Simple AAP VI

Goal

Create a simple VI that acquires, analyzes, and presents data.

Description

From a blank VI, the user must create a VI that takes an input of a signal and displays it. Then it must calculate, output and record the average value of the signal.

Design

The input for this problem is an analog channel of sine wave data.
The outputs include a graph of the sine data and a file that logs the data.
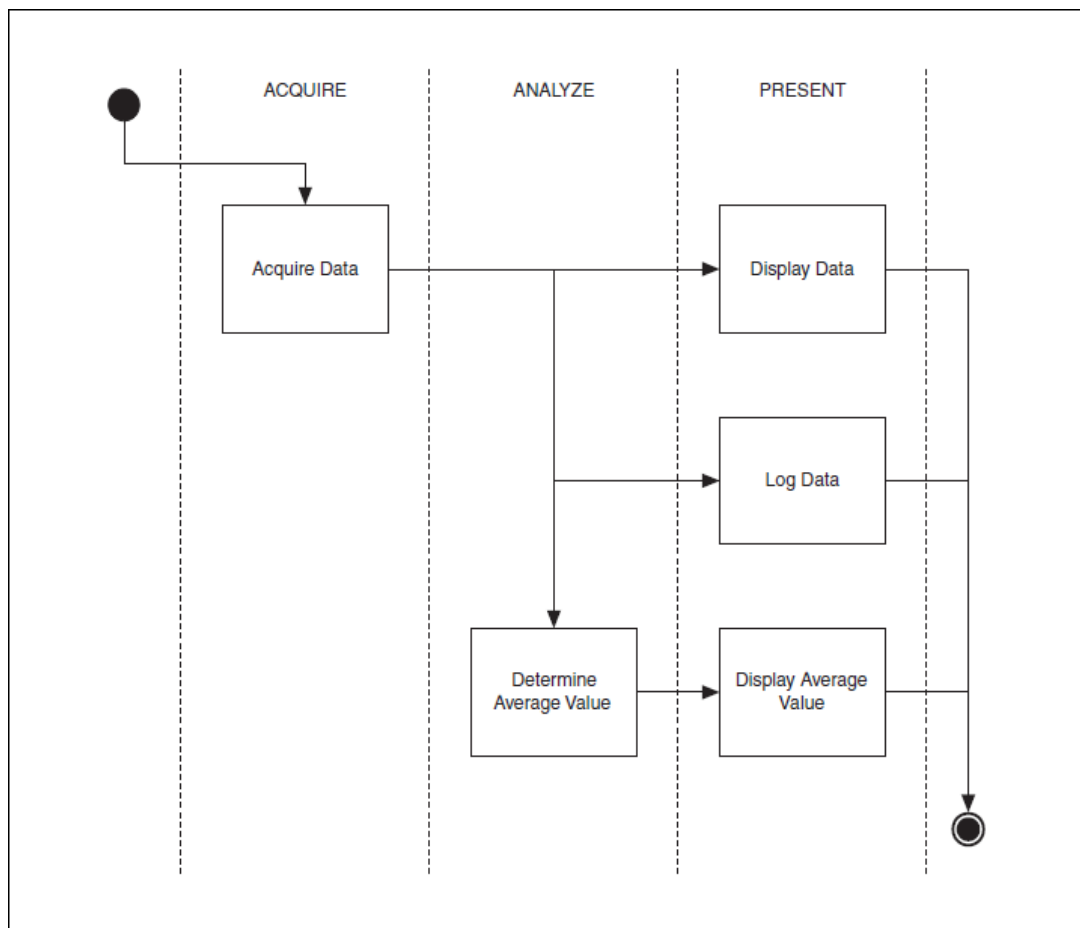

Figure 1. Simple AAP VI Flowchart

Implementation

The folder that you need to complete this exercise is here:
`<NI eLearning>\LV Core 1\Programming a Simple VI\ Exercise.`

1. Open LabVIEW.

2. Open a blank VI

3. Save the VI as `Simple AAP.vi`.

   ❑ Select **File»Save**.

   ❑ Save the VI as `Simple AAP.vi.` in the `<Exercise>` directory.

In the following steps, you will build a front panel window similar to the one in Figure 2.
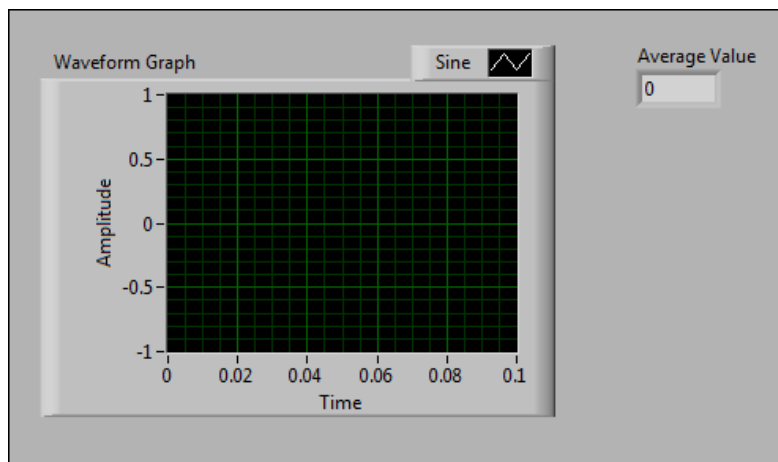

Figure 2. Acquire, Analyze and Present Front Panel

4. Add a waveform graph to the front panel window to display the acquired data.

   ❑ Select **View»Controls** Palette.

   ❑ Select the **Express** category.

   ❑ Select the **Graph Indicators** category from within the **Express** category.

   ❑ Select and drag the **Waveform Graph** onto the front panel.

5. Add a numeric indicator to the front panel window to display the average value.

❑ Collapse the **Graph Indicators** category by selecting **Express** on the **Controls** palette.

❑ Select the **Numeric Indicators** category from within the **Express** category.

❑ Select and drag the **Numeric Indicator** onto the front panel.

❑ Double-click the label of the numeric indicator.

❑ Enter the text `Average Value`.

6. Open the block diagram of the VI.

❑ Select **Window»Show Block Diagram**.

7. Acquire a sine wave for 0.1 seconds.

❑ Select **View»Functions Palette** from the LabVIEW menu.

❑ Select the **Express** category.

❑ Select the **Input** subcategory.

❑ Select and drag the **Simulate Signal** Express VI onto the block diagram.

❑ When the dialog box appears, select **Sine** for the signal type.

❑ Set the Signal frequency to `100`.

❑ Set the Samples per second (Hz) to `1000`.

❑ Deselect **Automatic** for the Number of samples.

❑ Set the Number of samples to `100`.

❑ Select **Simulate acquisition timing**.

❑ Click **OK**.

💡 **Tip** Reading 100 samples at a rate of 1,000 Hz retrieves 0.1 seconds worth of data.

8. Determine the average value of the data acquired by using the Statistics Express VI.

   ❏ Collapse the **Input** palette by selecting **Express** on the **Functions** palette.

   ❏ Select the **Signal Analysis** palette.

   ❏ Select and drag the **Statistics** Express VI onto the block diagram to the right of the Simulate Signal Express VI.

   ❏ In the dialog box that appears, enable the **Arithmetic mean** checkbox.

   ❏ Click **OK**.

9. Convert the dynamic data to a numeric data type.

   ❏ Collapse the Signal Analysis palette by selecting **Express** on the **Functions** palette.

   ❏ Select the **Signal Manipulation** palette.

   ❏ Select and drag the **Convert from Dynamic Data** Express VI onto the block diagram to the right of the Statistics Express VI.

   ❏ In the dialog box that appears, select **Single scalar**.

   ❏ Click the **OK** button.

10. Log the generated sine data to a LabVIEW Measurement File.

   ❏ Select **Express** on the **Functions** palette.

   ❏ Select the **Output** category.

   ❏ Select and drag the **Write to Measurement File** Express VI onto the block diagram below the Statistics Express VI.

   ❏ Leave all settings as default.
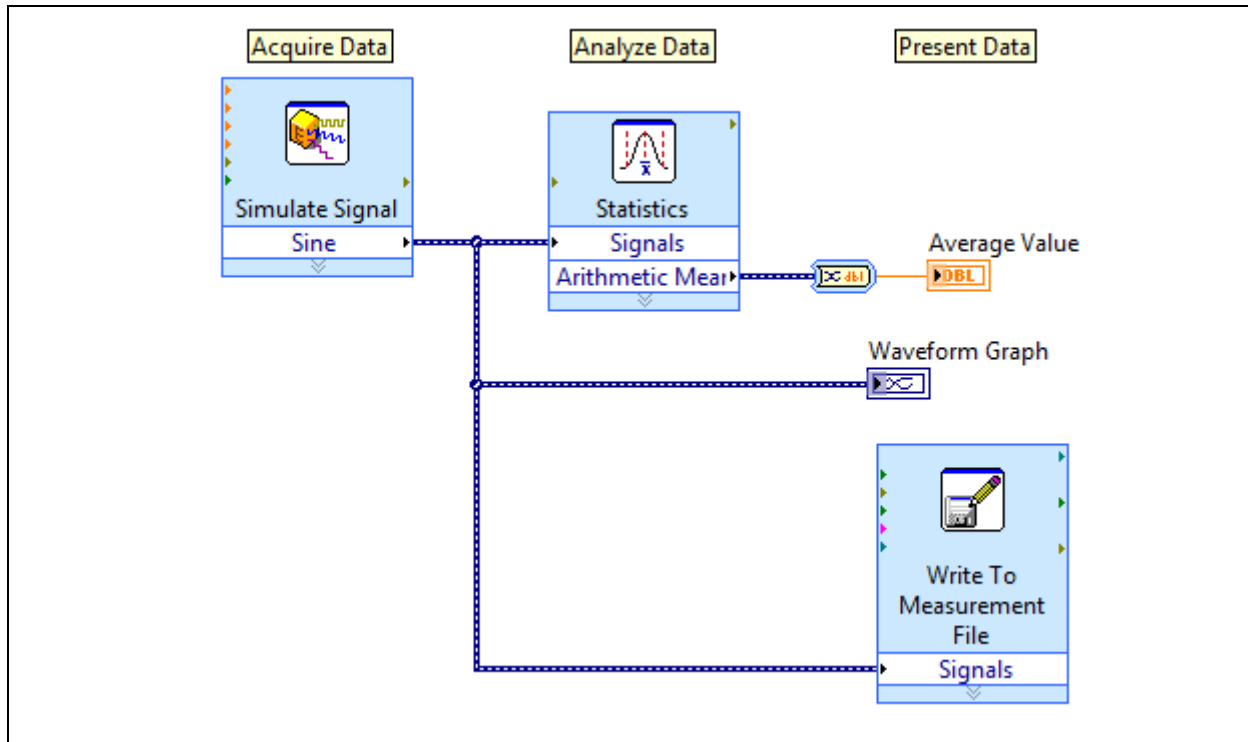
   ❏ Click the **OK** button.

Figure 3. Acquire, Analyze, and Present Block Diagram

11. Wire the Sine output of the Signal Express VI to the Signal input of the Statistics Express VI.

12. Wire the Sine output of the Signal Express VI to the graph indicator.

13. Wire the Arithmetic Mean output of the Statistics Express VI to the Dynamic Data Type input of the Convert from Dynamic Data Express VI.

14. Wire the Scalar output of the Convert from Dynamic Data Express VI to the Average Value numeric indicator.

15. Wire the Sine output of the Signal Express VI to the Signals input of the Write to Measurement File Express VI.

16. Save the VI.

17. Select **File»Save**.

Note Future exercises do not detail the directions for wiring between objects.

Test

1. Switch to the front panel of the VI.

2. Set the graph properties to be able to view the sine wave.

   ❑ Right-click the waveform graph and select **X Scale»Autsoscale** to disable autoscaling.

   ❑ Use the labeling tool to change the last number on the X Scale of the waveform graph to `.1`.

3. Save the VI.

4. Run the VI.

   ❑ Click the **Run** button on the front panel toolbar.

   The graph indicator should display a sine wave and the **Average Value** indicator should display a number around zero. If the VI does not run as expected, review the implementation steps.

5. Close the VI.

End of Exercise

Notes

Notes