**JavaFX GUI Development Simplified**

**Objectives**

1. **Understand JavaFX Components**: Learn about basic UI elements like buttons and text fields.
2. **Understand JavaFX Containers**: Learn about layout containers like panes and boxes.

**Key Concepts**

**Scene and Scene Graph**

* **Scene**: The main area where all UI elements (components) are placed.
* **Scene Graph**: A hierarchical structure (like a tree) where each element (node) is part of the scene.
  + **Root Node**: The starting point of the graph.
  + **Nodes**: Elements such as buttons, text fields, and layout regions.
  + **Parent-Child Relationship**: If a node (c) is contained within another node (p), c is the child, and p is the parent.

**Window Components**

* **Pointers to Parent**: Each component can access its parent component.
* Control aComponent = ...;
* Parent p = aComponent.getParent();
* Parent parentOfParent = p.getParent();**Pointers to Children**: Each parent component can access its children.
  + Example:

Parent aParent = ...;

ObservableList<Node> children = aParent.getChildren();

Node c1 = children.get(0);

**Creating and Using Components**

1. **Button Example**:
   * Create a button with text:

java

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Button b = new Button("Press Me");

* + Change button text:

java

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b.setText("Don't Press Me");

* + Align text (requires import):

java

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import javafx.geometry.Pos; b.setAlignment(Pos.CENTER);

1. **Adding an Image to a Button**:
   * Import required classes:

java

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import javafx.scene.image.Image; import javafx.scene.image.ImageView;

* + Create an image and add it to a button:

java

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Image anImage = new Image(getClass().getResourceAsStream("brain.gif"));

Button b = new Button("Brain", new ImageView(anImage));

1. **Styling a Button**:
   * Set styles like font, background color, and text color:

java

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b.setStyle("-fx-font: 22 arial; -fx-base: rgb(170,0,0); -fx-text-fill: rgb(255,255,255);");

1. **Disable or Hide a Component**:
   * Disable:

java

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b.setDisable(true);

* + Hide:

java

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b.setVisible(false);

1. **Setting Position and Size**:
   * Set location and size of a button:

java

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b.relocate(40, 60); // x and y position b.setPrefSize(100, 25); // width and height

**Example Program: Fruit List Application**

**Goal**

Create a window with a text field, two buttons, and a list view to add/remove fruits.

**Steps**

1. **Imports and Class Setup**:

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import javafx.application.Application;

import javafx.collections.FXCollections;

import javafx.scene.Scene;

import javafx.scene.control.Button;

import javafx.scene.control.ListView;

import javafx.scene.control.TextField;

import javafx.scene.layout.Pane;

import javafx.stage.Stage;

public class FruitListApp extends Application {

public void start(Stage primaryStage) {

1. **Create Components**:

Java

Pane aPane = new Pane();

TextField newItemField = new TextField();

newItemField.relocate(10, 10);

newItemField.setPrefSize(150, 25);

Button addButton = new Button("Add");

addButton.relocate(175, 10);

addButton.setPrefSize(100, 25);

Button removeButton = new Button("Remove");

removeButton.relocate(175, 45);

removeButton.setPrefSize(100, 25);

ListView<String> fruitList = new ListView<>();

String[] fruits = {"Apples", "Oranges", "Bananas", "Cherries"};

fruitList.setItems(FXCollections.observableArrayList(fruits));

fruitList.relocate(10, 45);

fruitList.setPrefSize(150, 150);

1. **Add Components to Pane**:

java

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aPane.getChildren().addAll(newItemField, addButton, removeButton, fruitList);

primaryStage.setTitle("My Fruit List");

primaryStage.setScene(new Scene(aPane, 285, 205));

primaryStage.show();

}

public static void main(String[] args) {

launch(args);

}

a

1. **Adjust Window Size**:

java

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primaryStage.setResizable(false);

primaryStage.setScene(new Scene(aPane, 273, 197));

**Result**

A fixed-size window with components for managing a list of fruits.

This simplified explanation and code give you a basic understanding of how to develop a GUI application using JavaFX.