JavaFX

Sample JavaFX Program

```
public guiApp extends Application { //Application class provides all JavaFx
components
    @Override //must implement this method as it is abstract
    public void start(Stage primaryStage) {
        //Node
        Button btOK = new Button("OK");
        //Scening
        Scene scene = new Scene(btOK, 200, 250);
        //Staging
        primaryStage.setScene(scene);
        primaryStage.setTitle("Test");
        primaryStage.setResizable(false); //The user can't maximize the window
        primaryStage.show();
    }
```

```
    public static void main(String[] args) {
        launch(args); //launching the JavaFX application
    }
}
```

Hierarchy

A **node** resides in a **scene** (node container), and the **scene** is placed in a **stage**.

A parent could be a **Pane** or **UI control**, and a **Pane** is the following,

- `FlowPane`
- `GridPane`
- `BorderPane`
- `HBox`
- `VBox`
- `StackPane`

Scene

```
//Scene constructor (2 types)
Scene scene1 = new Scene(Parent, width, height);
Scene scene2 = new Scene(Parent);
```

Scene must **contain a parent**, not a ***Shape/ImageView***

```
StackPane pane = new StackPane();
pane.getChildren().add(new Button("OK")); //addAll, remove, removeAll
```

Adding a **parent to a scene (pane)**

Java Coordinate

Begins in the top left most point (0,0)

LR (x-axis)

TD (y-axis)

Property Binding

Enables a target object to be bound to a source object, target changes when source changes

Target Object	Source Object
Binding Object	Bindable Object
Binding Property	Observable Object

```
//target.bind(source)
//example

Circle circle1 = new Circle(100, 100, 50) // (x, y, radius)
circle1.centerXProperty().bind(pane.widthProperty().divide(2));
circle1.centerYProperty().bind(pane.heightProperty().divide(2));

//now the circle would change according to the pane size
```

Layout Panes

Class	Description
Pane	Base class for panes
StackPane	Stacks nodes on top of each other in the center
FlowPane	Row-by-row horizontally or column-by-column vertically
GridPane	2D Grid
BorderPane	Top Right Left Right Center
HBox	Places nodes in a single row
VBox	Places nodes in a single column

FlowPane

The data fields: **alignment**, **orientation**, **hgap** and **vgap** and binding propeties

```
FlowPane pane1 = new FlowPane(); //Default pane, no gaps, horizontal
FlowPane pane2 = new FlowPane(Orientation.VERTICAL, 5, 10);

//FlowPane methods:
pane2.setAlignment(Pos.CENTER);
pane2.setHgap(5);
pane2.setVgap(5);
pane2.setPadding(new Insets(10, 15, 10, 15)); //clockwise
flow.setPrefWrapLength(300);
```

GridPane

Nodes are added using

```
GridPane mat1 = new GridPane();
mat1.add(new Button(), 0, 0); //node, col, row, colspan, rowspan
GridPane.setHalignment(new Button("add"), HPos.RIGHT);
mat1.setGridLinesVisible(true); //for debugging purposes
```

BorderPane

No space allocated, if no node in the region

HBox VBox

```
//HBox and VBox can set margins
VBox.setMargin(course, new Insets(0, 0, 0, 15));
```

Setting Node Styles

Use CSS

```
node.setStyle("-fx-styleName:value"); //property value pair

//Example
circle.setStyle("-fx-stroke: black; -fx-fill: red;");
hBox.setStyle("-fx-background-color: gold;");
```

Shape

You may set shape properties using shape methods, instead of CSS

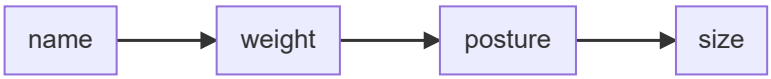
```
shapeObj.setStroke(Color.BLACK);
shapeObj.setFill(Color.RED);
shapeObj.setStrokeWidth(5);
```

Text

```
Text text2 = new Text(60, 60, "Programming is fun"); //x,y position based on
left-bottom corner
```

Font Class

```
Font font1 = new Font("SansSerif", 16);
Font font2 = Font.font("Times New Roman", FontWeight.BOLD, FontPosture.ITALIC,
12);
```



Follow the order of the diagram

Property	Values
name	"Times", "Courier", "Arial"
weight	FontWeight.NORMAL, FontWeight.BOLD
posture	FontPosture.REGULAR, FontPosture.ITALIC
size	default = 12

Line Class

Connects 2 lines with 4 parameters

```
Line line1 = new Line(10, 10, 30, 20); //startX, startY, endX, endY
```

Rectangle Class

```
Rectangle r2 = new Rectangle(30, 100, 70, 40); //x,y,width,height
r2.setArcWidth(15);
r2.setArcHeight(25);
```

Circle Class

```
Circle circle = new Circle(25, 25, 50); //x, y, radius
```

Ellipse Class

```
Ellipse e1 = new Ellipse(150, 100, 100, 50); //centerX, centerY, radiusX,
radiusY
```

Arc Class

Part of an ellipse

```
Arc arc1 = new Arc(150, 100, 100, 50, 60, 100) //x, y, radX, radY, startAngle,
spanAngle
```

Java Event Handling

Connect the event source object and the event handler/listener

When a button is clicked, it fires an **ActionEvent**, the handler processes the **ActionEvent**

```
class MainApp extends Application {
    public void start(Stage primaryStage) {
        OkHandlerClass handler1 = new OkHandlerClass();
        btOk.setOnAction(handler1) //Step 1: Registering the handler
    }

    class OKHandlerClass implements EventHandler<ActionEvent> { //Implementing
an action event handler class
        @Override
        public void handle(ActionEvent e) {
            System.out.println("OK Button Clicked");
        }
    }
}
```

Above shows the usage of an inner class event handler

Identifying source of event

use the `e.getSource()`

Anonymous Inner Classes

```
btOk.setOnAction(new EventHandler<ActionEvent>() {
    public void handle(ActionEvent e) {
        System.out.println("OK Button Clicked");
    }
});
```

Lambda Expression

```
btEnlarge.setOnAction(e -> {
   //Code here
});

//4 styles of lambda
btEnlarge.setOnAction((ActionEvent e) -> {
   //Code here
});

btEnlarge.setOnAction((e) -> {
   //Code here
});

btEnlarge.setOnAction(e -> {
   //Code here
});

btEnlarge.setOnAction(e -> System.out.println("Process Print"));
```

JavaFX UI Controls

Label

```
Label();
Label(String text);
Label(String text, Node graphic);

//Testing
Label lb = new Label("First Name: ");
ImageView us = new ImageView("us.gif"); //must be in the same directory as .java
file
Label lb1 = new Label("US 50 States", us);
lb1.setStyle("-fx-border-color: green; -fx-border-width: 2");
lb1.setContentDisplay(ContentDisplay.BOTTOM);
lb1.setTextFill(Color.RED);
```

Button

```
Button();
Button(String text);
Button(String text, Node graphic);

//Testing
Button btLeft = new Button("Left", new ImageView("left.gif"));
Button btCenter = new Button("Center");
btCenter.setPrefHeight(30);
Button btRigh = new Button("Right", new ImageView("right.gif"));
```

CheckBox

```
CheckBox();
CheckBox(String text);

//Testing
CheckBox chkBold = new CheckBox("Bold");
CheckBox chkBold = new CheckBox("Italic");
chkBold.setSelected(true);
chkItalic.setSelected(true);
chkItalic.setDisable(true);
```

RadioButton

```
RadioButton rbRed = new RadioButton("Red");
RadioButton rbGreen = new RadioButton("Green");
RadioButton rbBlue = new RadioButton("Blue");

ToggleGroup group = new ToggleGroup();
rbRed.setToggleGroup(group);
rbGreen.setToggleGroup(group);
rbBlue.setToggleGroup(group);
```

TextField

```
TextField();
TextField(String text);

TextField tf = new TextField("Testing");
tf.setEditable(false);
tf.setFont(Font.font("Times", 20));
double val = Double.parseDouble(tf.getText());
```

TextArea

```
TextArea();
TextArea(String text);

TextArea taNote = new TextArea("This is a text area");
taNote.setPrefColumnCount(20); //Default = 40
taNote.setPrefRowCount(5); //Default = 10
taNote.setWrapText(true);
```

ComboBox

Drop-down list

```
ComboBox<String> cbo = new ComboBox<String>();
cbo.getItems.addAll("Item 1", "Item 2", "Item 3", "Item 4");
cbo.setStyle("-fx-color: red");
cbo.setValue("Item 2");

String selected = cbo.getValue();

//ObservableList
String[] itemArray = {"Item 1", "Item 2"};
ObservableList<String> items = FXCollections.observableArrayList(itemArray);
ComboBox<String> cbo = new ComboBox<String>(items);

cbo.getItems().addAll(items);
```

Mouse Events