Project: Determine Warnings VI

Goal
Modify a VI to use a Case structure to make a software decision.

Scenario
You created a VI where a user inputs a temperature, a maximum temperature and a minimum temperature. A warning string is generated depending on the relationship of the given inputs. However, a situation could occur that causes the VI to work incorrectly. The user could enter a maximum temperature that is less than the minimum temperature. Modify the VI so that a different string is generated to alert the user to the error: "Upper Limit < Lower Limit." Set the warning Boolean to True to indicate the error.
Design

Modify the flowchart created for the original Determine Warnings VI as shown in Figure 3-1.

Figure 3-1. Modified Determine Warnings Flowchart
The original block diagram for the Determine Warnings VI appears in Figure 3-38. This VI must have a Case structure added to execute the code if the maximum temperature is greater than or equal to the minimum temperature. Otherwise, the code will not execute. Instead, a new string is generated and the Warning? Boolean indicator is set to True.

Figure 3-2. Determine Warnings VI Block Diagram
Implementation

Follow the instructions given below to modify the block diagram similar to that shown in Figure 3-3. This VI is part of the temperature weather station project.

1. Open the Determine Warnings VI.
   - Select File»Open Project.
   - Open the Weather Station.lvproj in the <dir>:\Exercises\ LabVIEW_Basics_I\Course Project directory.
   - Double-click the Determine Warnings.vi in the Project Explorer window to open the VI.

2. Open the block diagram.

3. Create space on the block diagram to add the case structure.
   The Max Temp and Min Temp controls and the Warning Text and Warning? indicators should be outside of the new Case structure, because both cases of the case structure use these indicators and controls.
   - Select the Min Temp and Max Temp control terminals.

   **Tip**  To select more than one item press the <Shift> key while you select the items.
While the terminals are still selected, use the left arrow key on the keyboard to move the controls further to the left of the block diagram.

Select the **Warning Text** and **Warning?** indicator terminals.

Align the terminals by selecting **Align Objects»Left Edges**.

While the terminals are still selected, use the right arrow key on the keyboard to move the controls further to the right of the block diagram.


   Place the **Greater?** function on the block diagram.

   Wire the **Min Temp** output to the x input on the **Greater?** function.

   Wire the **Max Temp** output to the y input on the **Greater?** function.

   Place a Case structure around the block diagram code, except for the excluded terminals.

   Wire the output of the **Greater?** function to the case selector of the Case structure.

5. If the Min Temp is less than the Max Temp, execute the code that determines the warning string and boolean.

   While the True case is visible, right-click the border of the Case structure, and select **Make This Case False** from the shortcut menu. When you create a Case structure around existing code, the code is automatically placed in the True case.
6. If the Min Temp is greater than the Max Temp, create a custom string for the Warning Text indicator and set the Warning? indicator to True, as shown in Figure 3-4.

- Select the True case.
- Right-click the string output tunnel.
- Select Create»Constant.
- Enter Upper Limit < Lower Limit in the constant.
- Right-click the Boolean output tunnel.
- Select Create»Constant.
- Use the Operating tool to change the constant to a True constant.

7. Save the VI.

**Testing**

1. Switch to the front panel of the VI.

2. Resize the Warning Text indicator to a length to accommodate the new string.

3. Test the VI by entering values from Table 3-4 for Current Temp, Max Temp, and Min Temp, and running for each set.
Table 3-4 shows the expected Warning Text and Warning? Boolean value for each set of inputs.

**Table 3-4. Testing Values for Determine Warnings.vi**

<table>
<thead>
<tr>
<th>Current Temp</th>
<th>Max Temp</th>
<th>Min Temp</th>
<th>Warning Text</th>
<th>Warning?</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30</td>
<td>10</td>
<td>Heatstroke Warning</td>
<td>True</td>
</tr>
<tr>
<td>25</td>
<td>30</td>
<td>10</td>
<td>No Warning</td>
<td>False</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
<td>10</td>
<td>Freeze Warning</td>
<td>True</td>
</tr>
<tr>
<td>25</td>
<td>20</td>
<td>30</td>
<td>Upper limit &lt; Lower Limit</td>
<td>True</td>
</tr>
</tbody>
</table>

4. Save and close the VI.

5. Save and close the project.