

## 13.9 Wrap-Up

In this chapter, we continued our presentation of JavaFX. We discussed JavaFX layout panes in more detail and used `BorderPane`, `TitledPane` and `Pane` to arrange controls.

You learned about the many mouse events supported by JavaFX nodes, and we used the `onMouseDragged` event in a simple **Painter** app that displayed **Circles** as the user dragged the mouse across an `Pane`. The **Painter** app allowed the user to choose the current color and pen size from groups of mutually exclusive `RadioButtons`. You used `ToggleGroups` to manage the relationship between the `RadioButtons` in each group. You also learned how to provide a so-called user data `Object` for a control. When a `RadioButton` was selected, you obtained it from the `ToggleGroup`, then accessed the `RadioButton`'s user data `Object` to determine the drawing color or pen size.

We discussed property binding and property listeners, then used them to implement a **Color Chooser** app. You bound a `TextField`'s text to a `Slider`'s value to automatically update the `TextField` when the user moved the `Slider`'s thumb. You also used a property listener to allow the app's controller to update the color of a `Rectangle` when a `Slider`'s value changed.

In our **Cover Viewer** app, we showed how to bind an `ObservableList` collection to a `ListView` control to populate it with the collection's elements. By default, each object in the collection was displayed as a `String` in the `ListView`. You configured a property listener to display an image in an `ImageView` when the user selected an item in the `ListView`. We modified the **Cover Viewer** app to use a custom `ListView` cell factory to specify the exact layout of a `ListView` cell's contents. Finally, we introduced several other JavaFX capabilities and the Java SE 9 changes to JavaFX.

In the next chapter, we discuss class `String` and its methods. We introduce regular expressions for pattern matching in strings and demonstrate how to validate user input with regular expressions.