

PHYC 500: Introduction to LabView

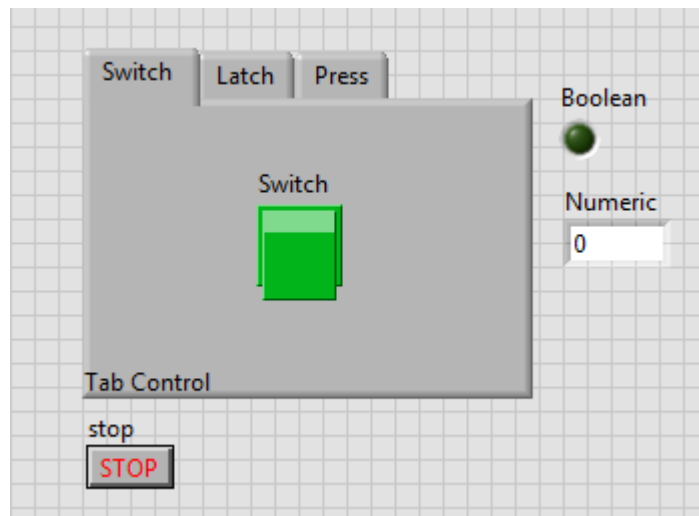
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Exercise 5 (v 1.2)

Open a new VI, go to the Block Diagram, and create a While Loop. Place a 1-second Wait (1000 ms) inside the While Loop and create a stop button control for the conditional terminal. Add a Shift Register to the While Loop and place a Case Structure inside it. This is the fundamental structure of an elementary State Machine, a topic that will be covered in more detail in later exercises.

Tab container

Go to the Front Panel and select Containers: Tab Control. Right-click and select Classic: Boolean: Square Push Button 2 and place it on Page 1. Add a color of your choice to the button with the Set Color tool and enlarge it. You can customize the colors for both Boolean states by clicking the switch to toggle it. Right-click on the Tab Container border and “Duplicate Page”. Do this twice so that you have three pages with a square Boolean pushbutton. There will be one empty page. Find it then right-click on the edge and select “Remove Page”. Label the tabs left to right as Switch, Latch, and Press. Label the button on the Switch tab as Switch.



Mechanical action of Booleans

Go to the Switch tab and right-click on the button. Select Mechanical Action: Switch When Pressed. Next, go to the Latch tab and edit the Mechanical Action to “Latch When Released”. Select the Press tab and make the mechanical action of the button “Switch

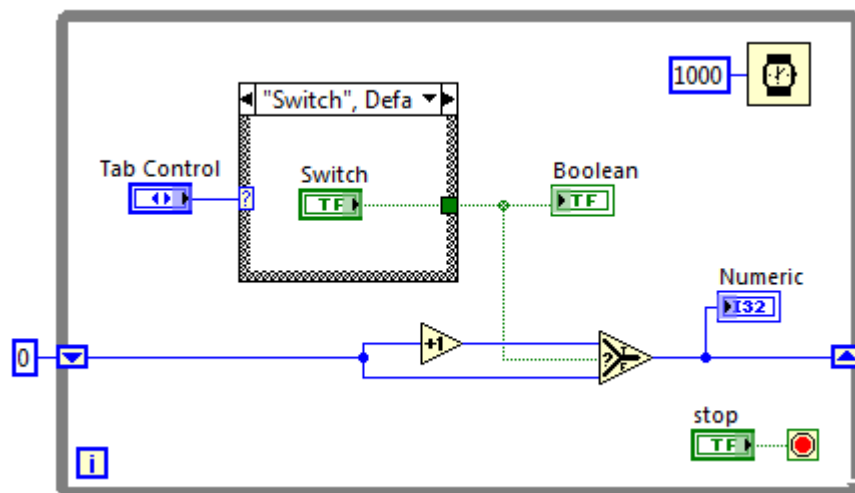
When Released”. Also change the labels of each Boolean switch to match its Tab label.

Add a Boolean: Round LED and Numeric: Numeric Indicator to the Front Panel (see example layout above).

Go to the Block Diagram and wire the Tab Enum icon to the case selector terminal. Right-click on the Case Structure and select “Add Case for Every Value”. Place the Boolean icons inside their corresponding cases. Connect a wire between each Boolean control inside the Case Structure to the Boolean indicator icon (round LED) located outside it. These wires must all go through the same output tunnel on the border of the Case Structure. The tunnel will fill to solid green when all cases are wired.

Select Function

The While Loop will be configured to count at a 1-Hz rate when the above Boolean condition of is true. The logic could be implemented with a second Case Structure, but it is easier to use the Select Function found on the Comparison palette. Wire the Boolean output to the center terminal of the Select function and wire the top terminal (True) to increment by +1 and the bottom terminal (False) to leave the count unchanged. Connect the Select output to the numeric indicator as well as to the output terminal of the Shift Register (right upward arrow) . Complete the Shift Register operation by wiring its input terminal (left downward arrow) to the two inputs of the Selection function:



In the above Block Diagram, the data type has been set to integer Representation: I32.

Run the VI and observe how the 3 different buttons behave. The Switch tab works similar to a typical on-off light switch. The Latch tab operates the same as clicking to

close a desktop window: if the mouse button is held down but not released, no action occurs. So if you click on this button, do not release, then move the cursor off the button, nothing happens. The Press tab is similar to the Switch, except that no action occurs until the button is pressed *and then* released.

There are six different mechanical actions available for Boolean Front Panel controls. An example VI is available in the LabView library that demonstrates their individual operations. Use “Help: Find examples” and search for “Mechanical Action of Booleans”.