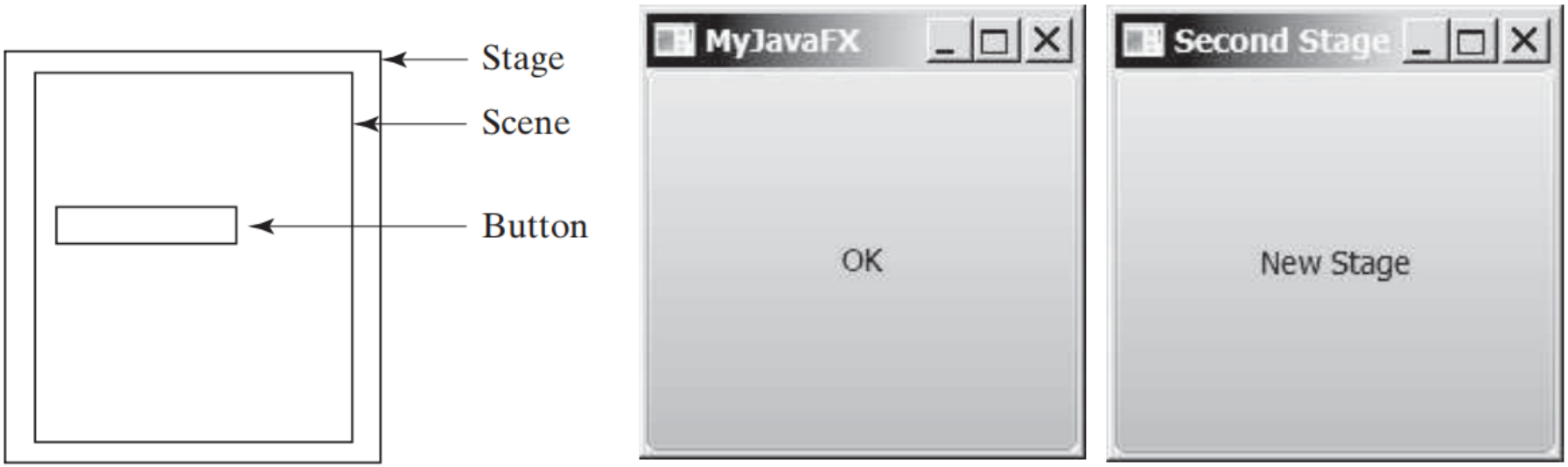
Introduction to GUI

Reference: Liang, Y., 2015. Intro To Java Programming. 10th ed. Pearson Education Limited.

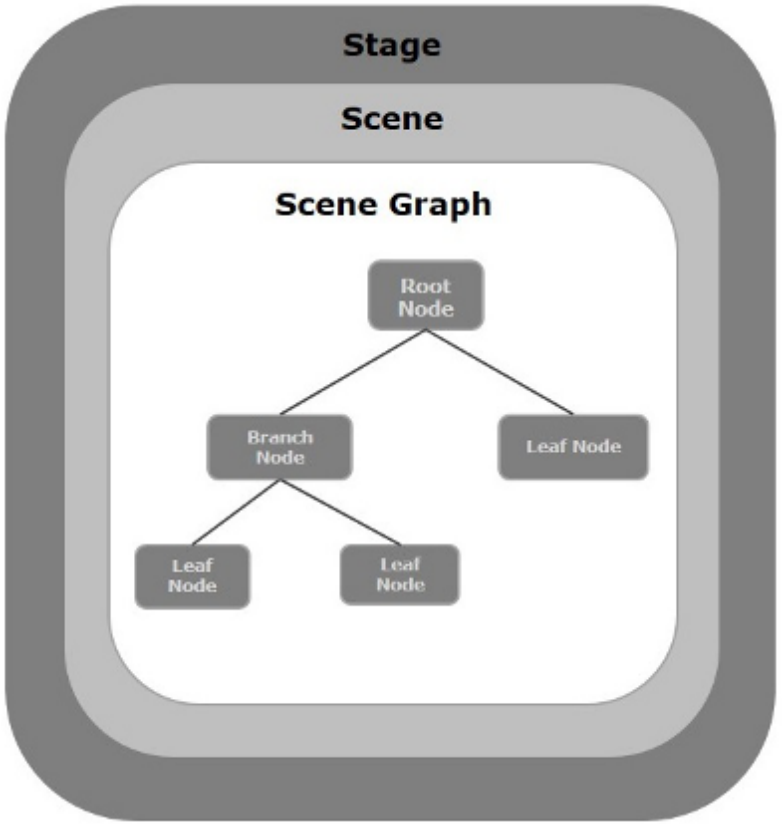
JavaFX

- JavaFX is a set of graphics and media packages that enables developers to design, create, test, debug, and deploy rich client applications that operate consistently across diverse platforms.
- The applications developed using JavaFX can run on various devices such as Desktop Computers, Mobile Phones, TVs, Tablets, etc.
- To develop GUI Applications using Java programming language, the programmers rely on libraries such as Advanced Windowing Tool kit and Swings.
- After the advent of JavaFX, Java programmers can now develop GUI applications effectively with rich content.

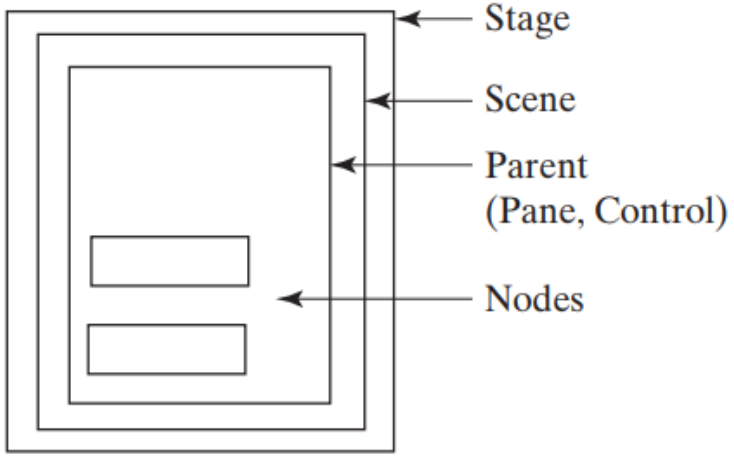
Relationship I

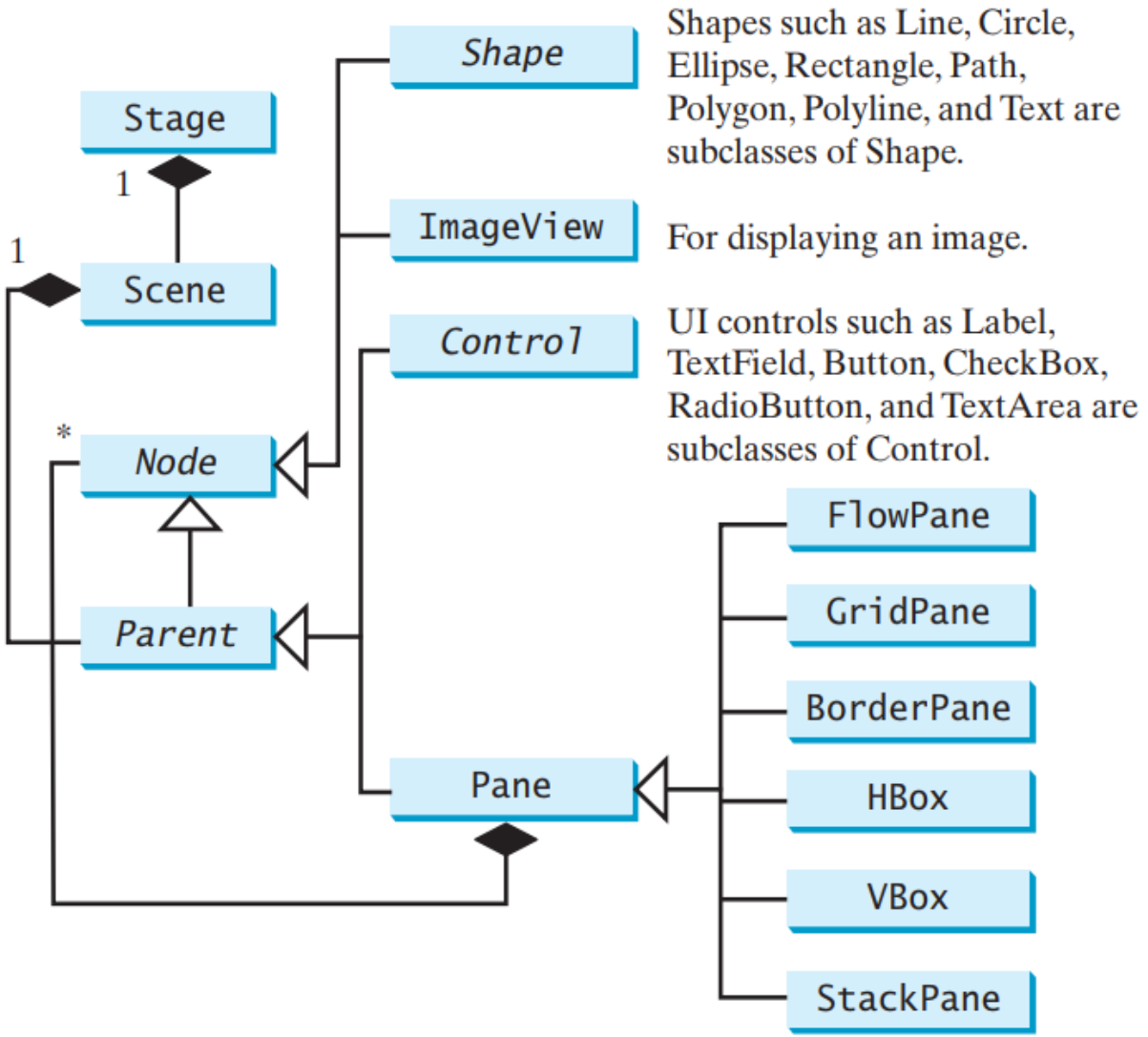


Application Structure



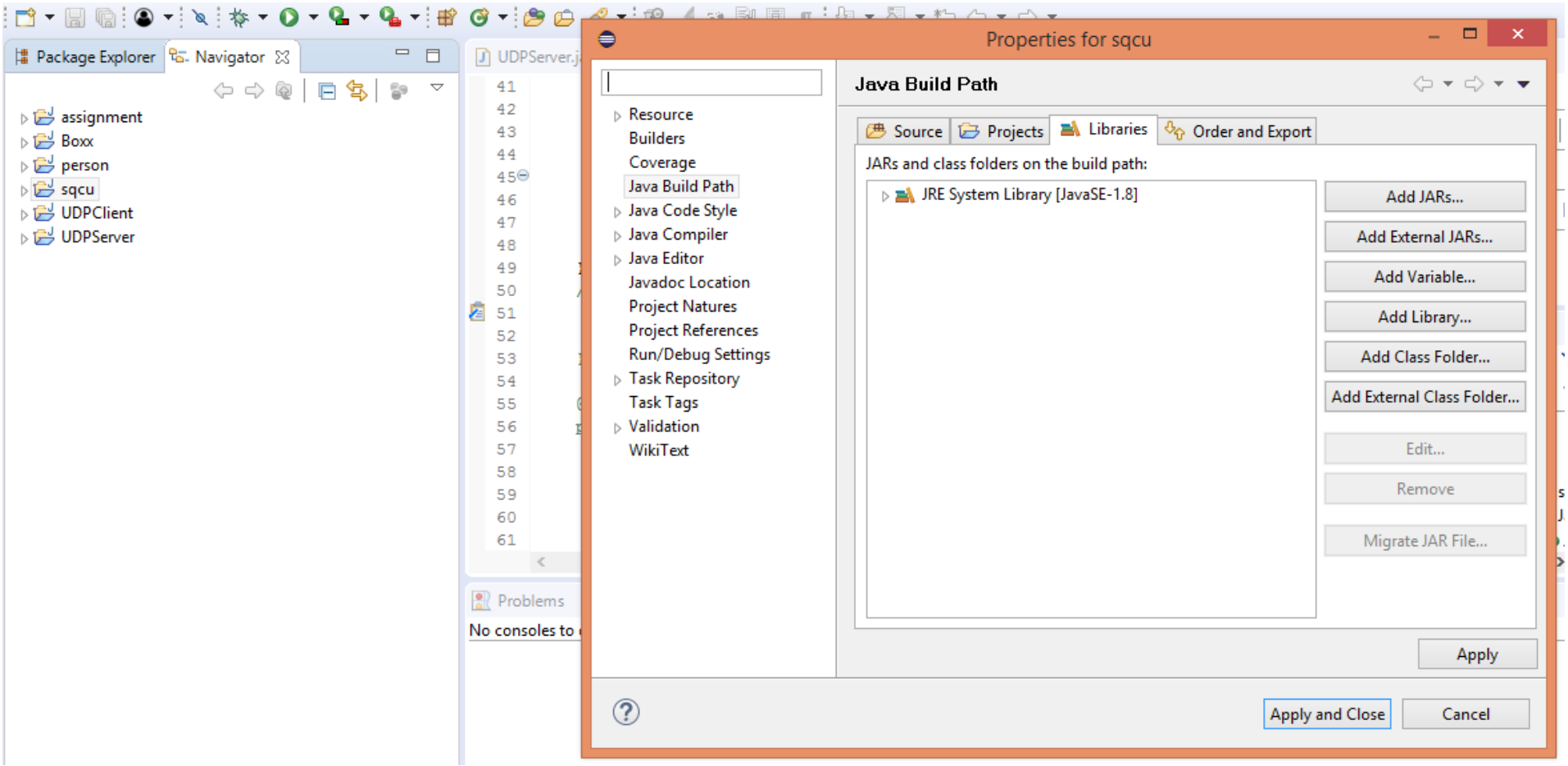
Relationship II



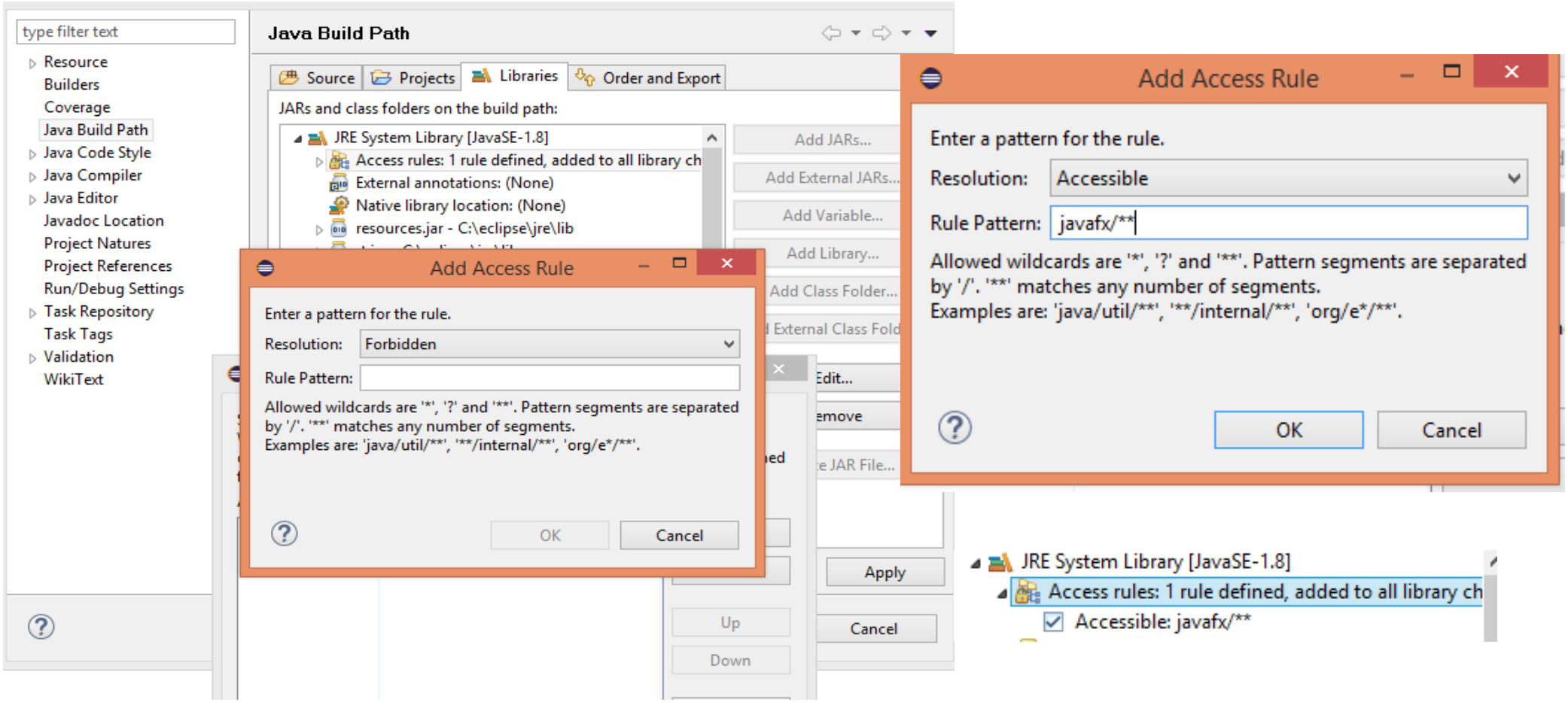


1- Check JRE System library should be 1.8

(by clicking on any java project-> properties->java build path



2- Add Access Rule



Basic Structure of a JavaFX Program

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.stage.Stage;

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);
  }
}
```

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Layouts

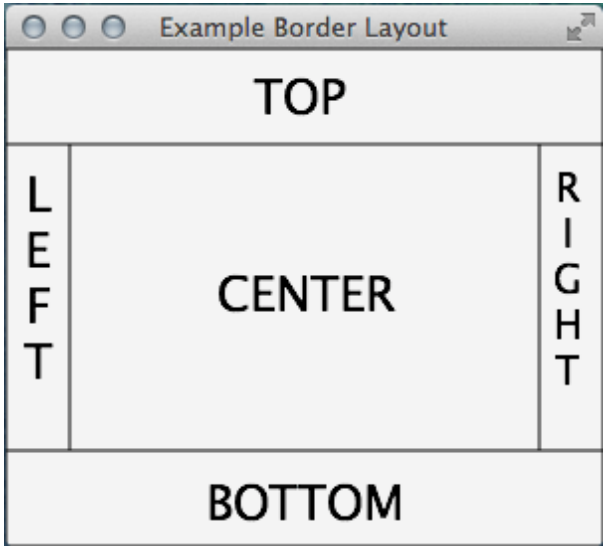
1. BorderPane
2. StackPane
3. GridPane
4. FlowPane
5. HBox
6. Vbox
7. TilePane
8. AnchorPane

JavaFX BorderPane

BorderPane arranges the nodes at the left, right, centre, top and bottom of the screen. It is represented by **javafx.scene.layout.BorderPane** class. This class provides various methods like **setRight(), setLeft(), setCenter(), setBottom()** and **setTop()** which are used to set the position for the specified nodes. We need to instantiate BorderPane class to create the **BorderPane** layout.

Constructors

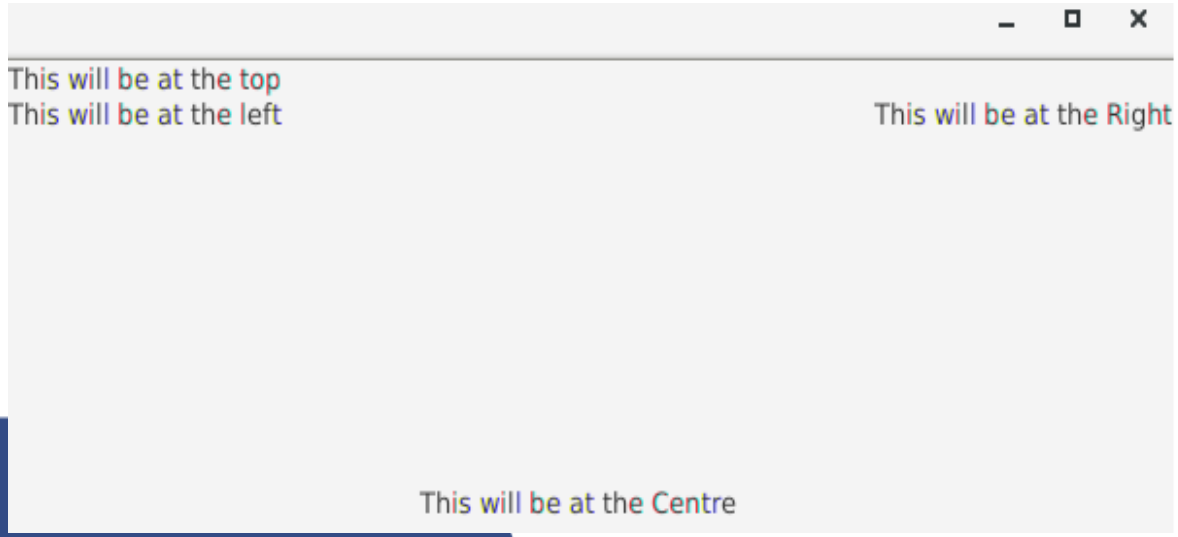
1. BorderPane() : create the empty layout
2. BorderPane(Node Center) : create the layout with the center node
3. BorderPane(Node Center, Node top, Node right, Node bottom, Node left) : create the layout with all the nodes



Example of BorderPane

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Label;
import javafx.scene.layout.*;
import javafx.stage.Stage;
public class Label_Test extends Application {
   public void start(Stage primaryStage) throws Exception {
      BorderPane BPane = new BorderPane();
      BPane.setTop(new Label("This will be at the top"));
      BPane.setLeft(new Label("This will be at the left"));
      BPane.setRight(new Label("This will be at the Right"));
      BPane.setCenter(new Label("This will be at the Centre"));
      BPane.setBottom(new Label("This will be at the bottom"));
      Scene scene = new Scene(BPane,600,400);
      primaryStage.setScene(scene);
      primaryStage.show();
   }
   public static void main(String[] args) {
      Application.launch(args);
   }

}
```

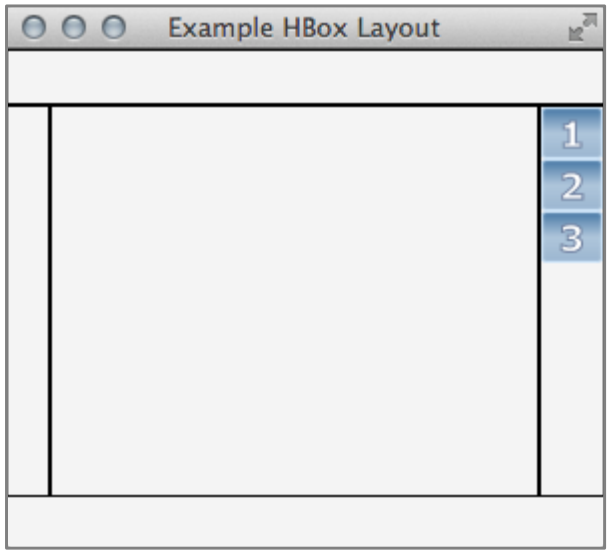


JavaFX StackPane

The StackPane layout pane places all the nodes into a single stack where every new node gets placed on the top of the previous node. It is represented by **javafx.scene.layout.StackPane** class. We just need to instantiate this class to implement StackPane layout into our application.

Constructors

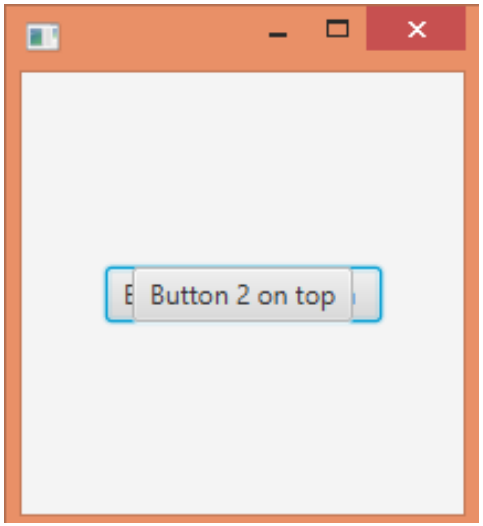
1. StackPane()
2. StackPane(Node/Children)



StackPane

Example of StackPane

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.layout.StackPane;
import javafx.stage.Stage;
public class Label_Test extends Application {
      public void start(Stage primaryStage) throws Exception {
       Button btn1 = new Button("Button 1 on bottom ");
       Button btn2 = new Button("Button 2 on top");
       StackPane root = new StackPane();
       Scene scene = new Scene(root,200,200);
       root.getChildren().addAll(btn1,btn2);
       primaryStage.setScene(scene);
       primaryStage.show();
   }
   public static void main(String[] args) {
      launch(args);
   }
}
```



```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.layout.*;
import javafx.scene.control.Label;
import javafx.stage.Stage;
import javafx.event.ActionEvent;
import javafx.event.EventHandler;
import javafx.scene.control.Button;
import javafx.scene.layout.StackPane;
public class test extends Application{
 private Button btnHello;
@Override
public void start(Stage primarystage) throws Exception {
        // Construct the "Button" and attach an "EventHandler"
        btnHello = new Button();
        btnHello.setText("Say Hello");
        // Using JDK 8 Lambda Expression to construct an EventHandler<ActionEvent>
        btnHello.setOnAction(evt -> System.out.println("Hello World!"));
        // Construct a scene graph of nodes
        StackPane root = new StackPane();  // The root of scene graph is a layout node
        root.getChildren().add(btnHello);  // The root node adds Button as a child
        Scene scene = new Scene(root, 300, 100);  // Construct a scene given the root of scene graph
        primarystage.setScene(scene);    // The stage sets scene
        primarystage.setTitle("Hello");  // Set window's title
        primarystage.show();             // Set visible (show it)
    }
    public static void main(String[] args) {
        Application.launch(args);
    }
}
```