Chapter 31 – JavaFX Basics

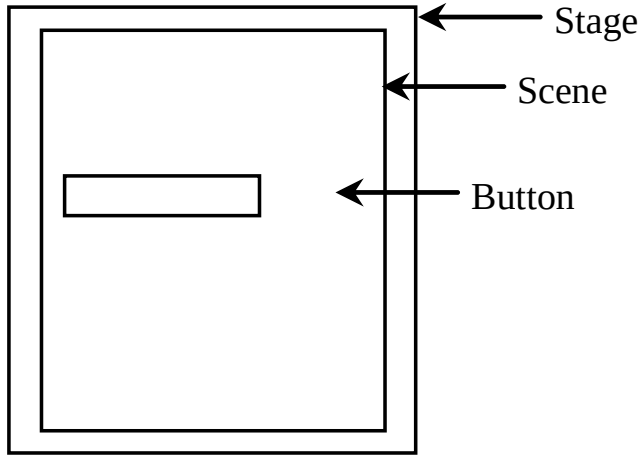
Lia10, C14

About JavaFX

- JavaFX started in Java 8.
- JavaFX is newer Swing.

Basic Structure of JavaFX

- Application
- Override the start(Stage) method
- Stage (one or more), Scene, and Nodes

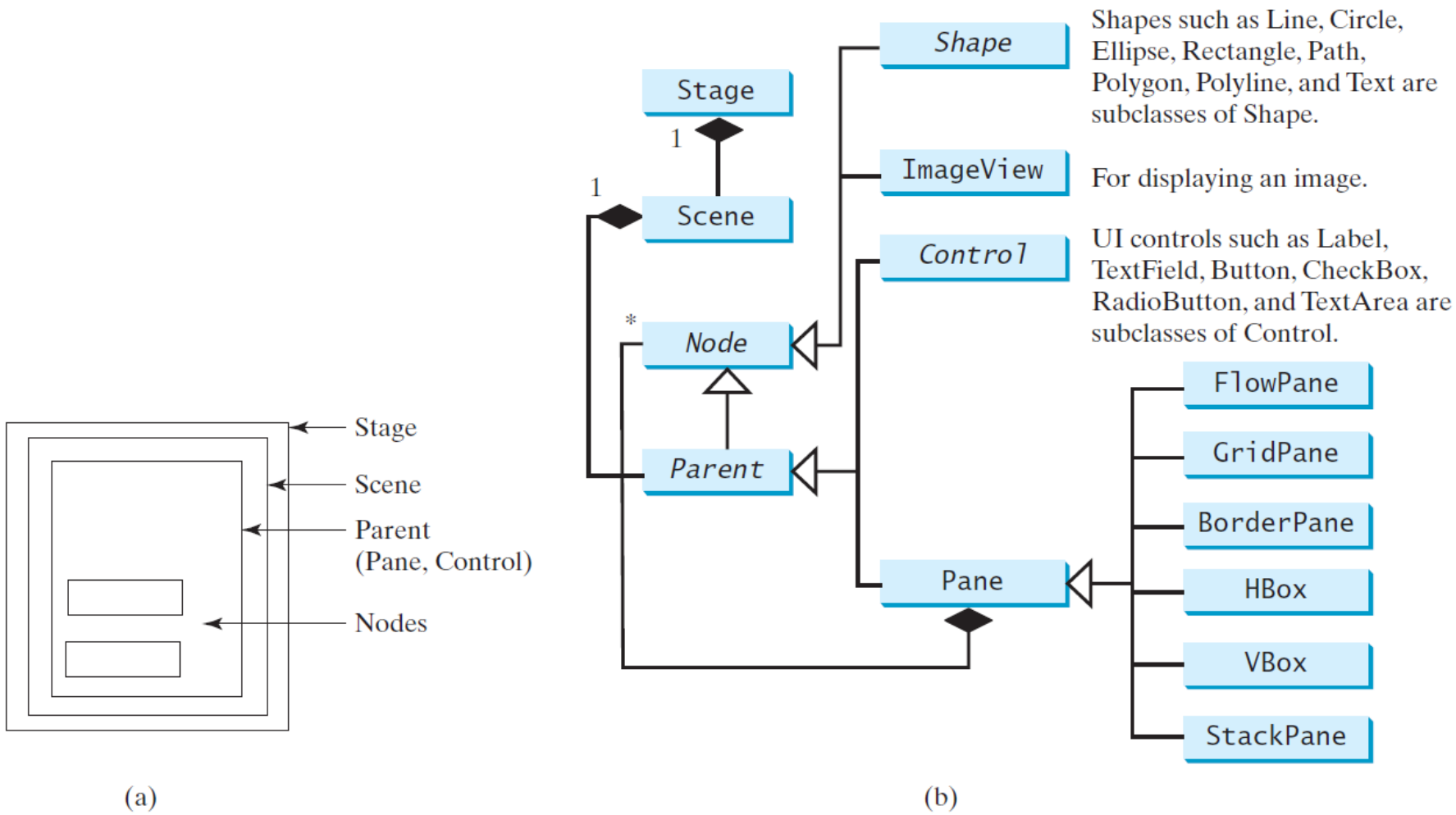


Example **MyJavaFX**

Note the difference in red between Swing & JavaFX programs

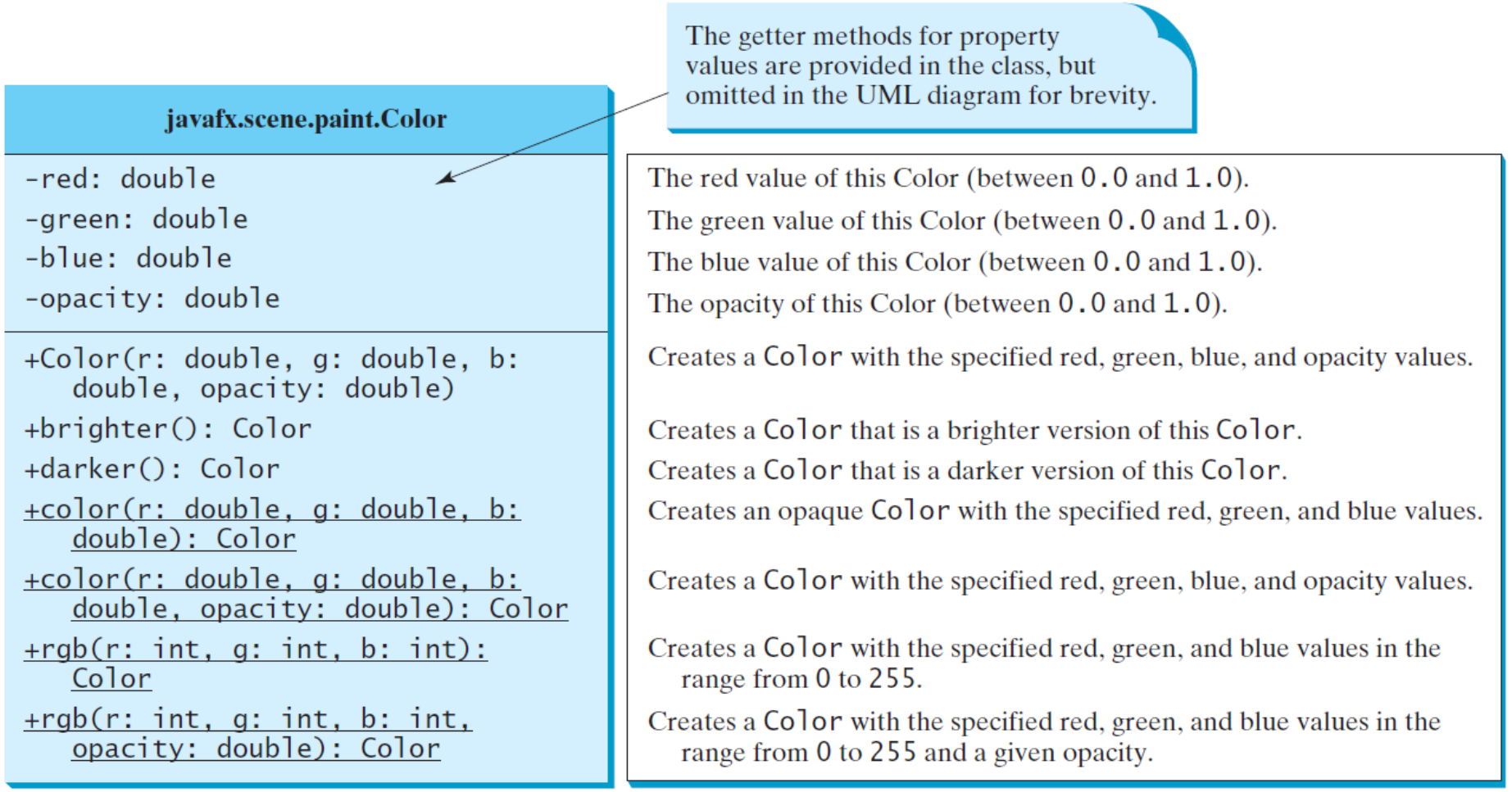
```
import javafx.application.Application;
import javafx.stage.Stage;
import javafx.scene.Scene;
import javafx.scene.control.Button;
public class MyJavaFX extends Application {
    @Override // Override the start method in the Application class
    public void start(Stage primaryStage) {
        // Create a scene and place a button in the scene
        Button btOK = new Button("OK");
        Scene scene = new Scene(btOK, 200, 250);
        primaryStage.setTitle("MyJavaFX"); // Set the stage title
        primaryStage.setScene(scene); // Place the scene in the stage
        primaryStage.show(); // Display the stage
    }
    /**
    * The main method is only needed for the IDE with limited
    * JavaFX support. Not needed for running from the command line.
    */
    public static void main(String[] args) {
       Application.launch(args);
    }
}
```

Panes, UI Controls, and Shapes



A Scene can contain a Pane or Control, but not a Shape or ImageView

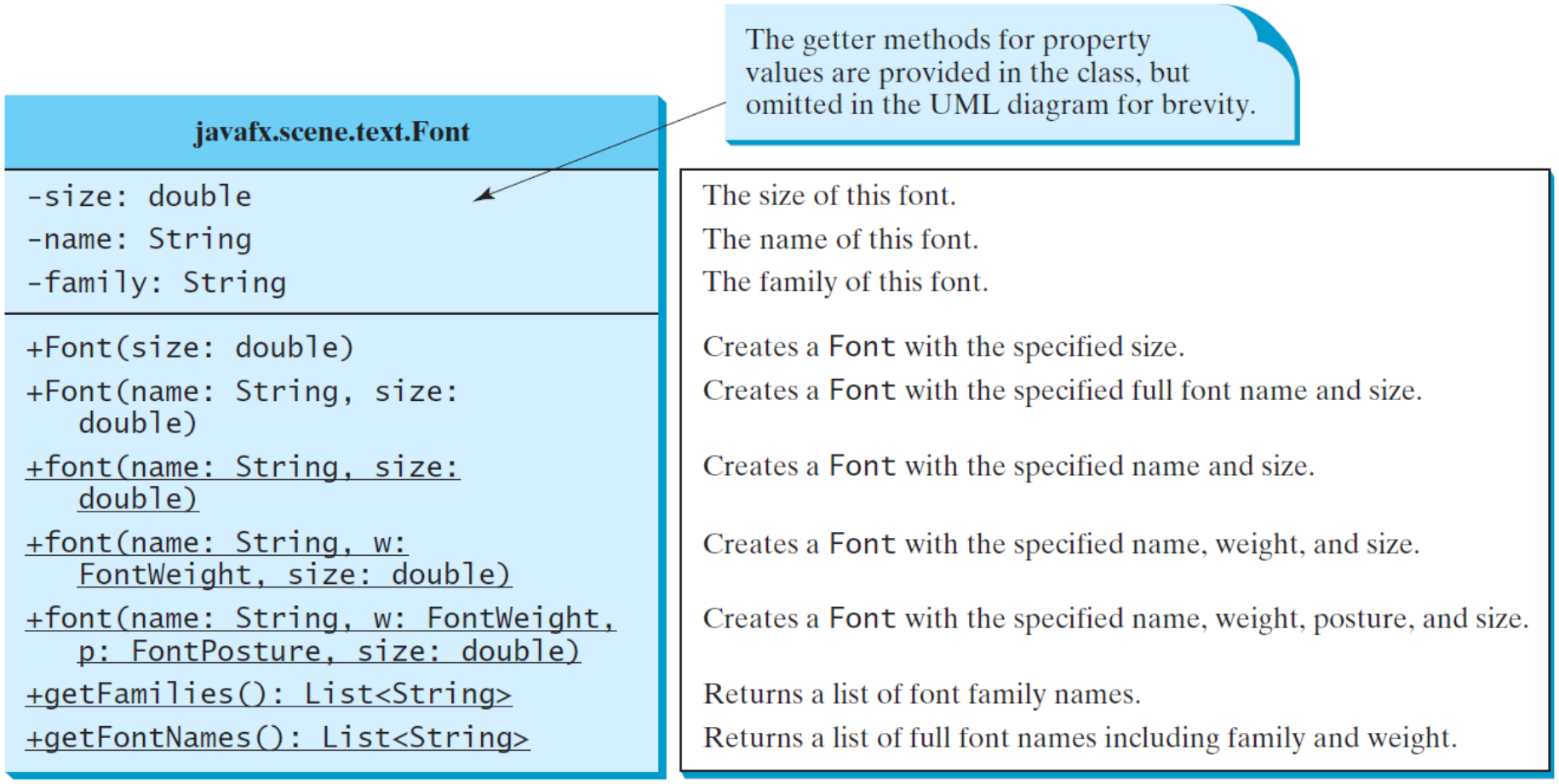
The Color Class



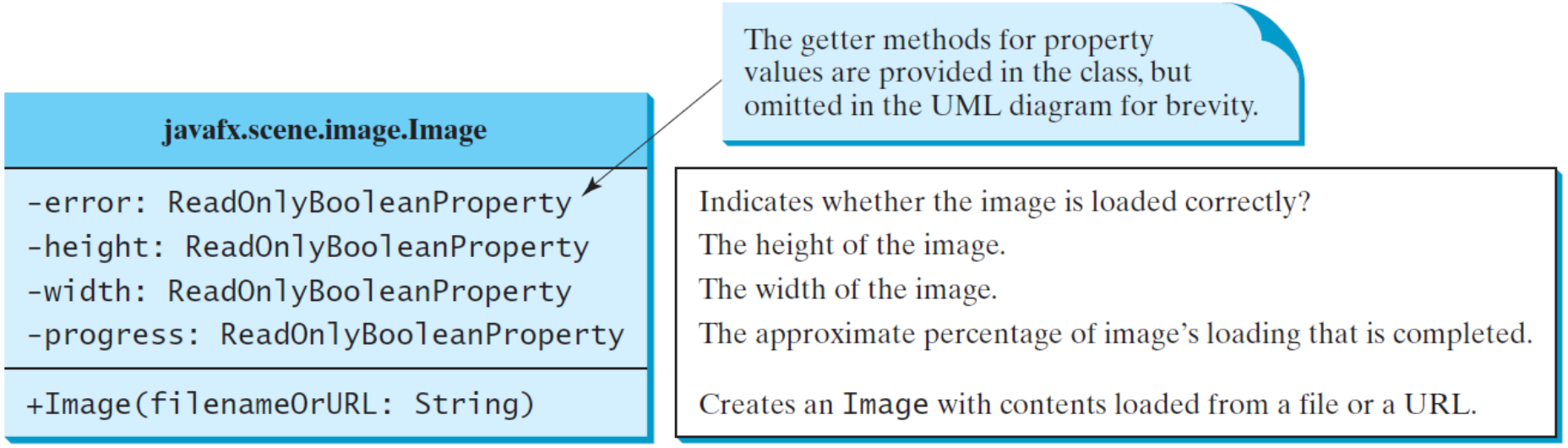

```
Color c = new Color(0,0,1.0); // constructor call
Color c = Color.color(0,0,1.0);  vs.  Color c = Color.rgb(0,0,255);
```

All pre-defined colors are in uppercase; e.g., `Color.BEIGE`

The Font Class

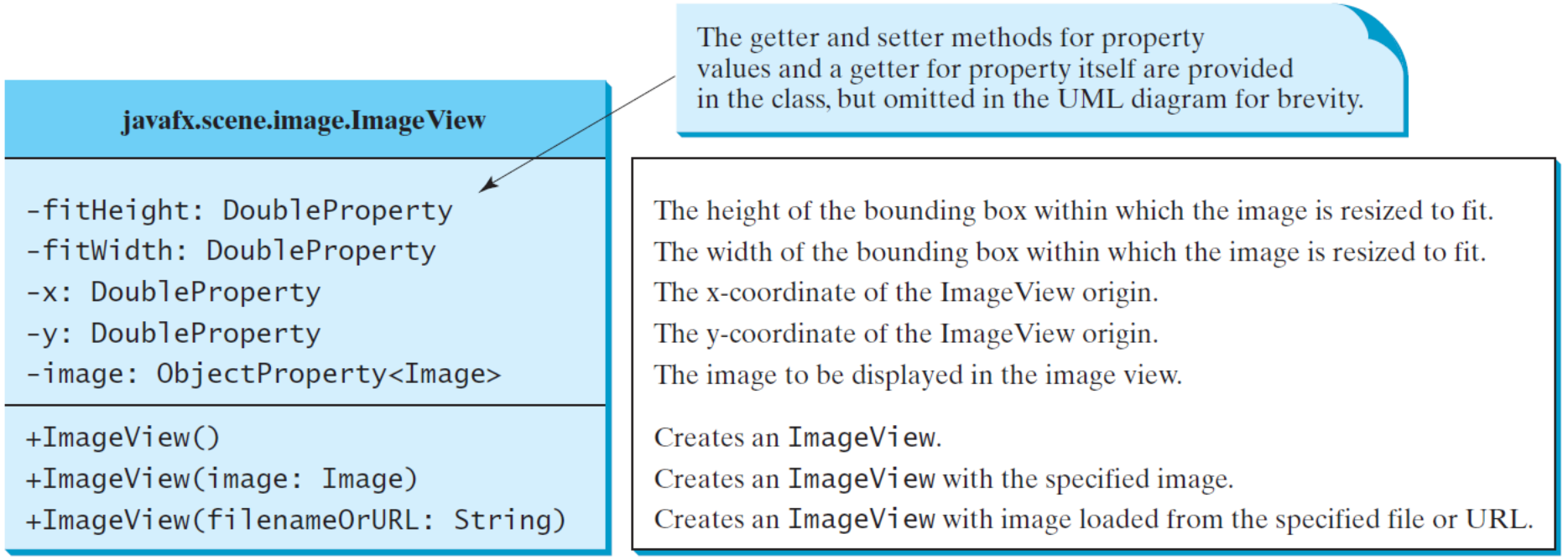


The Image Class

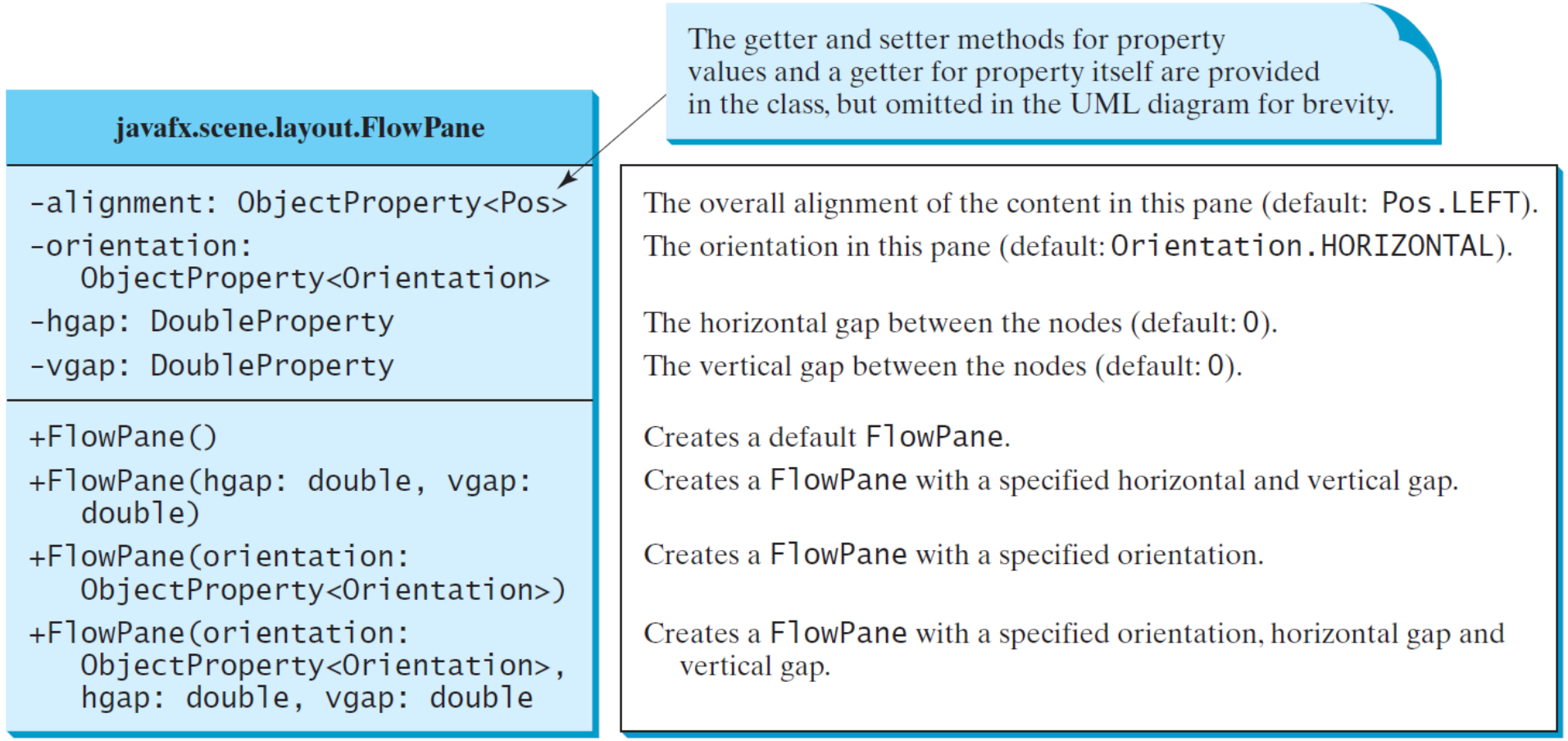


Note: a URL ("http://www.csCourse.net/image/us.gif") can be passed to constructor Image

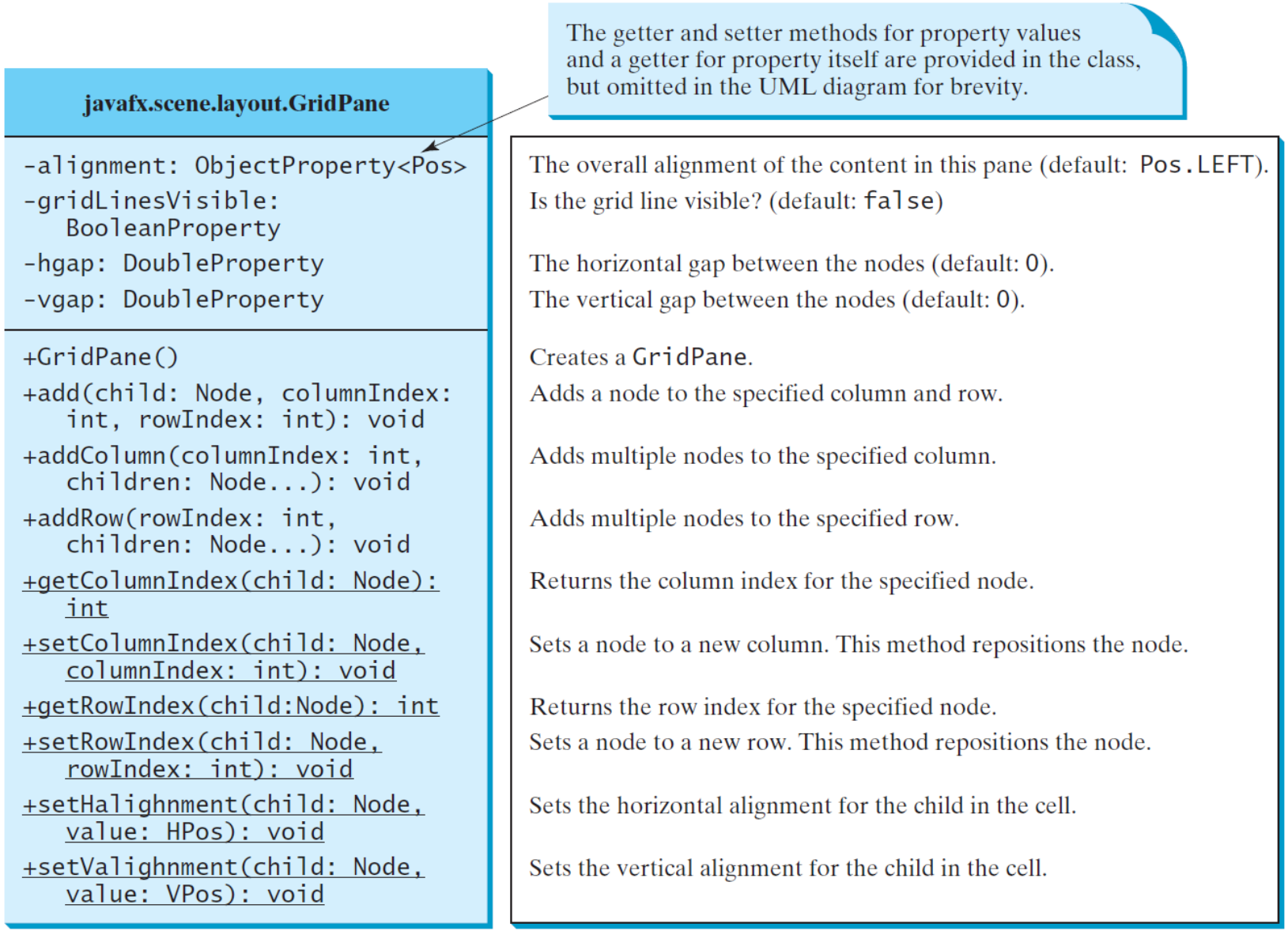
The ImageView Class



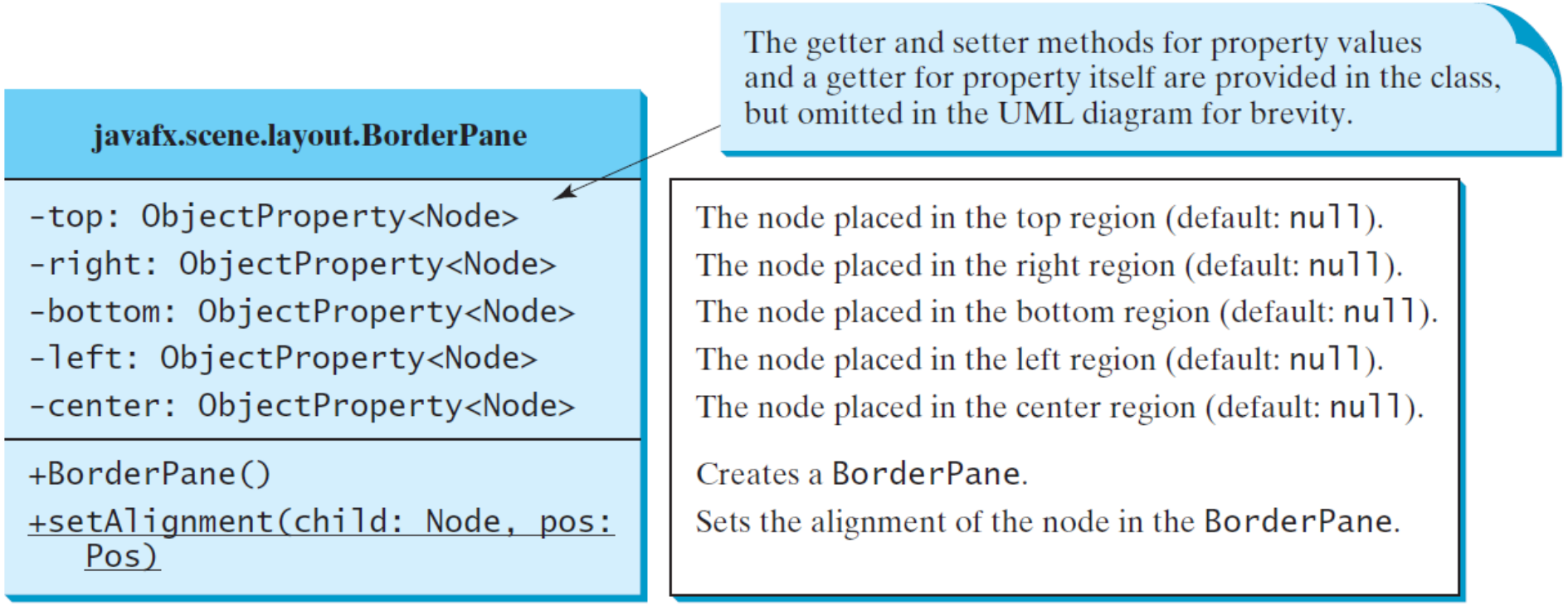
FlowPane: fill row 1, then 2, etc.



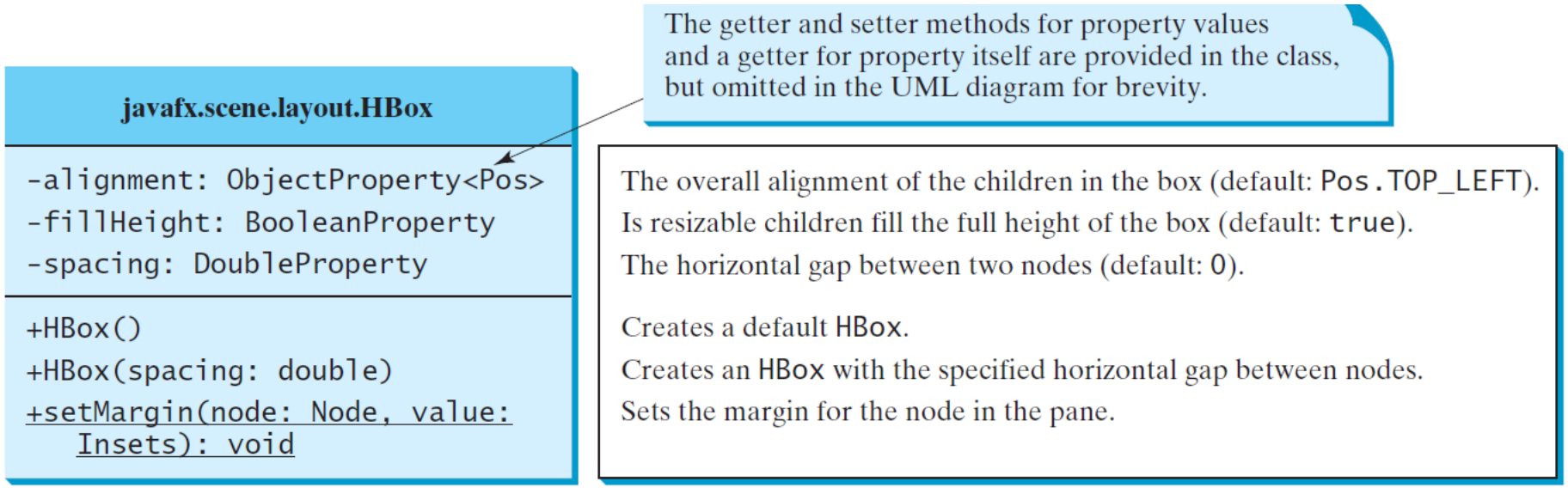
GridPane


The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
javafx.scene.layout.GridPane
-alignment: ObjectProperty<Pos>
-gridLinesVisible: BooleanProperty
-hgap: DoubleProperty
-vgap: DoubleProperty
+GridPane()
+add(child: Node, columnIndex: int, rowIndex: int): void
+addColumn(columnIndex: int, children: Node...): void
+addRow(rowIndex: int, children: Node...): void
+getColumnIndex(child: Node): int
+setColumnIndex(child: Node, columnIndex: int): void
+getRowIndex(child:Node): int
+setRowIndex(child: Node, rowIndex: int): void
+setHalighnment(child: Node, value: HPos): void
+setValighnment(child: Node, value: VPos): void
The overall alignment of the content in this pane (default: Pos.LEFT).
Is the grid line visible? (default: false)
The horizontal gap between the nodes (default: 0).
The vertical gap between the nodes (default: 0).
Creates a GridPane.
Adds a node to the specified column and row.
Adds multiple nodes to the specified column.
Adds multiple nodes to the specified row.
Returns the column index for the specified node.
Sets a node to a new column. This method repositions the node.
Returns the row index for the specified node.
Sets a node to a new row. This method repositions the node.
Sets the horizontal alignment for the child in the cell.
Sets the vertical alignment for the child in the cell.

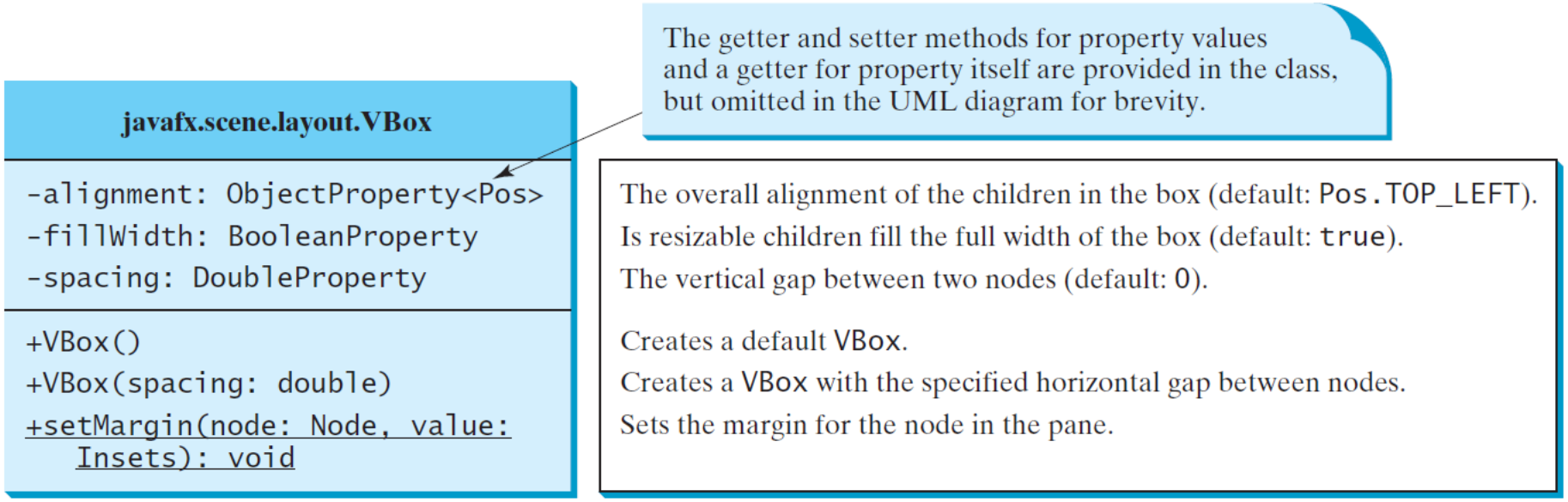
BorderPane


javafx.scene.layout.BorderPane
-top: ObjectProperty<Node>
-right: ObjectProperty<Node>
-bottom: ObjectProperty<Node>
-left: ObjectProperty<Node>
-center: ObjectProperty<Node>
+BorderPane()
+setAlignment(child: Node, pos: Pos)
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The node placed in the top region (default: null).
The node placed in the right region (default: null).
The node placed in the bottom region (default: null).
The node placed in the left region (default: null).
The node placed in the center region (default: null).
Creates a BorderPane.
Sets the alignment of the node in the BorderPane.

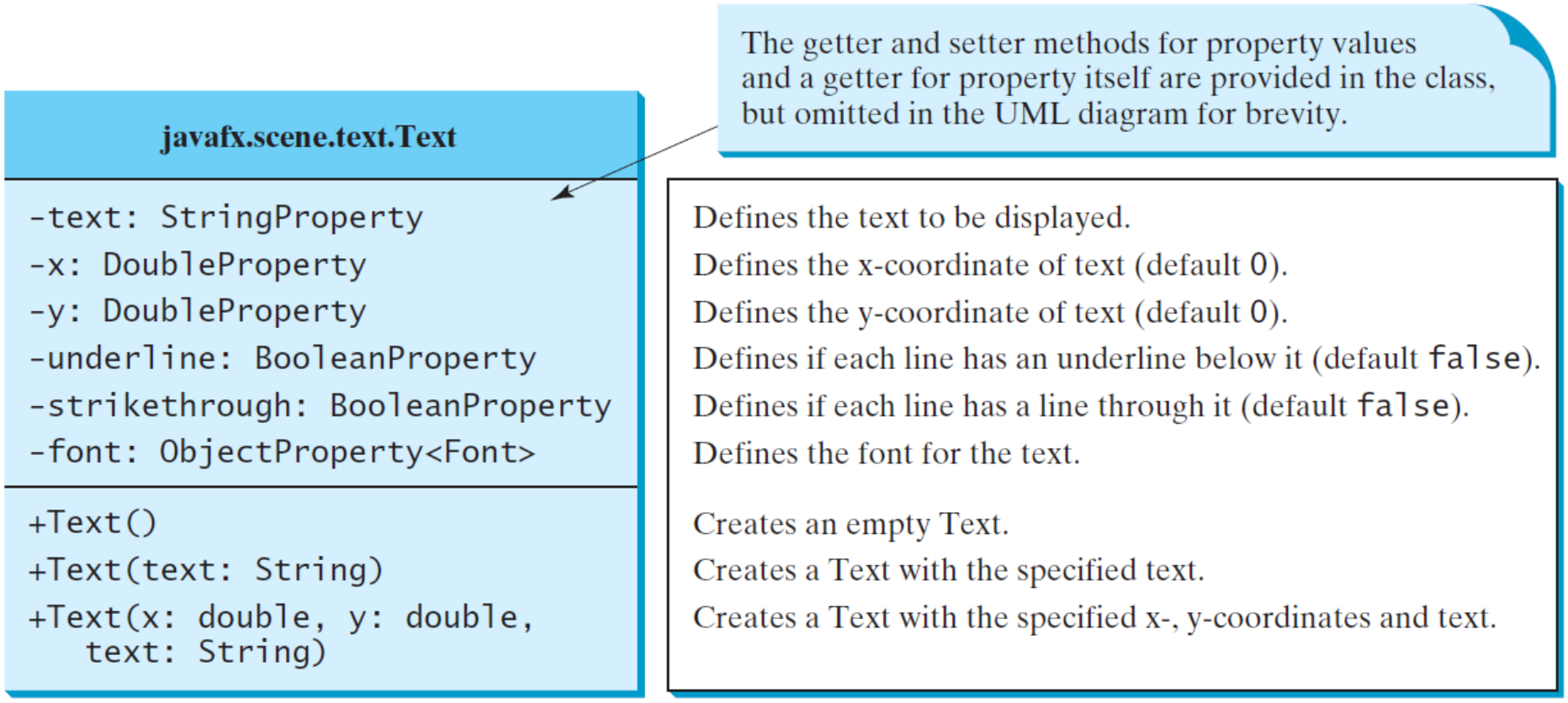
HBox


javafx.scene.layout.HBox
-alignment: ObjectProperty<Pos>
-fillHeight: BooleanProperty
-spacing: DoubleProperty
+HBox()
+HBox(spacing: double)
+setMargin(node: Node, value: Insets): void
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The overall alignment of the children in the box (default: Pos.TOP_LEFT).
Is resizable children fill the full height of the box (default: true).
The horizontal gap between two nodes (default: 0).
Creates a default HBox.
Creates an HBox with the specified horizontal gap between nodes.
Sets the margin for the node in the pane.

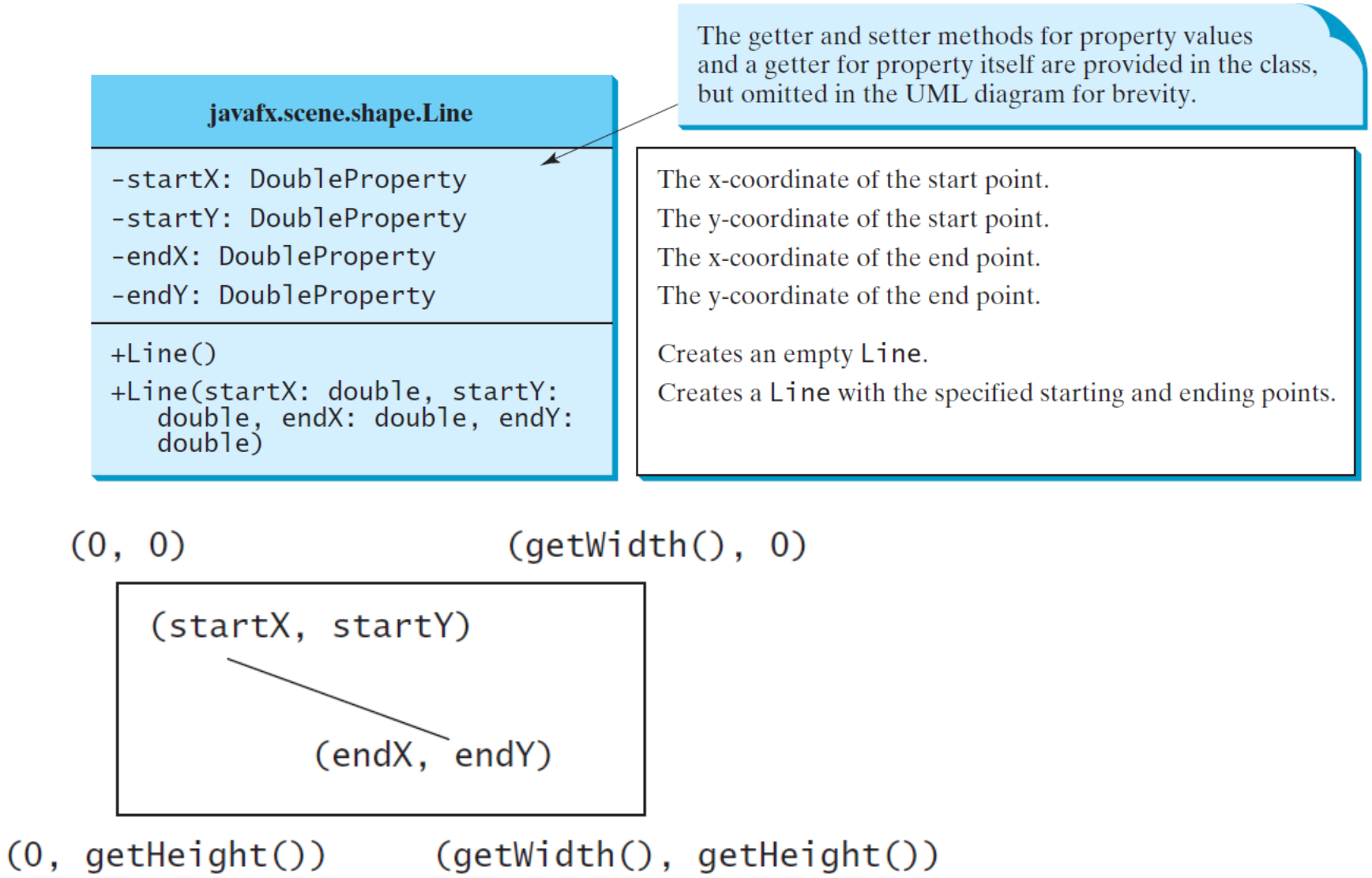
VBox


javafx.scene.layout.VBox
-alignment: ObjectProperty<Pos>
-fillWidth: BooleanProperty
-spacing: DoubleProperty
+VBox()
+VBox(spacing: double)
+setMargin(node: Node, value: Insets): void
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The overall alignment of the children in the box (default: Pos.TOP_LEFT).
Is resizable children fill the full width of the box (default: true).
The vertical gap between two nodes (default: 0).
Creates a default VBox.
Creates a VBox with the specified horizontal gap between nodes.
Sets the margin for the node in the pane.

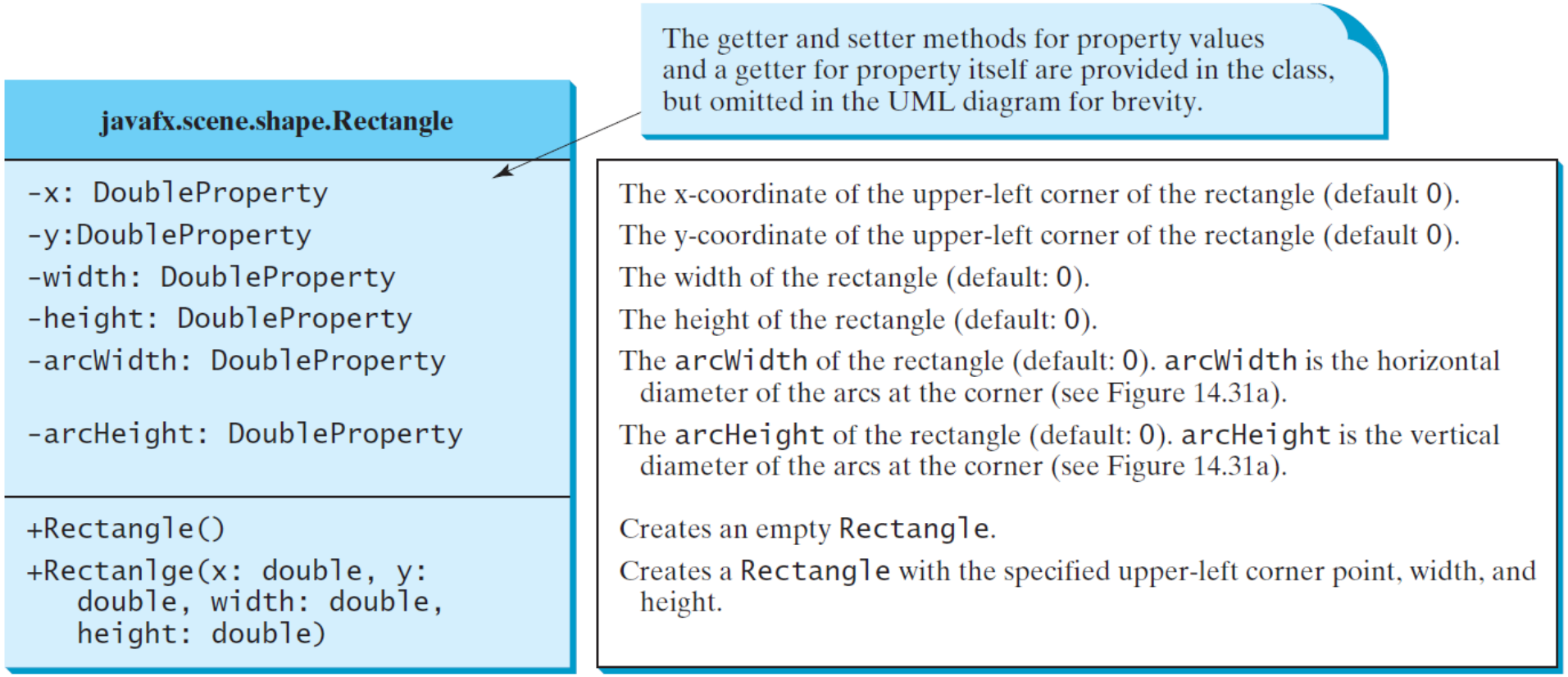
Text


javafx.scene.text.Text
-text: StringProperty
-x: DoubleProperty
-y: DoubleProperty
-underline: BooleanProperty
-strikethrough: BooleanProperty
-font: ObjectProperty<Font>
+Text()
+Text(text: String)
+Text(x: double, y: double, text: String)
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
Defines the text to be displayed.
Defines the x-coordinate of text (default 0).
Defines the y-coordinate of text (default 0).
Defines if each line has an underline below it (default false).
Defines if each line has a line through it (default false).
Defines the font for the text.
Creates an empty Text.
Creates a Text with the specified text.
Creates a Text with the specified x-, y-coordinates and text.

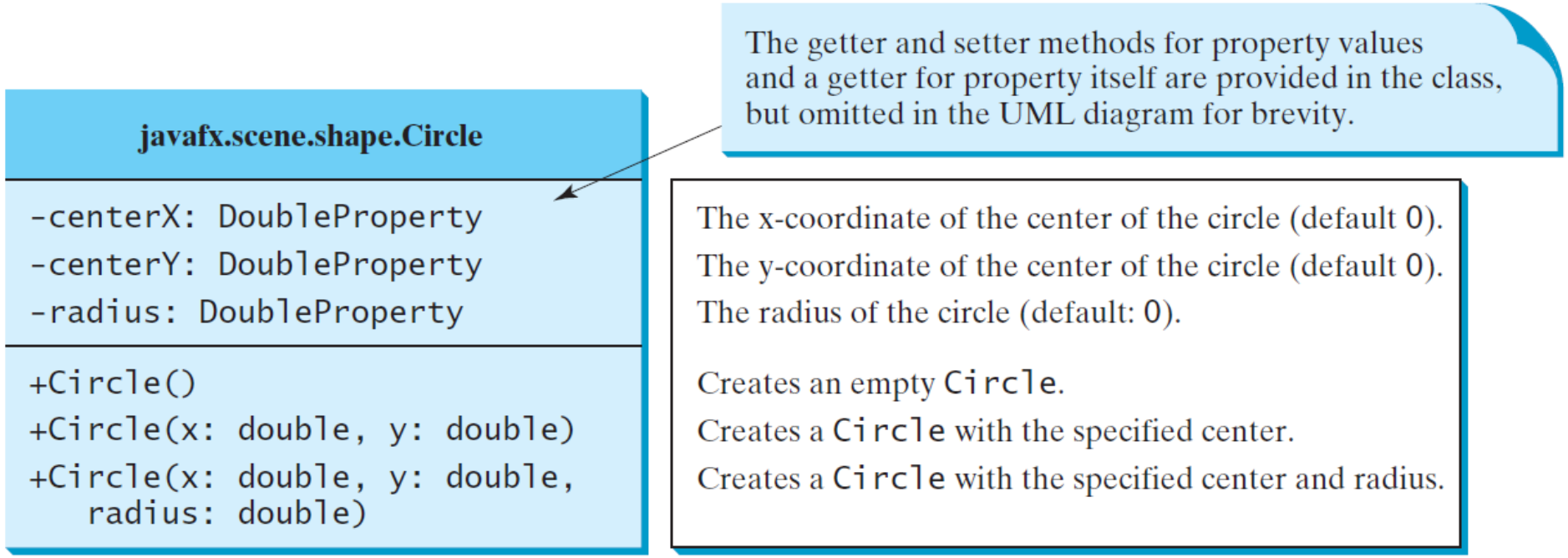
Line


The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
javafx.scene.shape.Line
-startX: DoubleProperty
-startY: DoubleProperty
-endX: DoubleProperty
-endY: DoubleProperty
+Line()
+Line(startX: double, startY: double, endX: double, endY: double)
The x-coordinate of the start point.
The y-coordinate of the start point.
The x-coordinate of the end point.
The y-coordinate of the end point.
Creates an empty Line.
Creates a Line with the specified starting and ending points.
(0, 0)
(getWidth(), 0)
(startX, startY)
(endX, endY)
(0, getHeight())
(getWidth(), getHeight())

Rectangle


javafx.scene.shape.Rectangle
-x: DoubleProperty
-y:DoubleProperty
-width: DoubleProperty
-height: DoubleProperty
-arcWidth: DoubleProperty
-arcHeight: DoubleProperty
+Rectangle()
+Rectanlge(x: double, y: double, width: double, height: double)
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The x-coordinate of the upper-left corner of the rectangle (default 0).
The y-coordinate of the upper-left corner of the rectangle (default 0).
The width of the rectangle (default: 0).
The height of the rectangle (default: 0).
The arcWidth of the rectangle (default: 0). arcWidth is the horizontal diameter of the arcs at the corner (see Figure 14.31a).
The arcHeight of the rectangle (default: 0). arcHeight is the vertical diameter of the arcs at the corner (see Figure 14.31a).
Creates an empty Rectangle.
Creates a Rectangle with the specified upper-left corner point, width, and height.

Circle


javafx.scene.shape.Circle
-centerX: DoubleProperty
-centerY: DoubleProperty
-radius: DoubleProperty
+Circle()
+Circle(x: double, y: double)
+Circle(x: double, y: double, radius: double)
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The x-coordinate of the center of the circle (default 0).
The y-coordinate of the center of the circle (default 0).
The radius of the circle (default: 0).
Creates an empty Circle.
Creates a Circle with the specified center.
Creates a Circle with the specified center and radius.

Ellipse

The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.

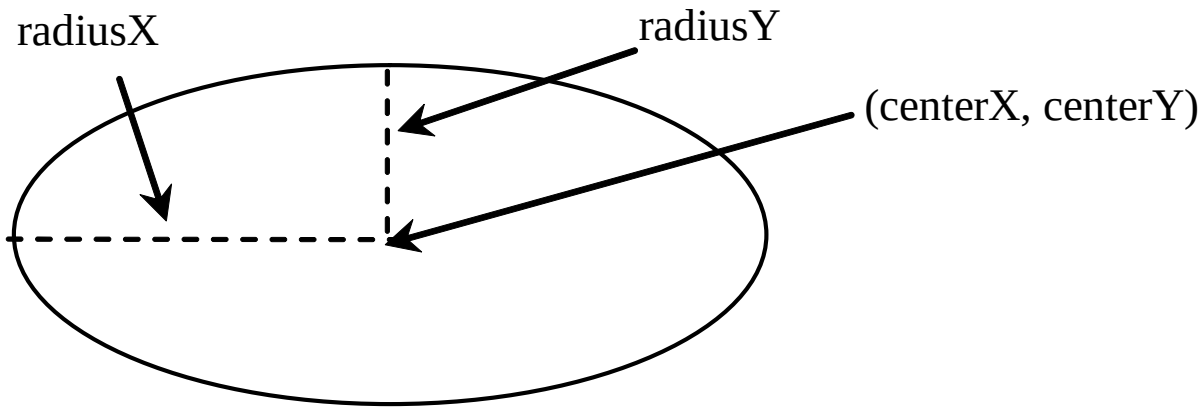
javafx.scene.shape.Ellipse

```
-centerX: DoubleProperty
-centerY: DoubleProperty
-radiusX: DoubleProperty
-radiusY: DoubleProperty
```

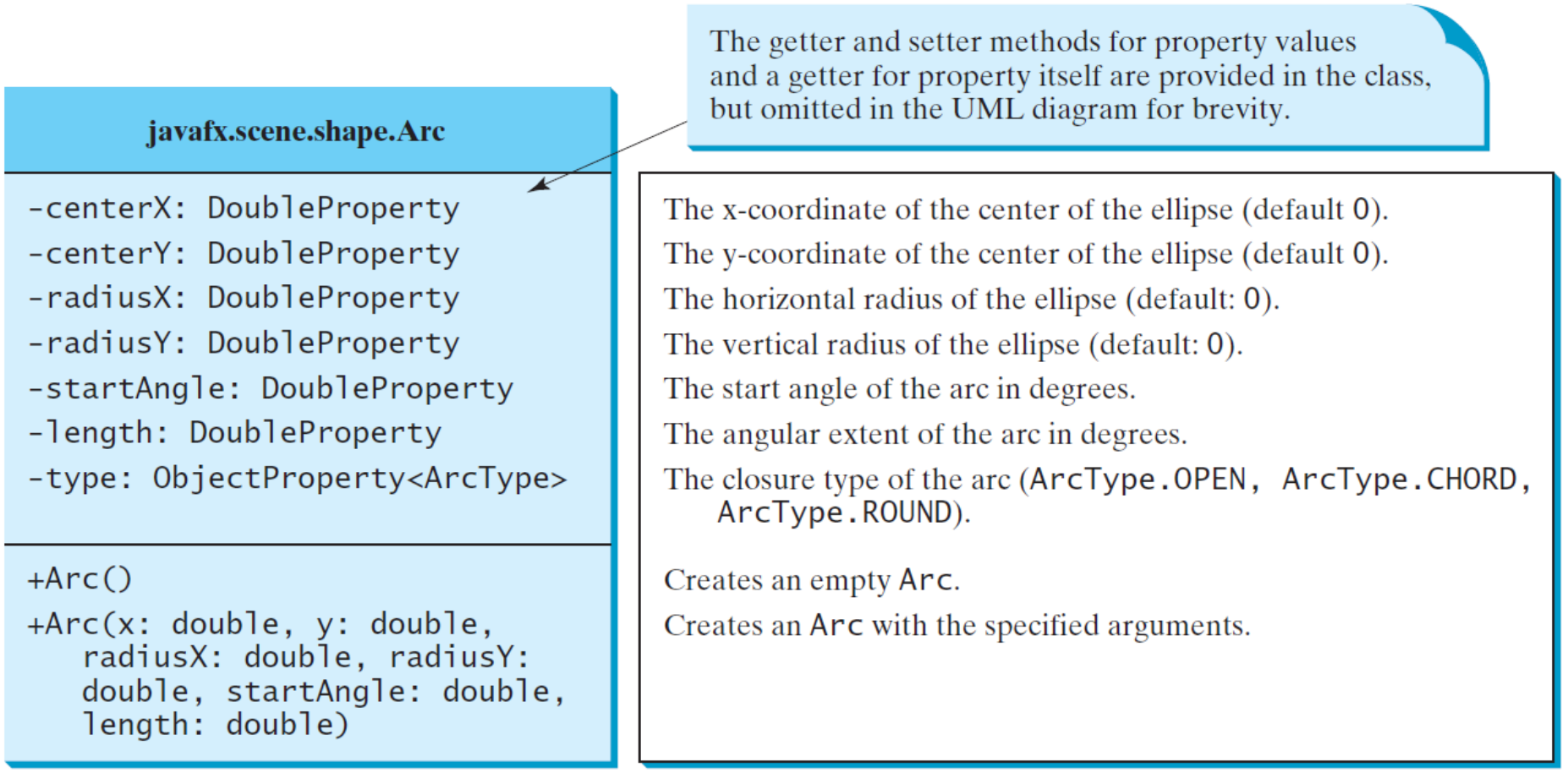
```
+Ellipse()
+Ellipse(x: double, y: double)
+Ellipse(x: double, y: double,
   radiusX: double, radiusY:
   double)
```

The x-coordinate of the center of the ellipse (default 0).
The y-coordinate of the center of the ellipse (default 0).
The horizontal radius of the ellipse (default: 0).
The vertical radius of the ellipse (default: 0).

Creates an empty `Ellipse`.
Creates an `Ellipse` with the specified center.
Creates an `Ellipse` with the specified center and radiuses.



Arc


javafx.scene.shape.Arc
-centerX: DoubleProperty
-centerY: DoubleProperty
-radiusX: DoubleProperty
-radiusY: DoubleProperty
-startAngle: DoubleProperty
-length: DoubleProperty
-type: ObjectProperty<ArcType>
+Arc()
+Arc(x: double, y: double, radiusX: double, radiusY: double, startAngle: double, length: double)
The getter and setter methods for property values and a getter for property itself are provided in the class, but omitted in the UML diagram for brevity.
The x-coordinate of the center of the ellipse (default 0).
The y-coordinate of the center of the ellipse (default 0).
The horizontal radius of the ellipse (default: 0).
The vertical radius of the ellipse (default: 0).
The start angle of the arc in degrees.
The angular extent of the arc in degrees.
The closure type of the arc (ArcType.OPEN, ArcType.CHORD, ArcType.ROUND).
Creates an empty Arc.
Creates an Arc with the specified arguments.