takes a little time to get used to using the UI.	Application may function correctly, but is somewhat challenging to use.	Little effort put into making a user-friendly experience.
Code quality	Code is clear and easy to read. Style is consistent throughout and comments are used where needed.	Code is mostly clear. A few inconsistencies in style, or locations where comments would help with readability.	Code could use some refactoring. Style is inconsistent with little to no documentation.	Code is very difficult to read.

Functionality will be tested with standard tests. Students are encouraged to tests their code thoroughly. Functional tests will check for the following features:

Functionality Task	**Marks**
Custom Control o **Does the control function as expected?** o **Does the control display data in a readable way?** o **Are all requirements implemented?**	40
Application User Interface o **Can the user enter data for your custom control?** o **Can all required data be entered?**	20
Total	60