

12.3 JavaFX App Window Structure

A JavaFX app window consists of several parts (Fig. 12.1).

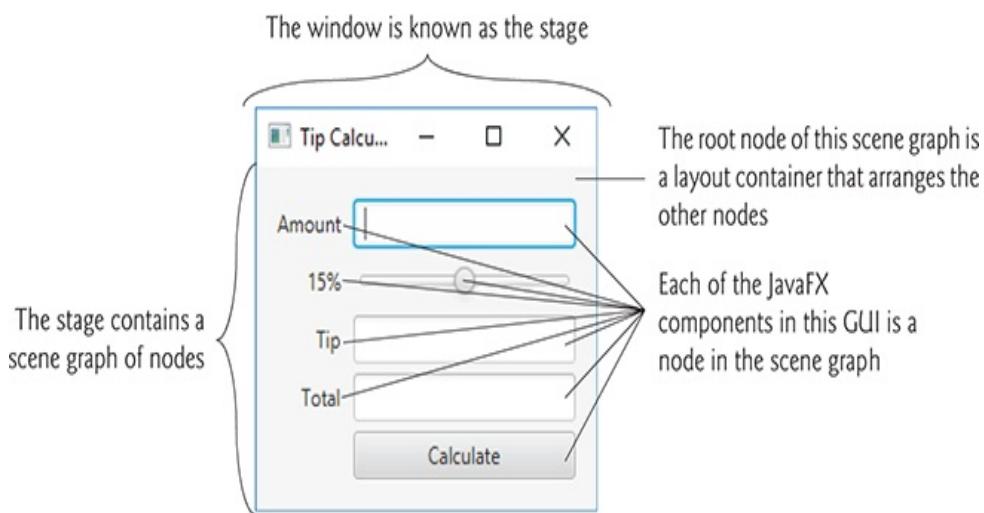


Fig. 12.1

JavaFX app window parts.

Description

Controls

Controls are GUI components, such as **Labels** that display

text, **TextFields** that enable a program to receive user input, **Buttons** that users click to initiate actions, and more.

Stage

The window in which a JavaFX app's GUI is displayed is known as the **stage** and is an instance of class **Stage** (package `javafx.stage`).

Scene

The stage contains one active **scene** that defines the GUI as a **scene graph**—a tree data structure of an app's visual elements, such as GUI controls, shapes, images, video, text and more (trees are discussed in [Section 21.7](#)). The scene is an instance of class **Scene** (package `javafx.scene`).

Nodes

Each visual element in the scene graph is a **node**—an instance of a subclass of **Node** (package `javafx.scene`), which defines common attributes and behaviors for all nodes. With the exception of the first node in the scene graph—the **root node**—each node in the scene graph has one parent. Nodes can have transforms (e.g., moving, rotating and scaling), opacity (whether a node is transparent, partially transparent or opaque), effects (e.g., drop shadows, blurs, reflection and

lighting) and more that we'll introduce in [Chapter 22](#).

Layout Containers

Nodes that have children are typically **layout containers** that arrange their child nodes in the scene. You'll use two layout containers (`VBox` and `GridPane`) in this chapter and learn several more in [Chapters 13–22](#). The nodes arranged in a layout container are a combination of controls and, in more complex GUIs, possibly other layout containers.

Event Handler and Controller Class

When the user interacts with a control, such as clicking a `Button` or typing text into a `TextField`, the control generates an event. Programs can respond to these events—known as event handling—to specify what should happen when each user interaction occurs. An **event handler** is a method that responds to a user interaction. An FXML GUI's event handlers are defined in a so-called **controller class** (as you'll see in [Section 12.5.5](#)).