

## Exercise: Data Flow, Debugging, and SubVIs

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### Overview

This exercise will go over dataflow within a VI. You will then go over debugging techniques and lastly how to turn your program into a subVI that you can use in alternate programs.

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#### Goal

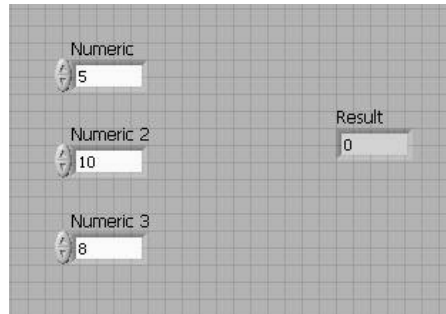
Understand the basic behavior of data flow and debugging in the LabVIEW environment. Modular programming using SubVIs is also explored.

#### Description

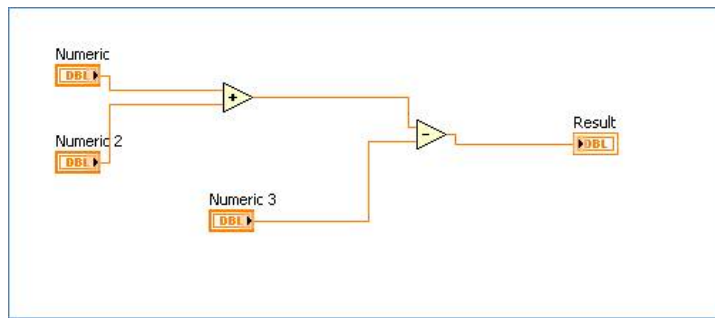
This exercise consists of a series of tasks in which will walk you through how data is passed from one element to another in the LabVIEW environment as well as how to debug using highlighted execution. Users will also learn how to create a SubVI for modular programming.

#### Data Flow, Debugging, and SubVIs

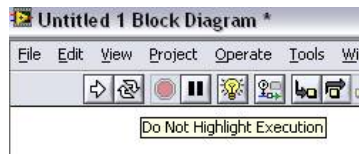
1. Launch LabVIEW and open a blank VI.  
Select File»New VI
2. Open the front panel.
3. Place a numeric control on the front panel.  
Select and place **Modern»Numeric»Numeric Control** on the front panel.  
Double click the number box of the numeric control and give it a value of **5**.  
Right click the numeric control and navigate to **Data Operation»Make Current Value Default**.
4. Place a numeric control on the front panel.  
Select and place **Modern»Numeric»Numeric Control** on the front panel underneath the **Numeric** control.  
Double click the number box of the numeric control and give it a value of **10**.  
Right click the numeric control and navigate to **Data Operation»Make Current Value Default**.
5. Place a numeric control on the front panel.  
Select and place **Modern»Numeric»Numeric Control** on the front panel underneath the **Numer 2** control.  
Double click the number box of the numeric control and give it a value of **8**.  
Right click the numeric control and navigate to **Data Operation»Make Current Value Default**.
6. Place a numeric indicator to the right of the numeric controls and name it "Result".  
Select and place **Modern»Numeric»Numeric Indicator** on the front panel to the right of the numeric controls.  
Right click the numeric control and navigate to **Data Operation»Make Current Value Default**.



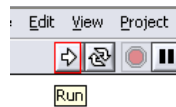
6. Switch to the block diagram.  
Select Window»Show Block Diagram.
7. Place an "Add" function  
Select and place **Programming»Numeric»Add** from the functions palette on the Block Diagram.
8. Place an "Add" function  
Select and place **Programming»Numeric»Subtract** from the functions palette on the Block Diagram.
9. Wire the block diagram as seen below.  
Wire the output of the **Numeric** control to the first input of the **Add** function.  
Wire the output of the **Numeric 2** control to the second input of the **Add** function.  
Wire the output of the **Add** function to the first input of the **Subtract** function.  
Wire the output of the **Numeric 3** control to the second input of the **Subtract** function.  
Wire the output of the **Subtract** function to the input of the **Result** indicator



10. Enable **Highlight Execution** by clicking the light bulb in the block diagram's tool bar.



11. Run the VI by clicking the **Run** button on the block diagram.



12. Observe how the program executes and the sequential steps taken during the execution. Take note how intermediary values are also shown.

13. Save the VI as "add\_subtract.vi".

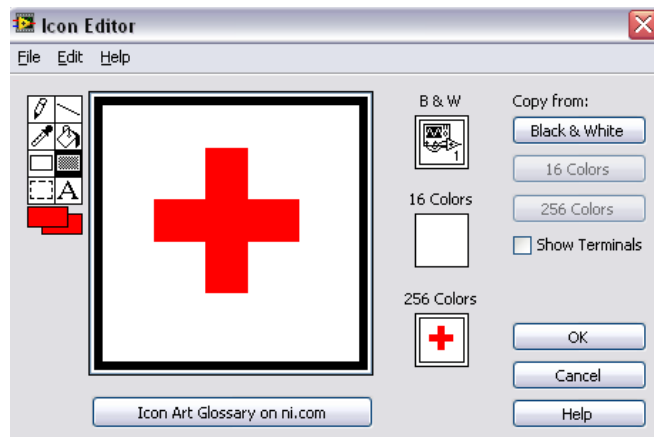
14. Open the front panel.

15. Create a custom icon.

Double click the VI icon in the upper right corner to open the icon editor.



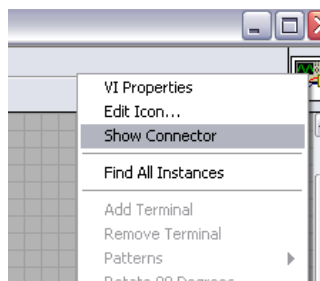
In the icon editor that opens, use the paint tools to create your own icon or the one below.



When done click **OK**.

15. Configure the connector pane.

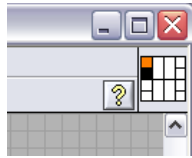
Right click the VI icon in the upper right corner and select **Show Connector**.



Click the upper left terminal of the connector pane.



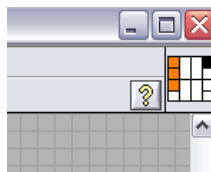
Click on the **Numeric** control on the front panel. This links the terminal with this control.  
Click the next terminal of the connector pane.



Click on the **Numeric 2** control on the front panel. This links the terminal with this control.  
Click the next terminal of the connector pane.

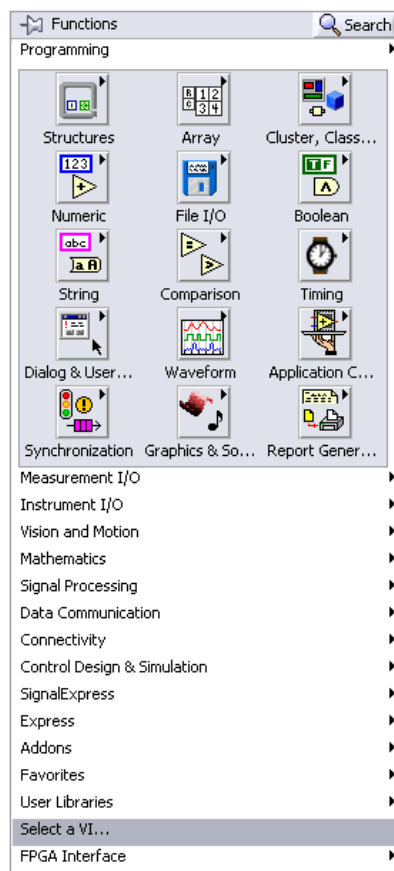


Click on the **Numeric 3** control on the front panel. This links the terminal with this control.  
Click the terminal in the upper right of the connector pane.

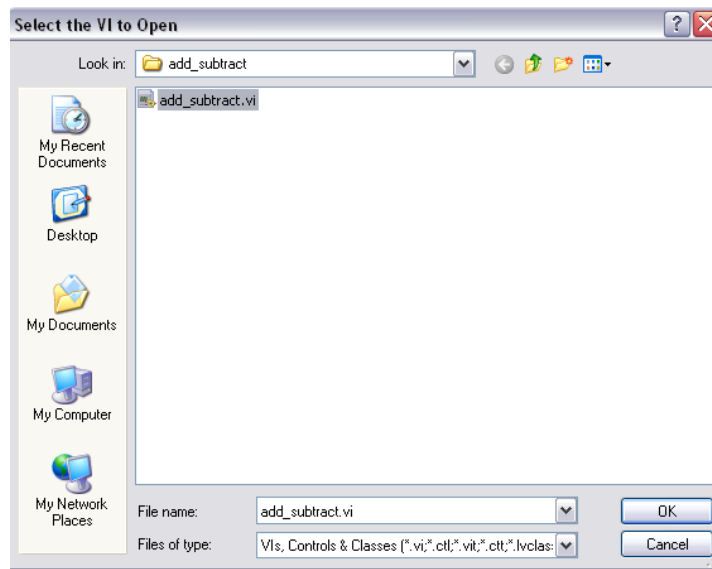


Click on the **Result** indicator on the front panel. This links the terminal with this indicator.

15. Save the VI.
16. Create a blank VI.  
Select File»New VI.
17. Switch to the block diagram.  
Select Window»Show Block Diagram.
18. Add the previously created **add\_subtract.vi** VI to the block diagram.  
From the functions palette navigate to and select **Select a VI...**



Navigate to where you saved **add\_subtract.vi**. Select this VI and press **OK**.

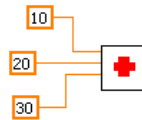


Place the VI on the front panel. Notice how the inputs and outputs correspond to those defined in the previous section.



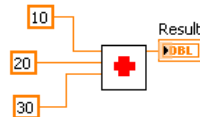
19. Create constants for the input of the **add\_subtract** VI.

Right click the **Numeric** input of the **add\_subtract** VI and select **Create»Constant**. Give this constant a value of **10**.  
 Right click the **Numeric 2** input of the **add\_subtract** VI and select **Create»Constant**. Give this constant a value of **20**.  
 Right click the **Numeric 3** input of the **add\_subtract** VI and select **Create»Constant**. Give this constant a value of **30**.



20. Create an indicator for the output of the **add\_subtract** VI.

Right click the **Result** output of the **add\_subtract** VI and select **Create»Indicator**.



21. Switch to the front panel.

Select **Window»Show Front Panel**.

22. Run the VI. Observe how the **add\_subtract** VI behaves just as the VI that was created earlier in this exercise.

23. Close both VIs. Save if desired.

End of Exercise