CSE2005 (Object Oriented Programming Systems)

Module 6
Introducing to JavaFX

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JavaFX

- JavaFX is a new framework for developing Java GUI programs.

- JavaFX makes it easier to create desktop applications and games in Java.

JavaFX is a Java library that is used to develop applications. The applications built in JavaFX, can run on multiple platforms including Web, Mobile and Desktops.

JavaFX vs Swing and AWT

- When Java was introduced, the GUI classes were bundled in a library known as the Abstract Windows Toolkit (AWT).

- AWT is fine for developing simple graphical user interfaces.

- The AWT user-interface components were replaced by a more robust, versatile, and flexible library known as Swing components.

- Swing components depend less on the target platform and use less of GUI resources.

- It is now replaced by a completely new GUI platform known as JavaFX.

- JavaFX incorporates modern GUI technologies to enable you to develop rich Internet applications.

- A rich Internet application (RIA) is a Web application designed to deliver the same features and functions normally associated with desktop applications.

- A JavaFX application can run seamlessly on a desktop and from a Web browser.

- It provides a multi-touch support for touch enabled devices such as tablets and smart phones.

Basic Structure of a JavaFX Program:

- The javafx.application.Application class defines the essential framework for writing JavaFX programs.

- The main method is not needed if you run the program from the command line. When you run a JavaFX application without a main method, JVM automatically invokes the launch method to run the application.

- A Scene object can be created using the constructor Scene(node, width, height). This constructor specifies the width and height of the scene and places the node in the scene.

- A Stage object is a window. A Stage object called primary stage is automatically created by the JVM when the application is launched.

JavaFX Features

- JavaFX comes with a large set of built-in GUI components, like buttons, text fields, tables, trees, menus, charts and much more.

- JavaFX can be styled via CSS and / or programmatically.

- JavaFX comes with a built-in chart library you can use for simple charts.

- JavaFX has support for 2D and 3D Graphics.

- JavaFX has a WebView which can display modern web applications.

Here is a more complete list of concepts, components and features in JavaFX:

- Core
  - Stage
  - Scene
  - Node
  - Properties
  - FXML

- Layout
  - Region
  - Pane
  - HBox
  - VBox
  - FlowPane
  - TilePane
  - GridPane
  - Group
  - StackPane
  - AnchorPane
  - BorderPane

- Basic Controls
- Label
- Button
- MenuButton
- SplitMenuButton
- ButtonBar
- ToggleButton
- RadioButton
- CheckBox
- ChoiceBox
- ComboBox
- ListView
- TextField
- PasswordField
- TextArea
- ImageView
- DatePicker
- ColorPicke

https://zetcode.com/gui/javafx/controls/
https://zetcode.com/gui/javafx/controlsII/

Panes, UI Controls, and Shapes:

Panes, UI controls, and shapes are subtypes of Node .

A better approach is to use container classes, called panes, for automatically laying out the nodes in a desired location and size.
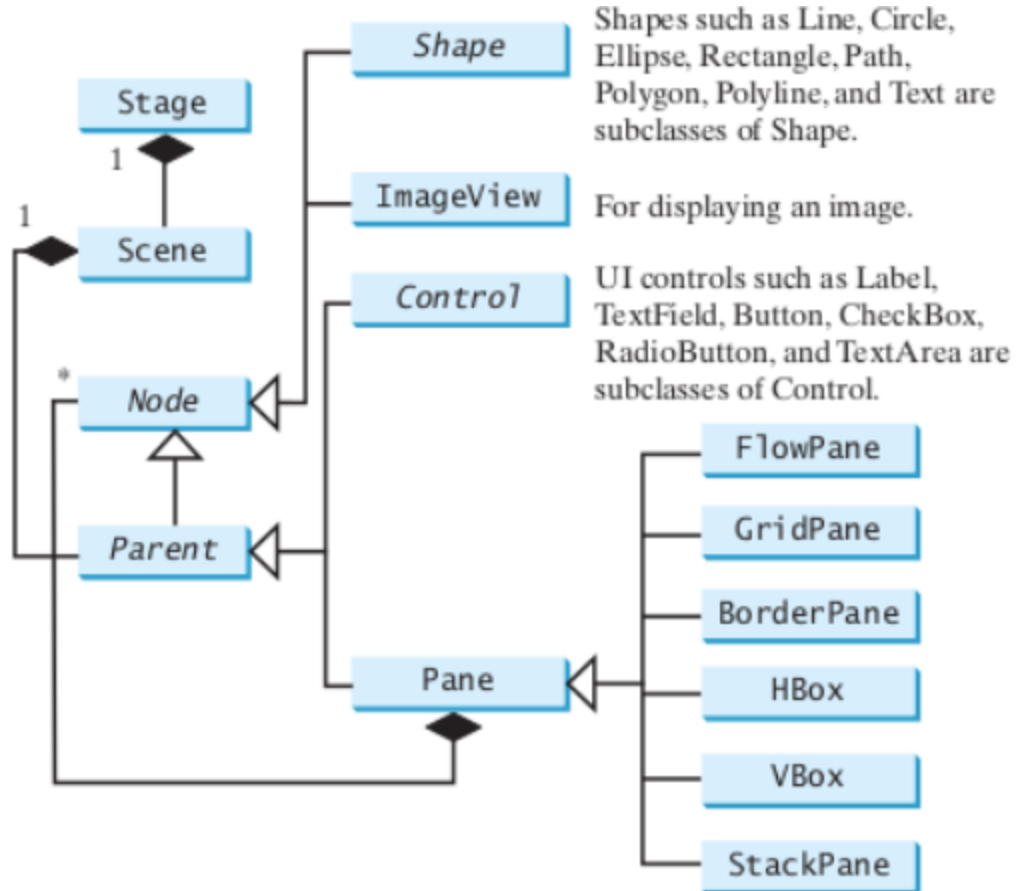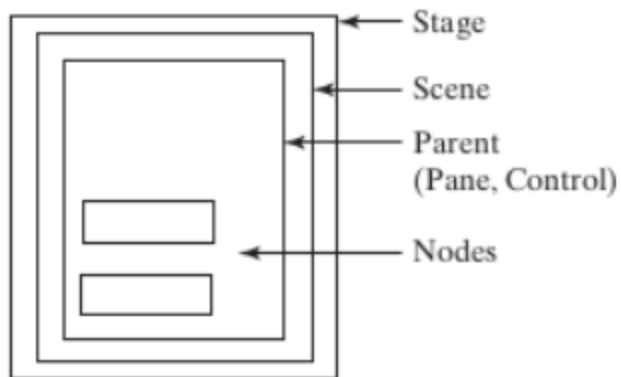
You place nodes inside a pane and then place the pane into a scene.

A node is a visual component such as a shape, an image view, a UI control, or a pane.

A shape refers to a text, line, circle, ellipse, rectangle, arc, polygon, polyline, etc.

A UI control refers to a label, button, check box, radio button, text field, text area, etc.

Panes, UI Controls, and Shapes:

Shapes such as Line, Circle, Ellipse, Rectangle, Path, Polygon, Polyline, and Text are subclasses of Shape.

For displaying an image.

UI controls such as Label, TextField, Button, CheckBox, RadioButton, and TextArea are subclasses of Control.

Refer guest lecture ppt and codes

JavaFX Canvas

Path Rendering

- Canvas is an image that can be drawn on using a set of graphics commands provided by a GraphicsContext. It is a high-level tool for doing painting.

```
beginPath(), moveTo(),
lineTo(),
quadraticCurveTo(),
bezierCurveTo(), arc(),
arcTo(), appendSVGPath(),
closePath(), rect()
```

- In the first example, we draw simple lines. A line is a basic graphics primitive. Two coordinates are needed to form a line.

```
fill()
```

```
stroke()
```

```
clip()
```

JavaFX stroke and fill: A stroke is used to draw outlines of shapes. A fill is used to paint interiors of shapes.

JavaFX Canvas

Method

Image Rendering

drawImage(all forms)

Basic Shape Rendering

fillRect(), fillRoundRect(), fillOval(), fillArc()

strokeLine(), strokeRect(), strokeRoundRect(), strokeOval(), strokeArc()

clearRect()

fillPolygon()

strokePolygon(), strokePolyline()

Refer the pages for more information:

https://zetcode.com/gui/javafx

https://docs.oracle.com/javase/8/javafx/api/javafx/scene/canvas/GraphicsContext.html

Q. Design a JavaFX application where you create a button and a text area. Add event handling such as on clicking the button there will be a message displayed in the text area "Button is clicked".
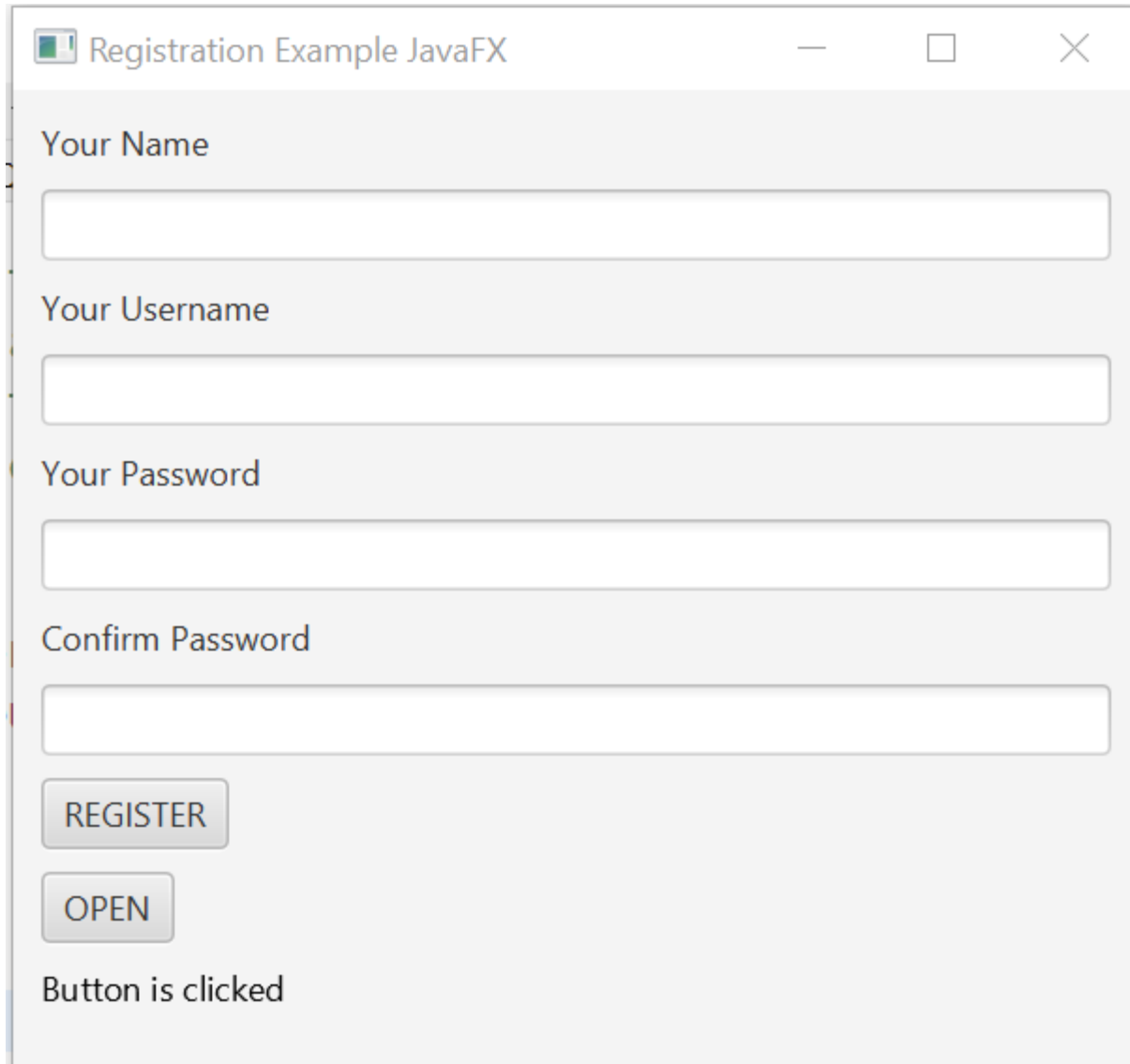
Q. Draw a rectangle using Canvas lineTo method.

Q. Design a Java FX application for creating two buttons namely 2D and 3D. When the user clicks on a 2D button, a display text "2D is clicked", and when clicked on 3D button display "3D is clicked'.

Q. Design a Java FX application for creating a canvas and two buttons namely 2D and 3D. When the user clicks on a 2D button, a 2D image should be rotated and displayed and when a 3D button is pressed, a 3D image should be displayed?

Q. Write down a JavaFX program to design three buttons. The first button is of red in color. The second button is of orange in color and the third button is of green in color. Create an appropriate mouse click event so that, when the user clicks on the first button "Stop" message is displayed. Similarly, by clicking on the second and third button "Ready" and "Go" messages would be displayed.

Q. Create an interface as shown below. Codes shown in the Main.java file last part of the code

Q. Create an interface as shown below.

Name	Yuvan
Gender	Male ● Female ○
Password	•••••••
Date Of Bi...	12 / 12 / 1990 DD/MM/YYYY
Mobile Nu...	9876543210
E-mail	yuvan@gmail.com
Area	hyderabad
State	Telangana ▾

Q. Create an interface as shown below.