

Stopwatch VI

Goal

Create a functional global variable to keep track of time elapsed.

Scenario

Starting from a pre-built interface, you use a functional global variable to create a stopwatch. The stopwatch VI count the seconds elapsed from the time you start the stopwatch. The stopwatch VI can pause, resume, stop, and reset.

The main stopwatch VI contains the inputs and displays for the timer, as shown in Figures 1 and 2.

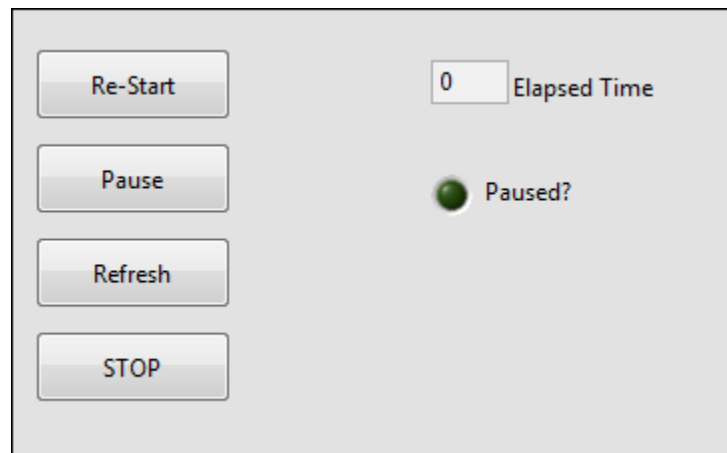


Figure 1. Stopwatch Front Panel

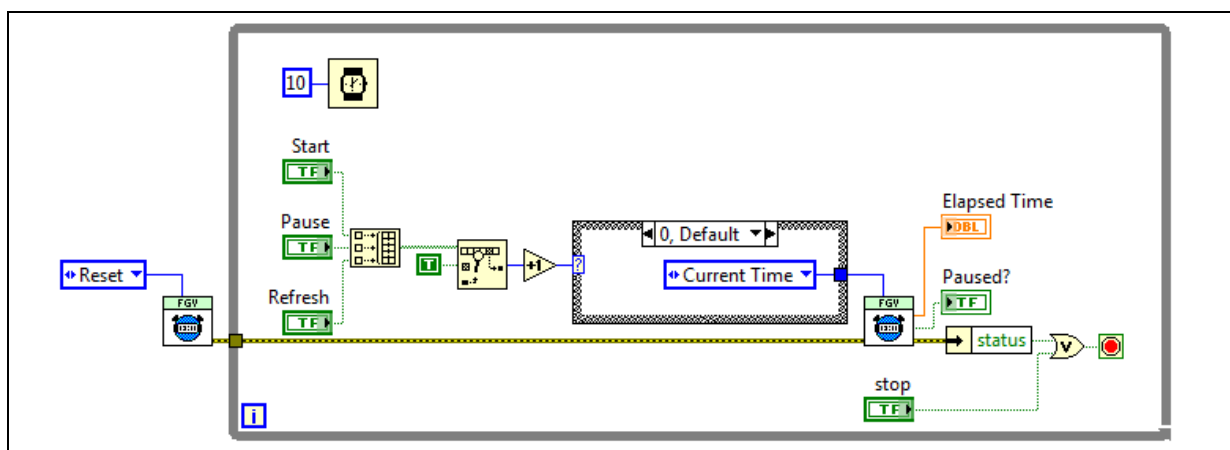


Figure 2. Stopwatch Block Diagram

Implementation

The files that you need to complete this exercise are here:
<NI eLearning>\LV Core 1\Functional Global Variables\Exercise.

1. Open `Stopwatch Tester.vi` from the <Exercise> directory.
2. Double-click the `Stopwatch FGV subVI` to open it.
3. Switch to the block diagram of the `Stopwatch FGV subVI`.
4. Wire the Start case of the Case structure as seen in Figure 3.
5. Add a **Get Date/Time in Seconds** function outside and to the left of the case structure.
6. Add a **To Double Precision Float** function to the right of the Get Date/Time in Seconds function.
7. Wire the output of the Get Date/Time function into the To Double Precision Float function.
8. Place a **False constant** in the Start case.
9. Wire the constant into the top shift register.
10. Add a **Subtract** function into the Start case.
11. Add an **Add** function into the Start case.
 - ☐ Wire the output of the To Double Precision Float function into the X terminal of the Subtract function.
 - ☐ Wire the output of the Subtract function into the Y terminal of the Add function.
 - ☐ Wire the output of the Add function into the middle shift register.
 - ☐ Wire the output of the To Double Precision Float function from inside the Start case into the bottom shift register.
 - ☐ Wire the Last Measured Timestamp input tunnel into the Y terminal.
 - ☐ Wire the Elapsed Time input tunnel into the X terminal of the Add function.

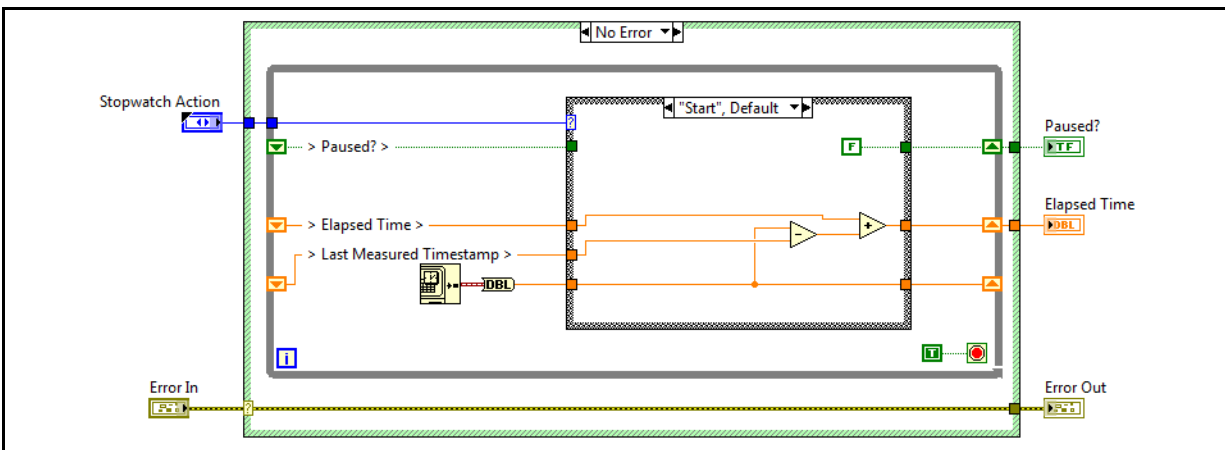


Figure 3. Completed Start Case of the Functional Global Variable

12. Wire the Pause case as seen in Figure 4.

- ☐ Right-click the top output tunnel of the Pause case and select **Create»Constant**.
- ☐ Change the value to True.
- ☐ Wire the Elapsed Time input tunnel to the middle output tunnel.
- ☐ Wire the output from the To Double Precision Float function to the bottom output tunnel.

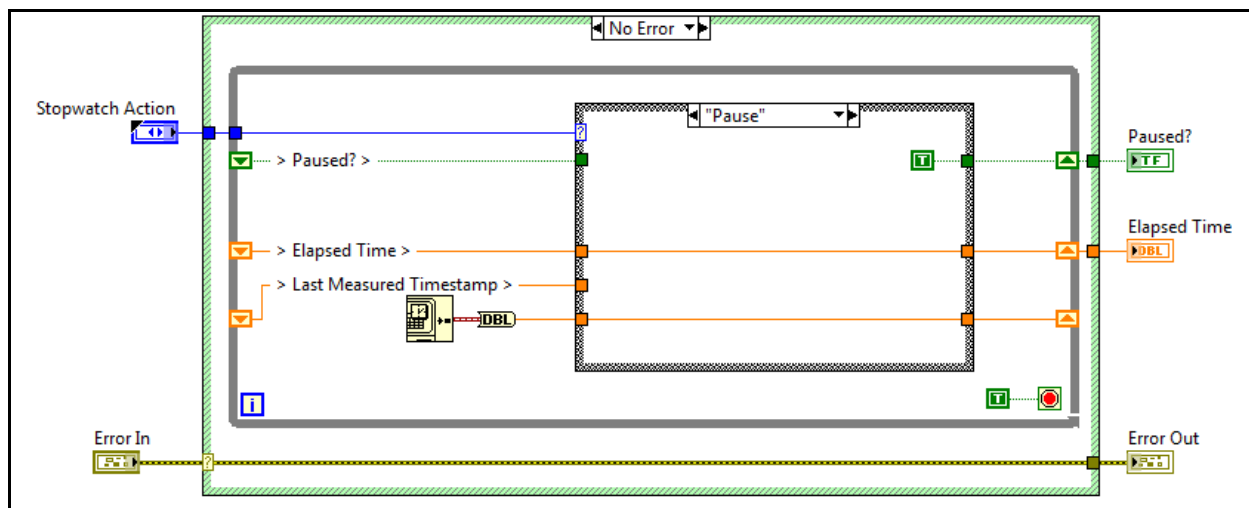


Figure 4. Completed Pause Case of the Functional Global Variable

13. Wire the Reset case as seen in Figure 5.

- ☐ Right-click the top output tunnel and select **Create»Constant**.
- ☐ Right-click the middle output tunnel and select **Create»Constant**.
- ☐ Wire the output from the To Double Precision Float function to the bottom output tunnel.

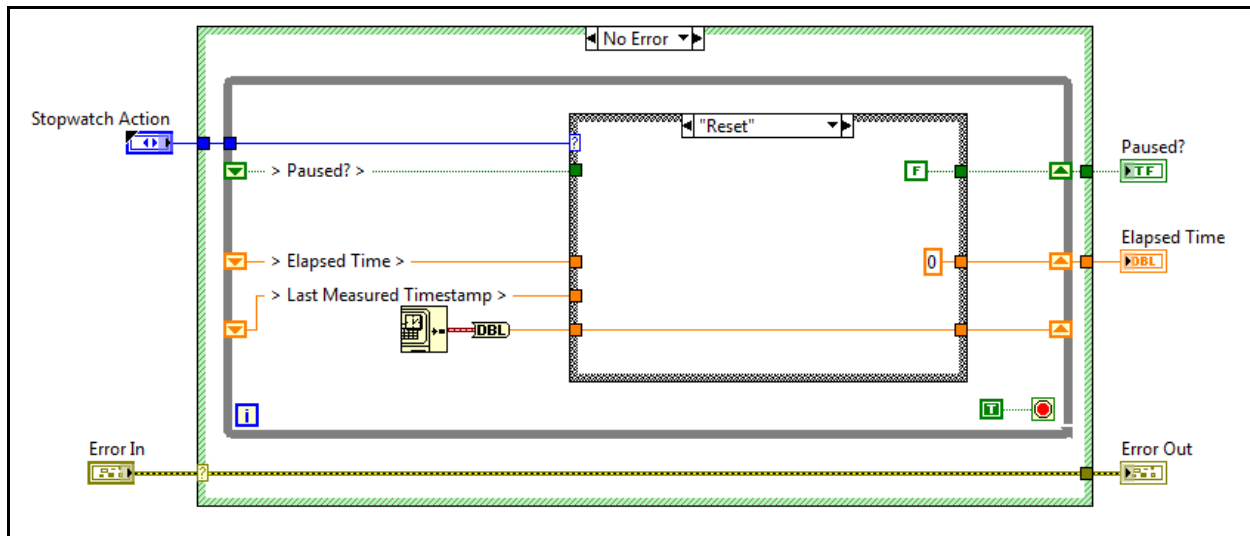


Figure 5. Completed Reset Case of the Functional Global Variable

14. Wire the Current Time case as seen in Figure 6.

- ☐ Wire the Paused? input tunnel to the top output tunnel.
- ☐ Create a Case structure inside the Current Time case.
- ☐ Wire the Paused? input tunnel into the case selector of the new Case structure.
- ☐ Wire the Elapsed Time input tunnel and the output from the To Double Precision Float function into the new Case structure.
- ☐ In the True case of the new Case structure, wire the Elapsed Time input tunnel and the output from the To Double Precision Float function into the middle and bottom output tunnels of the Current Time case.

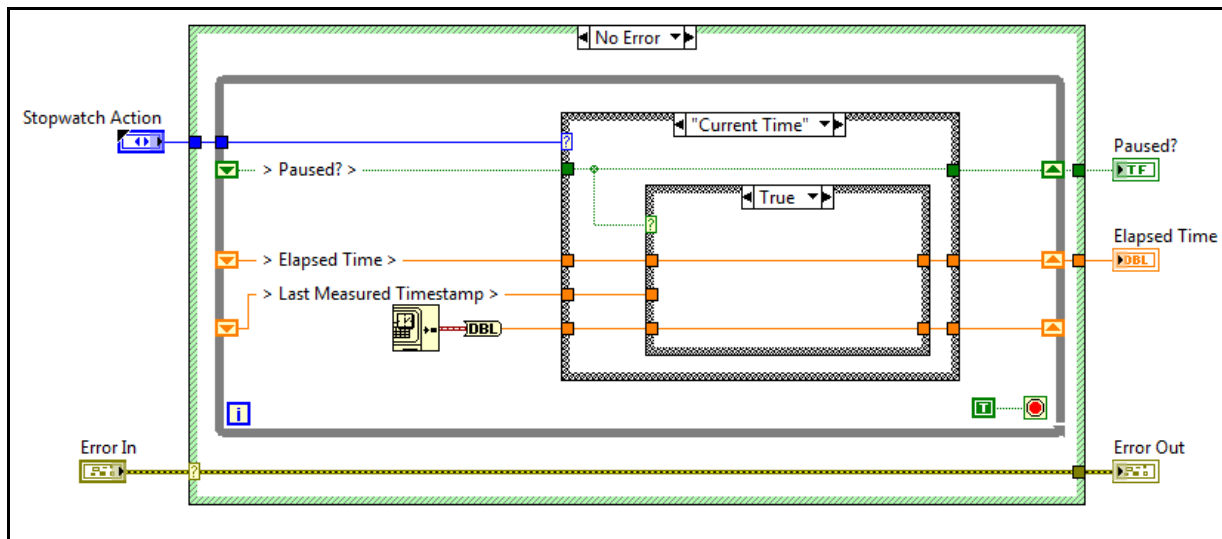


Figure 6. Completed True Case in the Current Time Case of the Functional Global Variable

15. Wire the False case as seen in Figure 7.

- ☐ Add a **Subtract** function into the False Case
- ☐ Wire the output from the To Double Precision Float function into the X terminal of the Subtract function.
- ☐ Wire Last Measured Timestamp input tunnel into the Y terminal.
- ☐ Add an **Add** function into the False case.
- ☐ Wire the Elapsed Time input tunnel into the X terminal of the Add function.
- ☐ Wire the output of the Subtract function into the Y terminal of the Add function.
- ☐ Wire the output of the Add function into the middle output tunnel.
- ☐ Wire the output of the To Double Precision Float function from inside the False case into the bottom output tunnel.

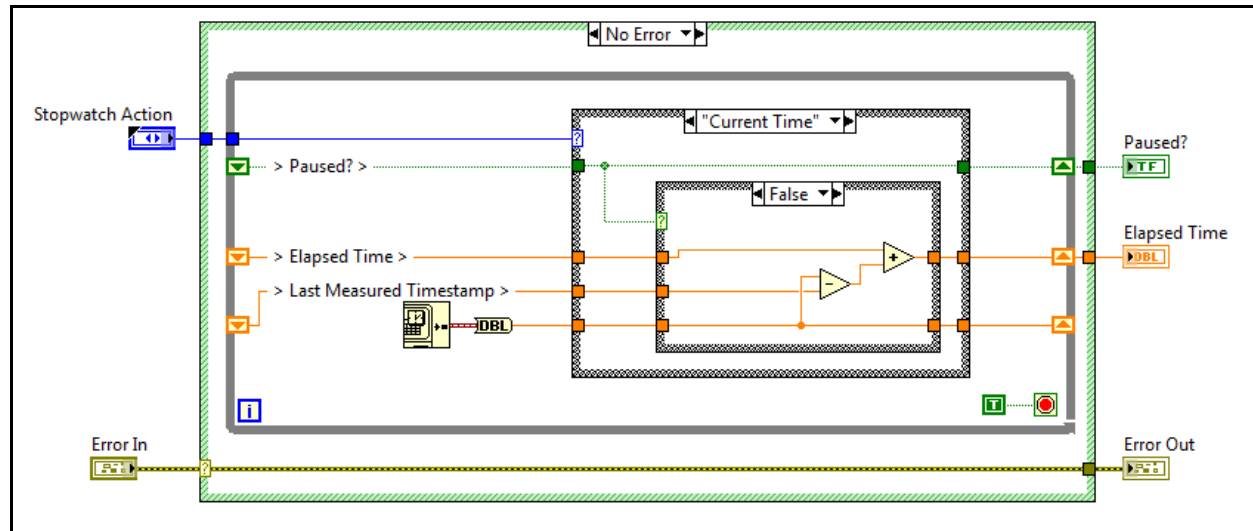


Figure 7. Completed False Case in the Current Time Case of the Functional Global Variable

Test

1. Save the Stopwatch Functional Global Variable subVI.
2. Return to the Stopwatch Tester VI.
3. Click the Run button to run the VI.
4. Manipulate the controls on the front panel to test the execution of the stopwatch. Notice that clicking Pause will stop the Elapsed Time from increasing and then clicking Re-Start will start it again. No time is added while it is paused.

End of Exercise

Notes
