Concept: Clusters

Goal

Create clusters on the front panel window, reorder clusters, and use the cluster functions to assemble and disassemble clusters.

Description

In this exercise, follow the instructions to experiment with clusters, cluster order, and cluster functions. The VI you create has no practical applications, but is useful for understanding cluster concepts.

Implementation

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

1. Open a blank VI.
2. Save the VI as `Cluster Experiment.vi` in the `<Exercise>` directory.

In the following steps, you create a front panel similar to Figure 1.

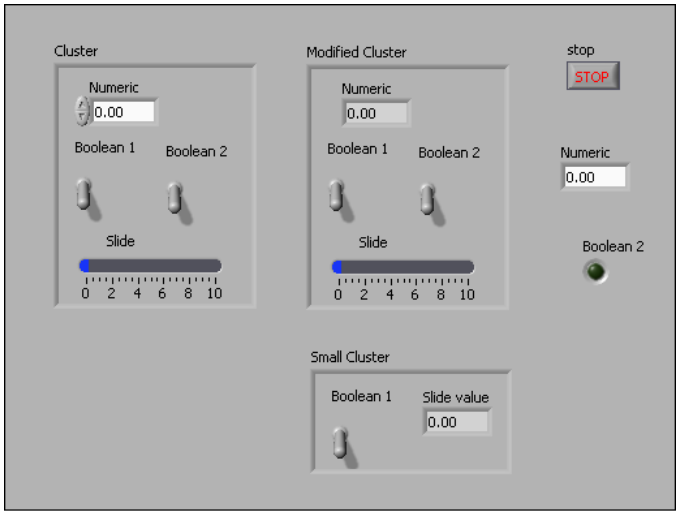

Figure 1. Cluster Experiment VI Front Panel

3. Add a stop button to the front panel window.
4. Add a numeric indicator to the front panel window.
5. Add a round LED to the front panel.

6. Rename the LED `Boolean 2`.

7. Create a cluster named Cluster, containing a numeric, two toggle switches, and a slide.

   - ❑ Add a cluster shell to the front panel.
   - ❑ Add a numeric control to the cluster.
   - ❑ Add two vertical toggle switches to the cluster.
   - ❑ Rename the Boolean toggle switches to `Boolean 1` and `Boolean 2`.
   - ❑ Add a horizontal fill slide to the cluster.

8. Create Modified Cluster, containing the same contents as Cluster, but indicators instead of controls.

   - ❑ Create a copy of Cluster.
   - ❑ Relabel the copy `Modified Cluster`.
   - ❑ Right-click the shell of **Modified Cluster**, and select **Change to Indicator** from the shortcut menu.

9. Create Small Cluster, containing a Boolean indicator and a numeric indicator.

   - ❑ Create a copy of Modified Cluster.
   - ❑ Relabel the copy `Small Cluster`.
   - ❑ Delete the second toggle switch.
   - ❑ Delete the horizontal fill slide indicator.
   - ❑ Right-click **Small Cluster** and select **Autosizing»Size to Fit**.
   - ❑ Relabel the numeric indicator to `Slide value`.
   - ❑ Resize the cluster as needed.

10. Verify the cluster order of Cluster, Modified Cluster, and Small Cluster.

    - ❑ Right-click the boundary of **Cluster** and select **Reorder Controls in Cluster** from the shortcut menu.
    - ❑ Confirm the cluster order shown in Figure 2.

- ❑ Click the **Confirm** button on the toolbar to set the cluster order and exit the cluster order edit mode.
- ❑ Right-click the boundary of **Modified Cluster** and select **Reorder Controls in Cluster** from the shortcut menu.
- ❑ Confirm the cluster orders shown in Figure 2. Modified Cluster should have the same cluster order as Cluster.
- ❑ Click the **Confirm** button on the toolbar to set the cluster order and exit the cluster order edit mode.
- ❑ Right-click the boundary of **Small Cluster** and select **Reorder Controls in Cluster** from the shortcut menu. Click the **Confirm** button on the toolbar to set the cluster order and exit the cluster order edit mode.
- ❑ Confirm the cluster orders shown in Figure 2.

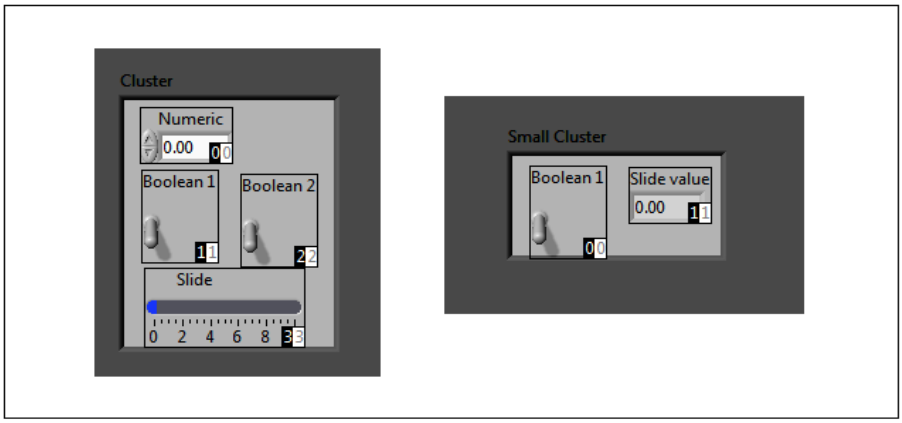

Figure 2. Cluster Orders

In the following steps, build the block diagram shown in Figure 3.

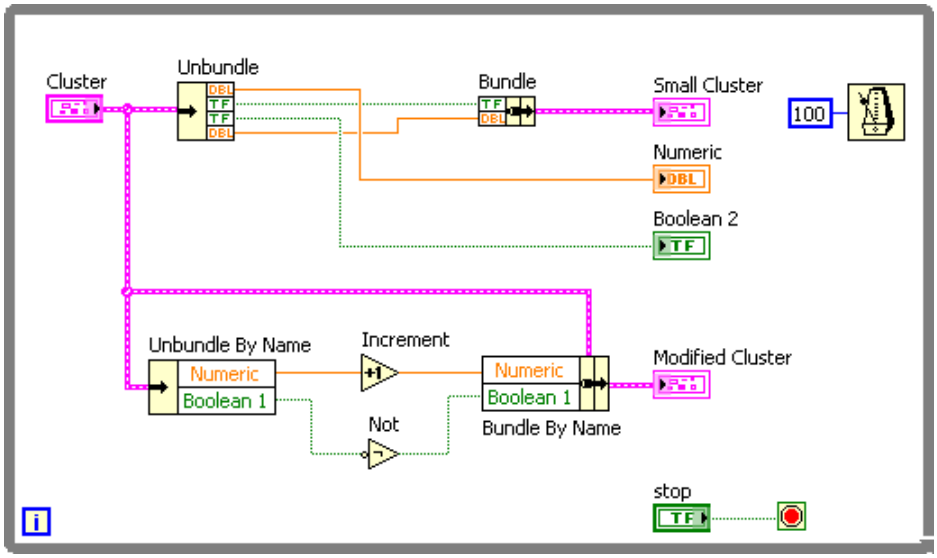

Figure 3. Cluster Experiment VI Block Diagram

11. Add the While Loop from the Structures palette to the block diagram.

12. Disassemble Cluster.

    - ❑ Add the Unbundle function to the block diagram.
    - ❑ Wire Cluster to the input of the Unbundle function to resize the function automatically.

13. Assemble Small Cluster.

    - ❑ Add the Bundle function to the block diagram.
    - ❑ Wire the Bundle function as shown in Figure 3.

14. Assemble Modified Cluster.

    - ❑ Add the Unbundle by Name function to the block diagram.
    - ❑ Wire the Cluster to the Unbundle by Name function.
    - ❑ Resize the Unbundle by Name function to have two output terminals.
    - ❑ Select Numeric in the first node, and Boolean 1 in the second node. If a label name is not correct, use the Operating tool to select the correct item.
    - ❑ Add the Increment function to the block diagram.

- ❑ Wire the Numeric output of the Unbundle By Name function to the input of the Increment function. This function adds one to the value of Numeric.

- ❑ Add the Not function to the block diagram.
- ❑ Wire the Boolean 1 output of the Unbundle By Name function to the x input of the Not function. This function returns the logical opposite of the value of Boolean.

- ❑ Add the Bundle by Name function to the block diagram.
- ❑ Wire Cluster to the input cluster input.
- ❑ Resize this function to have two input terminals.
- ❑ Select Numeric in the first node and Boolean 1 in the second node. If a label name is not correct, use the Operating tool to select the correct item.
- ❑ Wire the output of the Increment function to Numeric.
- ❑ Wire the output of the Not function to Boolean 1.
- ❑ Wire the output of the Bundle By Name function to the Modified Cluster indicator.

15. Add a wait function to provide the processor with time to complete other tasks.

- ❑ Add the Wait Until Next ms Multiple function to the block diagram.
- ❑ Right-click the **millisecond multiple** terminal of the Wait Until Next ms Multiple function.
- ❑ Select **Create»Constant** from the shortcut menu.
- ❑ Enter `100` in the constant.

16. Complete the block diagram and wire the objects as shown in Figure 3.
17. Save the VI.
18. Display the front panel.
19. Run the VI.

20. Enter different values in Cluster and notice how values entered in Cluster affect the Modified Cluster and Small Cluster indicators. Is this the behavior you expected?

21. Click the **Stop** button when you are done.

22. Change the cluster order of Modified Cluster. Run the VI. How did the changed order affect the behavior?

23. Close the VI. Do not save changes.

End of Exercise

Notes