CSCI 2120:

Software Design & Development II

UNIT4: UI management

GUI framework

JavaFX Primer

Overview

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What is JavaFX?

JavaFX is a GUI toolkit for Java (GUI is short for Graphical User Interface). JavaFX makes it easier to create desktop applications and games in Java. This JavaFX tutorial is a multi-page tutorial explaining the core features of JavaFX. See the menu in the left side of this page to see all the topics covered in this JavaFX tutorial (on mobile, check the Trail TOC in the bottom navigation bar). There is also an extensive list further down this page.

Why JavaFX?

There are several reasons why JavaFX is a great GUI application platform. First of all, Java is still one of the most popular programming languages in the world, with a large set of standard classes, and a rich set of open source toolkits developed by the Java developer community.

Second, JavaFX can run on all of the following OS'es and devices:

- Windows
- Linux
- Mac
- iOS
- Android / Chromebook
- Raspberry Pi

This makes JavaFX a versatile cross OS and cross device application toolkit.

Third, JavaFX comes with a rich set of GUI controls, and open source toolkits add even more tools to the total ecosystem.

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:

JavaFX Features

Core	Layout	Basic Controls		Container Controls	Web	Charts	Other Concepts
Stage Scene Node Properties FXML CSS	Region Pane HBox VBox FlowPane TilePane GridPane Group StackPane AnchorPane BorderPane	Label Button MenuButton SplitMenuButton ButtonBar ToggleButton RadioButton CheckBox ChoiceBox ComboBox ListView TextField PasswordField TextArea ImageView DatePicker ColorPicker	Slider Tooltip Hyperlink ProgressBar ProgressIndicator MenuBar ContextMenu Separator TableView TreeView TreeTableView HTMLEditor Pagination FileChooser DirectoryChooser Spinner	Accordion TitledPane TabPane SplitPane ScrollPane	WebView WebEngine	PieChart BarChart StackedBarChart ScatterChart LineChart AreaChart StackedAreaChart BubbleChart	Fonts TextFormatter Dialogs Color 2D Shapes 3D Shapes Effects Transformations Animation Canvas PixelBuffer Drag and Drop Audio Video Print API JavaFX concurrency

JavaFX Use Cases

Here is a list of some of general use cases for JavaFX:

- **Developer tools**
  - IDE
  - Editors
  - File compression / encryption tools
  - Tools scanning the local disk

- **Local system maintenance tools**
  - Backup tools
  - Virus scans

- **Utility apps**
  - Skype / Messenger / Chat
  - Screenshot tools
  - Photo and video editing
  - Video players
  - Audio editing
  - Audio players

- **Games**

- **Data Science Tools**

JavaFX vs. Swing

You may be aware that Java also has another GUI toolkit called Java Swing (or JFC). In case you wonder what the difference is between the two toolkits, I have listed some of the major differences below:

Feature	JavaFX	Swing
Property Bindings	JavaFX properties support binding, meaning you can listen for changes in their values.	Swing properties do not directly support binding.
Declarative Layout	JavaFX has support for declarative layout via FXML.	Swing has no built-in support for declarative layout
Styling	JavaFX supports CSS based and code based styling.	Swing only supports code based styling.
WebView	JavaFX has a WebView that can render modern web pages	Swing has no WebView.
Graphics	JavaFX uses vector based graphics.	Swing uses pixel based graphics.
3D Graphics	JavaFX has built-in support for 3D graphics.	Swing requires the Java 3D API for 3D graphics.
Concurrency API	JavaFX has a built-in concurrency API.	Swing has no built-in concurrency API.
Age of toolkit	JavaFX is newer.	Swing is older.
Included in Java SDK	JavaFX is not included from Java 11 and forward.	Swing is still included.

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