

CSEI 144: INTERMEDIATE PROGRAMMING FOR INDUSTRIAL ENGINEERING

LAB SESSION 4: JAVA FX

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AGENDA

- Graphics in Java
- Structure of JavaFX programs
- Stages, scenes, panes, nodes
- Examples
- Quiz I

GRAPHICS ON JAVA

- Java is introduced with Abstract Windows Toolkit (AWT)
- AWT is no longer widely used due to many limitations:
 - Platform dependent
 - Heavyweight
- Swing is a more flexible, robust and versatile alternative but no longer supported
- JavaFX is capable of producing cross-platform apps, simpler to learn and use

STRUCTURE OF JAVAFX PROGRAMS

- JavaFX programs are classes that extend **javafx.application.Application**
- `launch()` method (inherited from Application class) is invoked to run the program
- JavaFX has objects like stage, scene and node

EXAMPLE: DRAWING A POLYGON

```
import javafx.application.Application;
import javafx.scene.Group;
import javafx.scene.Scene;
import javafx.scene.shape.Polygon;
import javafx.stage.Stage;
public class Shape_Example extends Application {
    @Override
    public void start(Stage primaryStage) {
        Group root = new Group();
        primaryStage.setTitle("Polygon Example");
        Polygon polygon = new Polygon();
        polygon.getPoints().addAll(new Double[]{
            0.0, 0.0,
            100.0, 200.0,
            200.0, 100.0 });
        root.getChildren().add(polygon);
        Scene scene = new Scene(root,300,400);
        primaryStage.setScene(scene);
        primaryStage.show(); }
    public static void main(String[] args) {
        launch(args); } }
```

EXAMPLE: SCATTERPLOT

```
import javafx.application.Application;
import javafx.scene.Group;
import javafx.scene.Scene;
import javafx.scene.chart.NumberAxis;
import javafx.scene.chart.ScatterChart;
import javafx.scene.chart.XYChart;
import javafx.stage.Stage;
public class ScatterChartExample extends Application{
    @Override
    public void start(Stage primaryStage) throws Exception {
        // TODO Auto-generated method stub
        //Configuring Xaxis and Yaxis
        NumberAxis xaxis = new NumberAxis(35,105,5);
        NumberAxis yaxis = new NumberAxis(1,2.2,0.1);
        xaxis.setLabel("Weight");
        yaxis.setLabel("Height");
        //Configuring ScatterChart
        ScatterChart s = new ScatterChart(xaxis,yaxis);
        s.setTitle("Perfect height according to your weight");
        //Configuring Series and adding data to the series
        XYChart.Series series = new XYChart.Series();
```

```
        series.setName("Height value");
        series.getData().add(new XYChart.Data(40,1.27));
        series.getData().add(new XYChart.Data(45,1.35));
        series.getData().add(new XYChart.Data(50,1.42));
        series.getData().add(new XYChart.Data(55,1.49));
        series.getData().add(new XYChart.Data(60,1.55));
        series.getData().add(new XYChart.Data(65,1.62));
        series.getData().add(new XYChart.Data(70,1.68));
        series.getData().add(new XYChart.Data(75,1.74));
        series.getData().add(new XYChart.Data(80,1.79));
        series.getData().add(new XYChart.Data(85,1.85));
        series.getData().add(new XYChart.Data(90,1.90));
        series.getData().add(new XYChart.Data(95,1.95));
        series.getData().add(new XYChart.Data(100,2.1));
        //Adding series to the ScatterChart
        s.getData().add(series);
        //Configuring group and Scene
        Group root = new Group();
        root.getChildren().add(s);
        Scene scene = new Scene(root,600,400);
        primaryStage.setScene(scene);
        primaryStage.setTitle("ScatterChart Example");
        primaryStage.show();
    }
    public static void main(String[] args) {
        launch(args);
    }
```

EXAMPLE: CYLINDER

```
import javafx.application.Application;
import javafx.scene.Group;
import javafx.scene.PerspectiveCamera;
import javafx.scene.Scene;
import javafx.scene.paint.Color;
import javafx.scene.shape.Cylinder;
import javafx.stage.Stage;
public class CylinderExample extends Application{
    @Override
    public void start(Stage primaryStage) throws Exception {
        // TODO Auto-generated method stub
        //creating cylinder
        Cylinder cyn = new Cylinder();
        //setting the radius and height for the cylinder
        cyn.setRadius(80);
        cyn.setHeight(200);
        cyn.setTranslateX(300);
        cyn.setTranslateY(250);
```

```
//setting camera
PerspectiveCamera camera = new PerspectiveCamera();
camera.setTranslateX(100);
camera.setTranslateY(100);
camera.setTranslateZ(0);
//setting group and stage
    Group root = new Group();
    root.getChildren().addAll(cyn);
    Scene scene = new Scene(root,450,300,Color.LIMEGREEN);
    scene.setCamera(camera);
    primaryStage.setScene(scene);
    primaryStage.setTitle("Cylinder Example");
    primaryStage.show();
}
public static void main(String[] args) {
    launch(args); } }
```

EXAMPLE: TEXT INPUT

```
// Java Program to create a text input
// dialog and add it to the stage
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.layout.*;
import javafx.event.ActionEvent;
import javafx.event.EventHandler;
import javafx.scene.control.*;
import javafx.stage.Stage;
import javafx.scene.control.Alert.AlertType;
import java.time.LocalDate;
public class TextInputDialog_1 extends Application {
    // launch the application
    public void start(Stage s)
    {
        // set title for the stage
        s.setTitle("creating textInput dialog");
        // create a tile pane
        TilePane r = new TilePane();
        // create a text input dialog
        TextInputDialog td = new TextInputDialog("enter any text");
```

```
        // setHeaderText
        td.setHeaderText("enter your name");
        // create a button
        Button d = new Button("click");
        // create a event handler
        EventHandler<ActionEvent> event = new EventHandler<ActionEvent>() {
        public void handle(ActionEvent e)
        {
            // show the text input dialog
            td.show();}};
        // set on action of event
        d.setOnAction(event);
        // add button and label
        r.getChildren().add(d);
        // create a scene
        Scene sc = new Scene(r, 500, 300);
        // set the scene
        s.setScene(sc);
        s.show(); }
    public static void main(String args[])
    {
        // launch the application
        launch(args); }}
```


EXAMPLE: CHOICE BOX

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.*;
import javafx.scene.layout.*;
import javafx.event.ActionEvent;
import javafx.event.EventHandler;
import javafx.collections.*;
import javafx.stage.Stage;
public class Choice_1 extends Application {
// launch the application
public void start(Stage s)
{
// set title for the stage
s.setTitle("creating ChoiceBox");
// create a button
Button b = new Button("show");
// create a tile pane
TilePane r = new TilePane();
// create a label
Label l = new Label("This is a choice box");
```

```
// string array
String st[] = { "Arnab", "Andrew", "Ankit", "None" };
// create a choiceBox
ChoiceBox c = new ChoiceBox(FXCollections.observableArrayList(st));
// add ChoiceBox
r.getChildren().add(l);
r.getChildren().add(c);
// create a scene
Scene sc = new Scene(r, 200, 200);
// set the scene
s.setScene(sc);
s.show(); }
public static void main(String args[])
{
// launch the application
launch(args) }}
```

REFERENCES

- Liang (2014) Introduction to Java Programming (10th ed.) Pearson
- <https://www.javatpoint.com/javafx-polygons>
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- <https://www.javatpoint.com/javafx-cylinder>
- <https://www.geeksforgeeks.org/javafx-textinputdialog/>
- <https://www.geeksforgeeks.org/javafx-choicebox/>