Concept: Debugging

Goal

Use the debugging tools built into LabVIEW.

Description

Complete the following steps to load a broken VI and correct the errors. Use single-stepping and execution highlighting to step through the VI.

Implementation

The files that you need to complete this exercise are here:
`<NI eLearning>\LV Core 1\Basic Debugging\Exercise`.

1. Open and examine the Debug Exercise (Main) VI.

   ❑ Select **File»Open**.

   ❑ Open `Debug Exercise (Main).vi` in the `<Exercises>` directory.

   The following front panel appears.

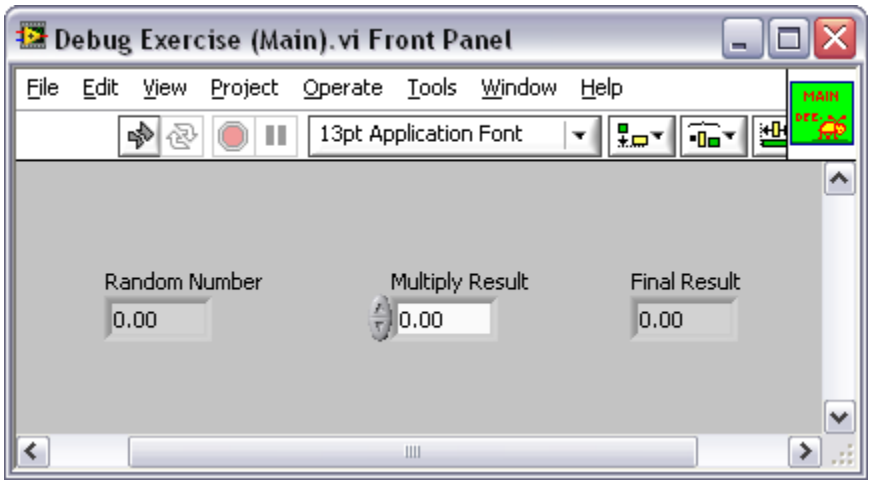

Figure 1. Debug Exercise (Main).vi Front Panel

   ❑ Notice the **Run** button on the toolbar appears broken, indicating that the VI is broken and cannot run.

2. Display and examine the block diagram of Debug Exercise (Main) VI.

   ❑ Select **Window»Show Block Diagram** to display the block diagram shown in Figure 2.

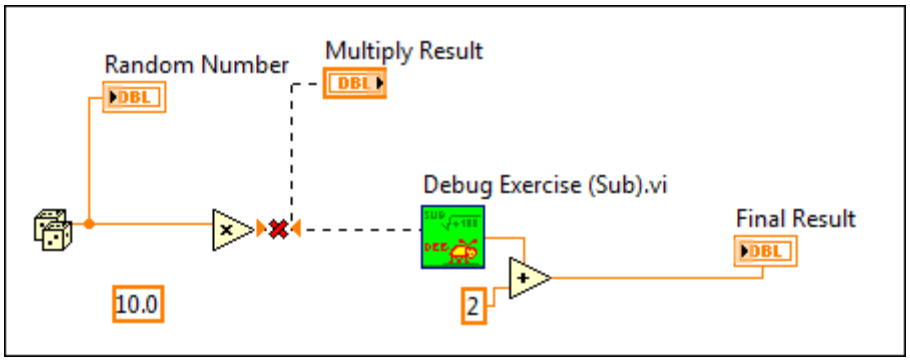

Figure 2. Debug Exercise (Main).vi Block Diagram

❑ The Random Number (0-1) function produces a random number between 0 and 1.

❑ The Multiply function multiplies the random number by `10.0`.

❑ The numeric constant is the number multiplied with the random number.

❑ The Debug Exercise (Sub) VI, located in the directory where you saved the provided VIs, adds `100.0` and calculates the square root of the value.

3. Clean up the messy section of the block diagram to make the block diagram more readable.

   ❑ Click and drag your mouse cursor to select the Debug Exercise (Sub) VI and the function, constant, and indicator to the right of the VI.

❑ Click the **Clean Up Diagram** button on the toolbar.

4. Find and fix each error.

   ❑ Click the broken **Run** button to display the **Error list** window, which lists all the errors.

   ❑ Select an error description in the **Error list** window. The **Details** section describes the error and in some cases recommends how to correct the error.

- ❑ Click the **Help** button to display a topic in the *LabVIEW Help* that describes the error in detail and includes step-by-step instructions for correcting the error.
- ❑ Click the **Show Error** button or double-click the error description to highlight the area on the block diagram that contains the error.
- ❑ Use the **Error list** window to fix each error.

5. Select **File»Save** to save the VI.
6. Display the front panel by clicking it or by selecting **Window»Show Front Panel**.
7. Click the **Run** button.
8. Select **Window»Show Block Diagram** to display the block diagram.
9. Animate the flow of data through the block diagram.

- ❑ Click the **Highlight Execution** button on the toolbar to enable execution highlighting.

- ❑ Click the **Step Into** button to start single-stepping. Execution highlighting shows the flow of data on the block diagram from one node to another using bubbles that move along the wires. Nodes blink to indicate they are ready to execute.

- ❑ Click the **Step Over** button after each node to step through the entire block diagram. Each time you click the **Step Over** button, the current node executes and pauses at the next node.
- ❑ Data appears on the front panel as you step through the VI. The VI generates a random number and multiplies it by `10.0`. The subVI adds `100.0` and calculates the square root of the result.

- ❑ When a blinking border surrounds the entire block diagram, click the **Step Out** button to stop single-stepping through the Debug Exercise (Main) VI.

10. Single-step through the VI and its subVI.
- ❑ Click the **Step Into** button to start single-stepping.

- ❑ When the Debug Exercise (Sub) VI blinks, click the **Step Into** button. Notice the **Run** button on the subVI.

- ❑ Display the Debug Exercise (Main) VI block diagram by clicking it. A green glyph appears on the subVI icon on the Debug Exercise (Main) VI block diagram, indicating that the subVI is running.
- ❑ Display the Debug Exercise (Sub) VI block diagram by clicking it.
- ❑ Click the **Step Out** button twice to finish single-stepping through the subVI block diagram. The Debug Exercise (Main) VI block diagram is active.
- ❑ Click the **Step Out** button to stop single-stepping.

11. Use a probe to check intermediate values on a wire as a VI runs.
    - ❑ From the Tools palette, select the **Probe Data** tool.

    - ❑ Use the Probe tool to click any wire. The **Probe Watch Window** appears.

      The Probe Watch Window displays all probes in all VIs currently in memory. This window sorts the probes in the order you create them and lists the probes under the VI they belong to.
    - ❑ Single-step through the VI again. The Probe Watch Window displays data passed along the wire.
12. Place breakpoints on the block diagram to pause execution at that location.

    - ❑ Use the **Breakpoint** tool to click nodes or wires. Place a breakpoint on the block diagram to pause execution after all nodes on the block diagram execute.
    - ❑ Click the **Run** button to run the VI. When you reach a breakpoint during execution, the VI pauses and the Pause button on the toolbar appears red.

    - ❑ Click the **Continue** button to continue running to the next breakpoint or until the VI finishes running.
    - ❑ Use the **Breakpoint** tool to click the breakpoints you set and remove them.
13. Click the **Highlight Execution** button to disable execution highlighting.
14. Select **File»Close** to close the VI and all open windows.

End of Exercise

Notes

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