CSCI 2120:
Software Design & Development II

UNIT4: UI management

GUI framework

JavaFX: Charts

Overview

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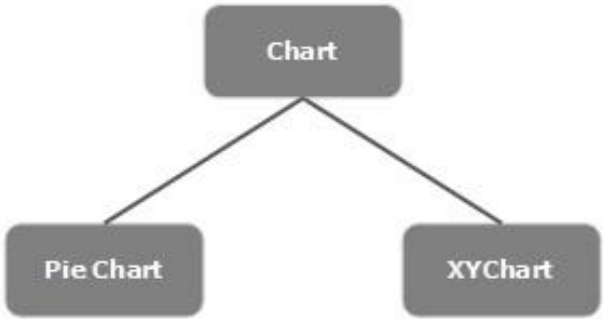
Introduction

- In general, a chart is a graphical representation of data. There are various kinds of charts to represent data such as **Bar Chart, Pie Chart, Line Chart, Scatter Chart, etc.**
- JavaFX Provides support for various **Pie Charts** and **XY** Charts. The charts that are represented on an XY–plane include **AreaChart, BarChart, BubbleChart, LineChart, ScatterChart, StackedAreaChart, StackedBarChart, etc.**
- Each chart is represented by a class and all these charts belongs to the package **javafx.scene.chart.**
- The class named **Chart** is the base class of all the charts in JavaFX and the **XYChart** is base class of all those charts that are drawn on the XY–plane.



Creating a Chart

To create a chart, you need to –

- Define the axis of the chart
- Instantiate the respective class
- Prepare and pass data to the chart

Instantiating the Respective Class

To create a chart, instantiate its respective class. For example, if you want to create a line chart, you need to instantiate the class named Line as follows −

```
LineChart linechart = new LineChart(xAxis, yAxis);
```

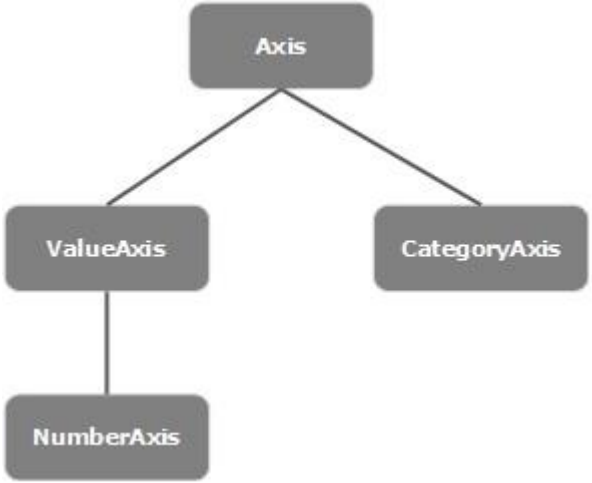
As observed in the above code, while instantiating, you need to pass two objects representing the X and Y axis of the chart respectively.

Defining the Axis

In general, the axis of the charts can be represented by −

- Numbers such as Population, Age and
- Categories such as Days in a Week, Countries.

In JavaFX, an axis is an abstract class representing X or Y axis. It has two subclasses to define each type of axis, namely CategoryAxis and NumberAxis as shown in the following diagram −



Defining the Axis → Category Axis

By instantiating this class, you can define (create) an X or Y axis along which each value represents a category.

You can define a Category axis by instantiating this class as shown below −

```
CategoryAxis xAxis = new CategoryAxis();
```

To this axis, you need set the list of categories and label to the axis as shown below −

```
//setting the list of categories.
xAxis.setCategories(FXCollections.<String>observableArrayList
(Arrays.asList("n ame1", "name2"….)));

//Setting label to the axis
xAxis.setLabel("name of the axis ");
```

Defining the Axis → NumberAxis

By instantiating this class, you can define (create) an X or Y axis along which each value represents a Numerical value. You can use any **Number type with this Axis, Long, Double, BigDecimal, etc**.

You can define a Number axis by instantiating this class as follows −

```
//Defining the axis
NumberAxis yAxis = new NumberAxis();

//Setting labelto the axis
yAxis.setLabel("name of the axis");
```

Passing Data to XY Charts

All the XY charts are represented along the XY plane. To plot a set of points in a chart, we need to specify a series of XY coordinates.

The **<X,Y>** class of the **javafx.scene.chart** package is a class using which, you can send data to a chart.

This class holds an observable list of named series. You can get this list using the **getData()** method of **XYChart.Series** class −

```
ObservableList list = series.getData();
```

Where, **series** is the object of the **XYChart.Series** class. You can add data to this list using the **add()** method as follows −

```
list.add(new XYChart.Data(x-axis data, y-axis data));
```

These two lines can be written together as shown below −

```
series.getData().add(new XYChart.Data(x-axis data, y-axis data));
```

Chart subclasses

S.No	Chart & Description
1	**Pie Chart** A pie-chart is a representation of values as slices of a circle with different colors. These slices are labeled and the values corresponding to each slice is represented in the chart. In JavaFX, a pie chart is represented by a class named PieChart. This class belongs to the package javafx.scene.chart.
2	**Line Chart** A line chart or line graph displays information as a series of data points (markers) connected by straight line segments. Line Chart shows how the data changes at equal time frequency. In JavaFX, a line chart is represented by a class named LineChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a LineChart node in JavaFX.
3	**Area Chart** Area charts are used to draw area based charts. It plots the area between the given series of points and the axis. In general, this chart is used to compare two quantities. In JavaFX, an Area chart is represented by a class named AreaChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a AreaChart node in JavaFX.

Chart subclasses

S.No	Chart & Description
4	**Bar Chart** A bar chart is used to represent grouped data using rectangular bars. The length of these bars depicts the values. The bars in the bar chart can be plotted vertically or horizontally. In JavaFX, a Bar chart is represented by a class named BarChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a BarChart node in JavaFX.
5	**Bubble Chart** A bubble chart is used to plat three-dimensional data. The third dimension will be represented by the size (radius) of the bubble. In JavaFX, a Bubble chart is represented by a class named BubbleChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a BubbleChart node in JavaFX.
6	**Scatter Chart** A scatterplot is a type of graph which uses values from two variables plotted in a Cartesian plane. It is usually used to find out the relationship between two variables. In JavaFX, a Scatter chart is represented by a class named ScatterChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a ScatterChart node in JavaFX.

Chart subclasses

S.No	Chart & Description
7	**Stacked Area Chart** In JavaFX, a Stacked Area chart is represented by a class named StackedAreaChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create an StackedAreaChart node in JavaFX.
8	**Stacked Bar Chart** In JavaFX, a Stacked Bar chart is represented by a class named StackedBarChart. This class belongs to the package javafx.scene.chart. By instantiating this class, you can create a StackedBarChart node in JavaFX.

END