StopwatchFXML

Description: Create a Java 8 SE application in NetBeans using JavaFX FXML and associated Controller that implements a stopwatch that has an analog and a digital display. The analog display is comprised of a dial with tick marks and a sweeping hand that displays the elapsed time in 1 second increments. The digital display shows the elapsed time in minutes and seconds, MM:SS, and displays the elapsed time in 1 second increments. The stopwatch has three buttons: start, stop, reset. The start button starts the timer, the stop button halts the timer, and reset button halts the timer and sets the elapsed time back to 0.

Purpose: This challenge develops skills in creating and manipulating JavaFX interfaces, using FXML and Scene Builder, using a Controller associated with an FXML interface, generating and handling events, and organizing code.

Requirements:
Project Name: <Pawprint>StopwatchFXML

For the Project Name follow the same naming scheme used in the first challenge. The Project Name is to be comprised of your pawprint with the first letter capitalized followed by Stopwatch. For example if the pawprint is **abcxyz9** the project is to be named **Abcxyz9StopwatchFXML**.

This challenge allows you to apply your creativity while meeting a set of requirements. Not every aspect of the application is described in the requirements. The requirements establish what functionality must exist, but it is up to you to apply your creativity in implementing the functionality and the user interface to support that functionality.

You can use the same Stopwatch design you created for the Stopwatch challenge. Or, if you prefer, you can implement a new design. Just make sure you use FXML, Scene Builder, and a Controller that is associated with the FXML.

Platform: Java 8 SE, JavaFX, FXML with Controller.
Project IDE: NetBeans

Create a stopwatch application that contains both an analog and a digital display. The analog display contains a circular dial with 60 tick marks where each tick mark represents 1 second of elapsed time and a sweeping hand that increments to the next tick mark every elapsed second. See *Figure 1: Analog Interface* for an example. It takes 60 seconds for the hand to sweep one time around the dial. The digital display, minimally, shows minutes and seconds in a MM:SS format. For each elapsed second, the digital display is to increment 1 second. ("Minimally means you can do more if you'd like. You could display sub-second increments, hours, etc.)

The stopwatch has three buttons: start, stop, and reset. The start button starts the stopwatch. The stop button halts the stopwatch. The reset button halts the stopwatch

and sets the elapsed time to 0. Starting the stopwatch causes it to increment the time from the last elapsed time value. If the stopwatch is at 0 and the start is pressed the stopwatch increments from 0. If the stopwatch is stopped at 00:25 and then start is selected, the stopwatch will increment from 00:25. The reset is used to set the stopwatch to 0 and place it in a halted state.

Figure 1: Analog Interface

Two image files are provided with this challenge that you can use: *clockface.png* and *hand.png*. You are not required to use the provided images. If you want to use alternatives, that is okay. The *clockface.png* image is the dial of the stopwatch. The *hand.png* image is the sweeping hand of the stopwatch.

How you layout the user interface is up to you. You get to decide the locations of the analog display, digital display, and the start, stop, and reset buttons. Whatever you choose should be a well organized, thoughtful, aesthetically pleasing, and useable interface. The layout should look like you made intentional choices and are in control of their placement and not a disorganized mess that is a result of not knowing how to do a layout.

You may expand the functionality beyond the basic requirements provided above if you choose. You could do the following for example:

- Add an additional sweeping hand that displays the minutes elapsed.
- Add an additional sweeping hand that displays the hours elapsed.
- Add hundredths of a second to the digital display.
- Add hours to the digital display.
- Add the ability to record/display split times or lap times.

For inspiration: https://en.wikipedia.org/wiki/Stopwatch

Run your application and make sure everything works as expected. ZIP the project directory and submit it on Blackboard.