

22.1 Introduction

In this chapter, we continue our discussion of JavaFX from [Chapters 12](#) and [13](#). Here, we present various JavaFX graphics and multimedia capabilities. You'll:

- Use external Cascading Style Sheets (CSS) to customize the appearance of JavaFX nodes.
- Customize fonts and font attributes used to display text.
- Display two-dimensional shapes, including lines, rectangles, circles, ellipses, arcs, polylines, polygons and custom paths.
- Apply transforms to `Nodes`, such as rotating a `Node` around a particular point, scaling, translating (moving) and more.
- Display video and control its playback (e.g., play, pause, stop, and skip to specific time).
- Animate JavaFX `Nodes` with `Transition` and `Timeline` animations that change `Node` property values over time. As you'll see, the built-in `Transition` animations change specific JavaFX `Node` properties (such as a `Node`'s stroke and fill colors), but `Timeline` animations can be used to change *any* modifiable `Node` property.
- Create frame-by-frame animations with an `AnimationTimer`.
- Draw two-dimensional graphics on a `Canvas Node`.
- Display three-dimensional shapes, including boxes, cylinders and spheres.

Throughout this chapter, we do not show each example's `Application` subclass, because it performs the same tasks we demonstrated in [Chapters 12](#) and [13](#). Also, some examples do not have controller classes because they simply display

JavaFX controls or graphics to demonstrate CSS capabilities.

Project Exercises

At the end of this chapter, we provide dozens of project exercises that you'll find challenging and hopefully entertaining. These will reinforce techniques you've learned and encourage you to investigate additional JavaFX graphics and multimedia capabilities in Oracle's online JavaFX documentation. The **Block Breaker**, **SpotOn**, **Horse Race**, **Cannon** and other exercises will give you experience with game-programming fundamentals.