

LabVIEW Introduction

Course: Biomedical Engineering Laboratory

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After starting the LabVIEW software, click Blank VI, it will create two panels. One is Block diagram with white background, and the other is front panel with gray background. In front panel, we will show the process of application. And block diagram panel, we will do some programming stuff. LabVIEW is graphical programming language, we can easily do data acquisition or automation or instrumentation.

In front panel, click view/controls palette. This palette will use all the time to do the control. For example, if we want to use button to control the led to turn on or off. We can click Buttons/Push Button and drag into the front panel. We call this button as input control. We can drag a led into the front panel, and this is called indicator. And now we want to switch the led by pressing the button. Click view/tools palette, and now we can use the tool to connect the control and indicator and make a logical combination with control.

After putting the controls and indicators in the front panel, the block diagram panel will automatically create two backend controls and indicator. We can join them with the wire or logical control. As for the logical control, click view/function palette, there are many logic expressions to let user define logic to control the output due to the input. Since there are many controls in LabVIEW, if we want some controls but have no idea to implement it, we can click help/show control help. After that, we can hover any indicator or control, it will show you how to control it.

Using numeric controls with numeric indicators. The function we want to do here is let the numeric indicator to display same value in numeric controls. After drag into the panel, using wire in tool palette to connect the numeric control with numeric indicator and we're done. Click run continuously button, and the program will run as we expected. And now we want to display the value in numeric controls multiply some constant, we can open function palette, and choose multiply and connect the numeric control to one input of the multiply and right click to add a constant to the other input. Finally, connect the output of the multiply to the numeric indicator. Click run continuously, the program run as we expect.

Using loops in LabVIEW. There are two loops in LabVIEW: choose for loop if know how many times do the program run, choose while loop to let the program keep running. In function palette, loop in Programming/Structure/. Click it and cover the program in block diagram, and then setting the condition to stop.

According to the above technique, we can simulate the sine wave on the LabVIEW. We can set up the setting in the simulate signal to create the signal we want. After that, we can connect it with waveform chart and connect frequency and amplitude to the simulate signal. Click run, the waveform of sine wave appears in the screen. We can click highlight execution to be able to seen how the data being transferred.

Using data acquisition in LabVIEW. DAQ card facilitates input and output of digital signal. ADC convert analog signal to digital signal by using sampling. DAC convert digital signal to analog signal. Select Generate Output/Analog Output/ Voltage in DAQ Assistant. After connect the wires between elements, we're now have a manually set voltage to create analog output signal by DAQ assistant. And now, we acquire signal from NI ELVIS to the DAQ assistant, setup the display waveform chart. And select Acquire Signals/Analog Input/Voltage., connect the wire to the elements. Finally, open NI ELVIS instrumentation launcher/variable power supplies to supply the signal to DAQ assistant, and we can see the data on the screen.