

SE 423 Mechatronics

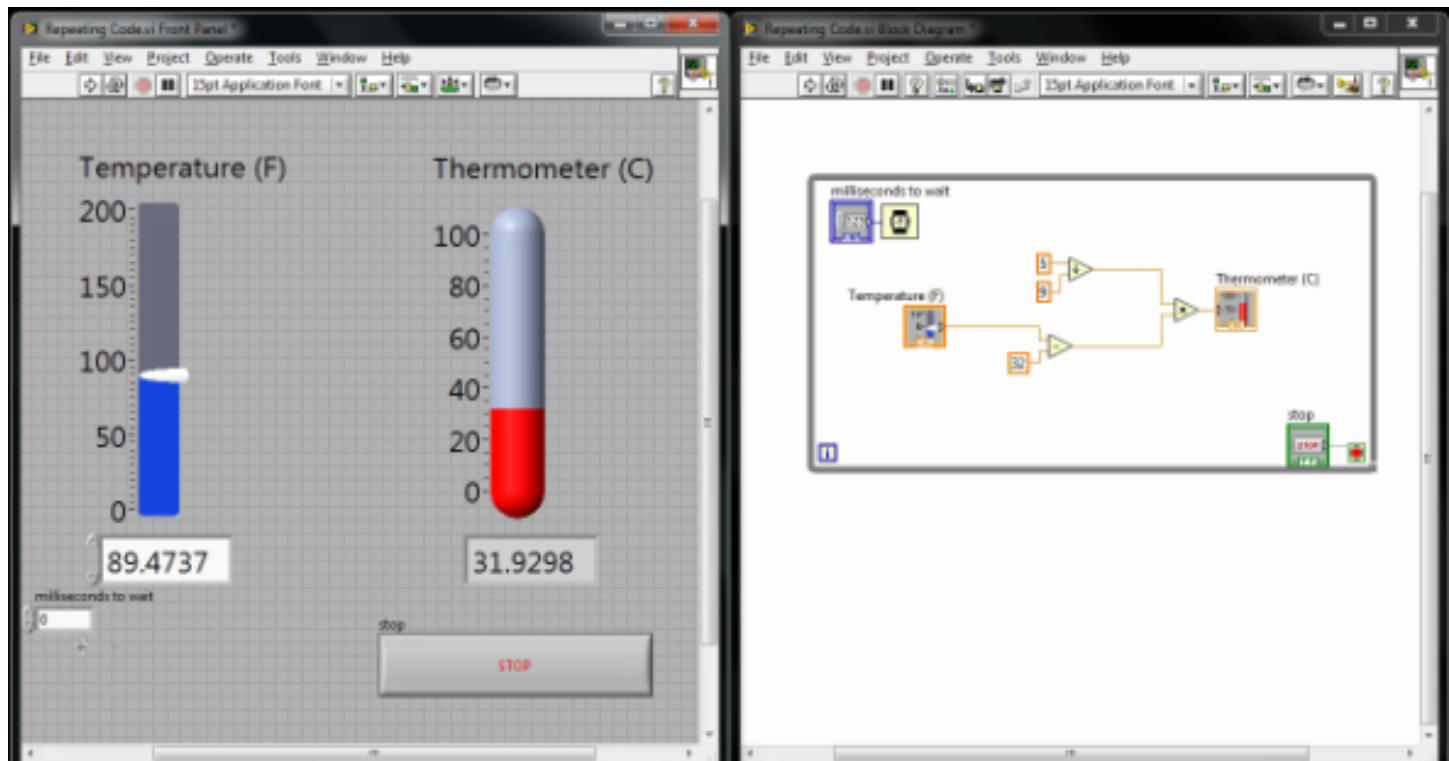
LabVIEW Assignment #1

Due before **5PM Thursday, February 05**. Demonstrate your five LABVIEW programs working. Grading for this assignment is simply full credit if you did the assignment and no credit if you did not complete the assignment. Make sure to ask questions if you get stuck.

Exercise 1: Temperature

Read through at least the first two sections at the site <http://www.ni.com/gettingstarted/labviewbasics> *LABVIEW Environment Basics and Dataflow Programming Basics* and watch at least the first two videos and the tenth video at the site <https://www.youtube.com/playlist?list=PLB968815D7BB78F9C>

Reproduce (does not have to be exactly the same) the Fahrenheit to Celsius LABVIEW program that **uses a loop structure** to continuously run until a Stop button is pressed. Add some bells and whistles if you would like.



Exercise 2: Sequence Structures

Read through all 12 sections at the site <http://www.ni.com/gettingstarted/labviewbasics> and watch the first 10 videos at the site <https://www.youtube.com/playlist?list=PLB968815D7BB78F9C>.

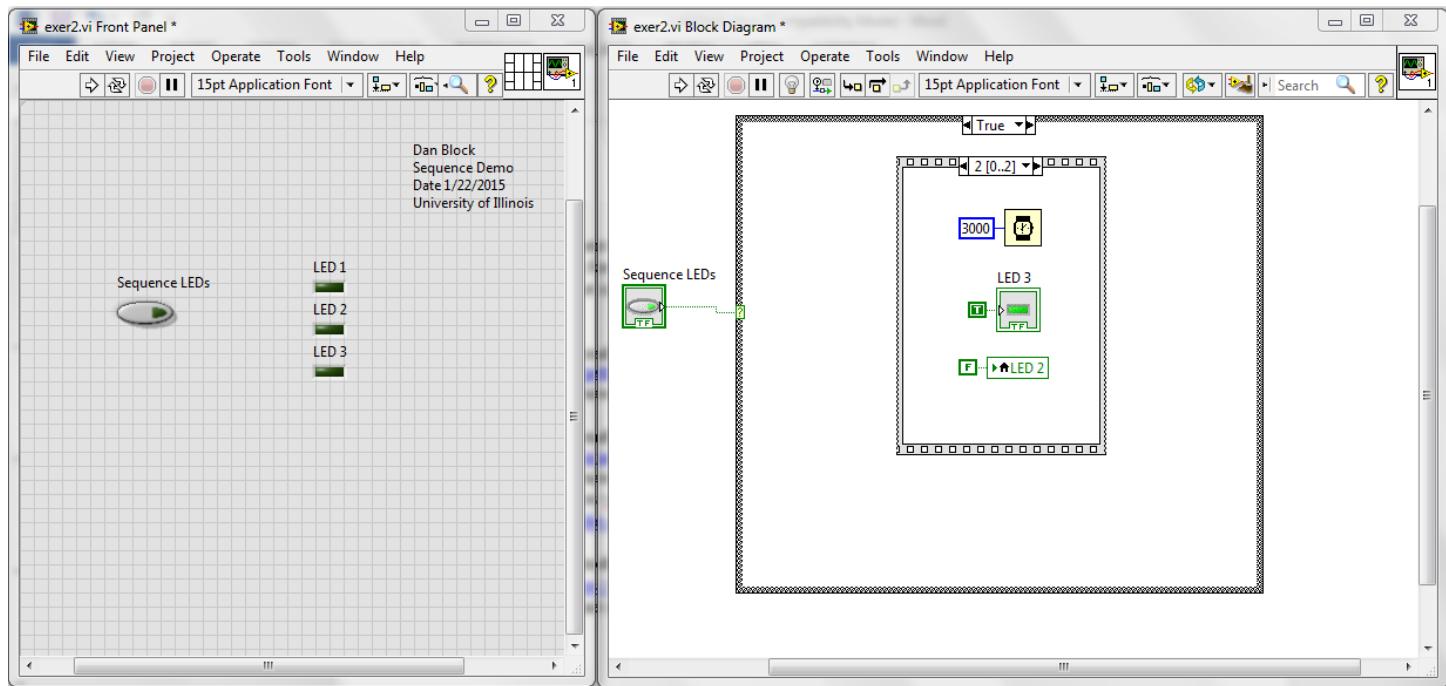
You can find other good YouTube videos. Here are a few others I found to get you started

- https://www.youtube.com/watch?v=Em5R_RM8E08
- <https://www.youtube.com/watch?v=bflByHG5jdc>

- <https://www.youtube.com/watch?v=0Ea2IQeCIMY>
- <https://www.youtube.com/watch?v=QxoJljThkKk>

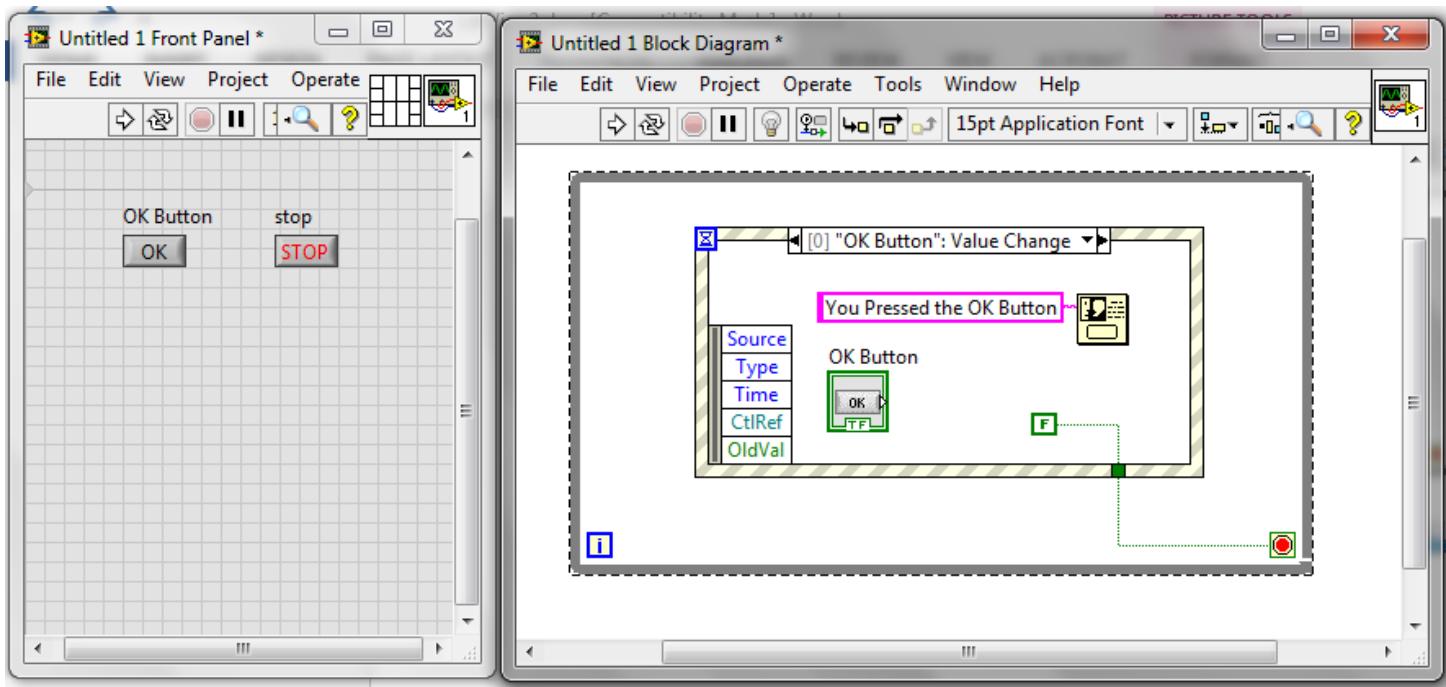
Furthermore, watch the YouTube video below that introduces sequence structures: <https://www.youtube.com/watch?v=DjN5Fpsjwng>.

To give you an introduction to sequence structures, reproduce the VI demonstrated in the YouTube video <https://www.youtube.com/watch?v=03PykG101x0>. You may need to find online help on “Case structures” as they are used in this video, but are not explained.



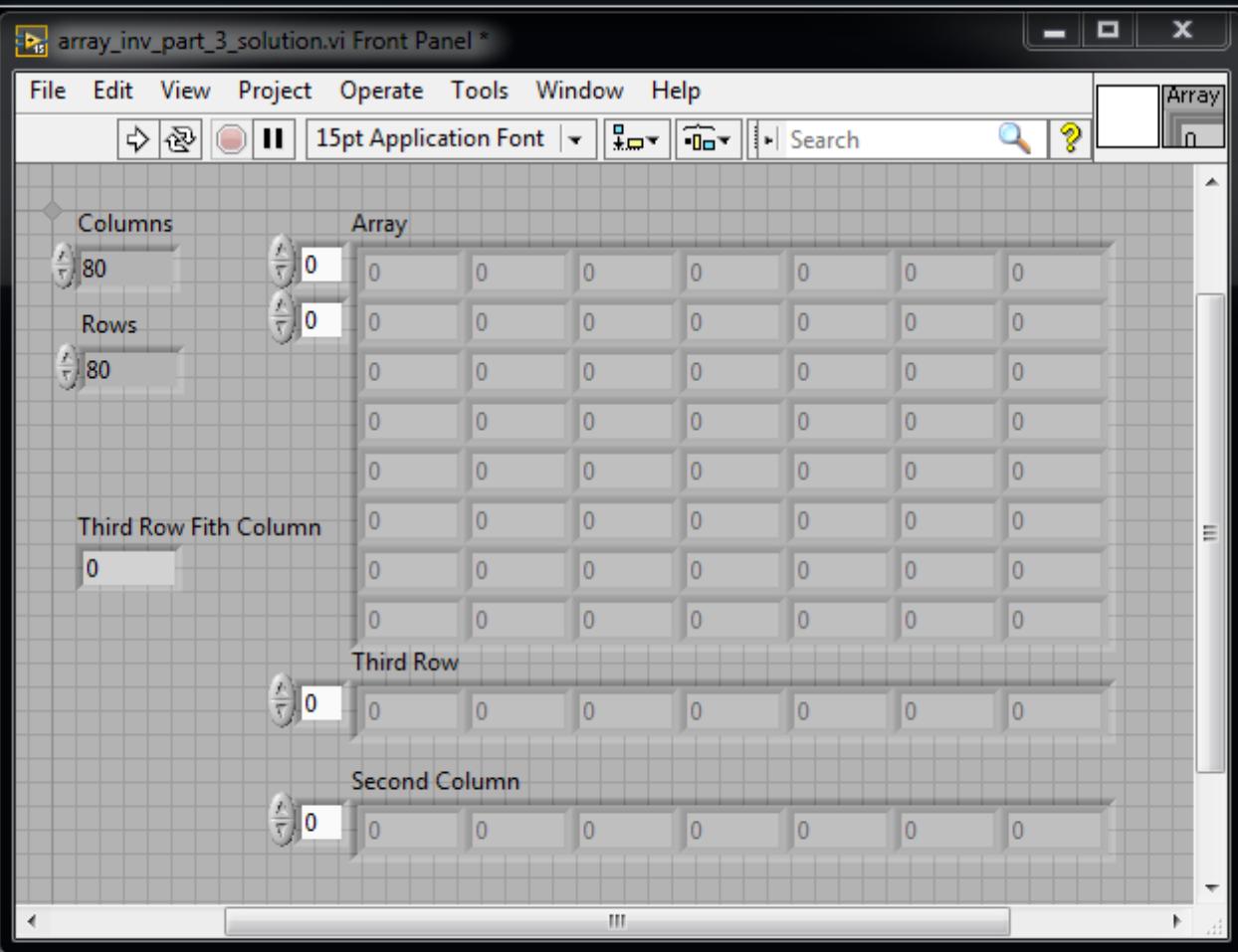
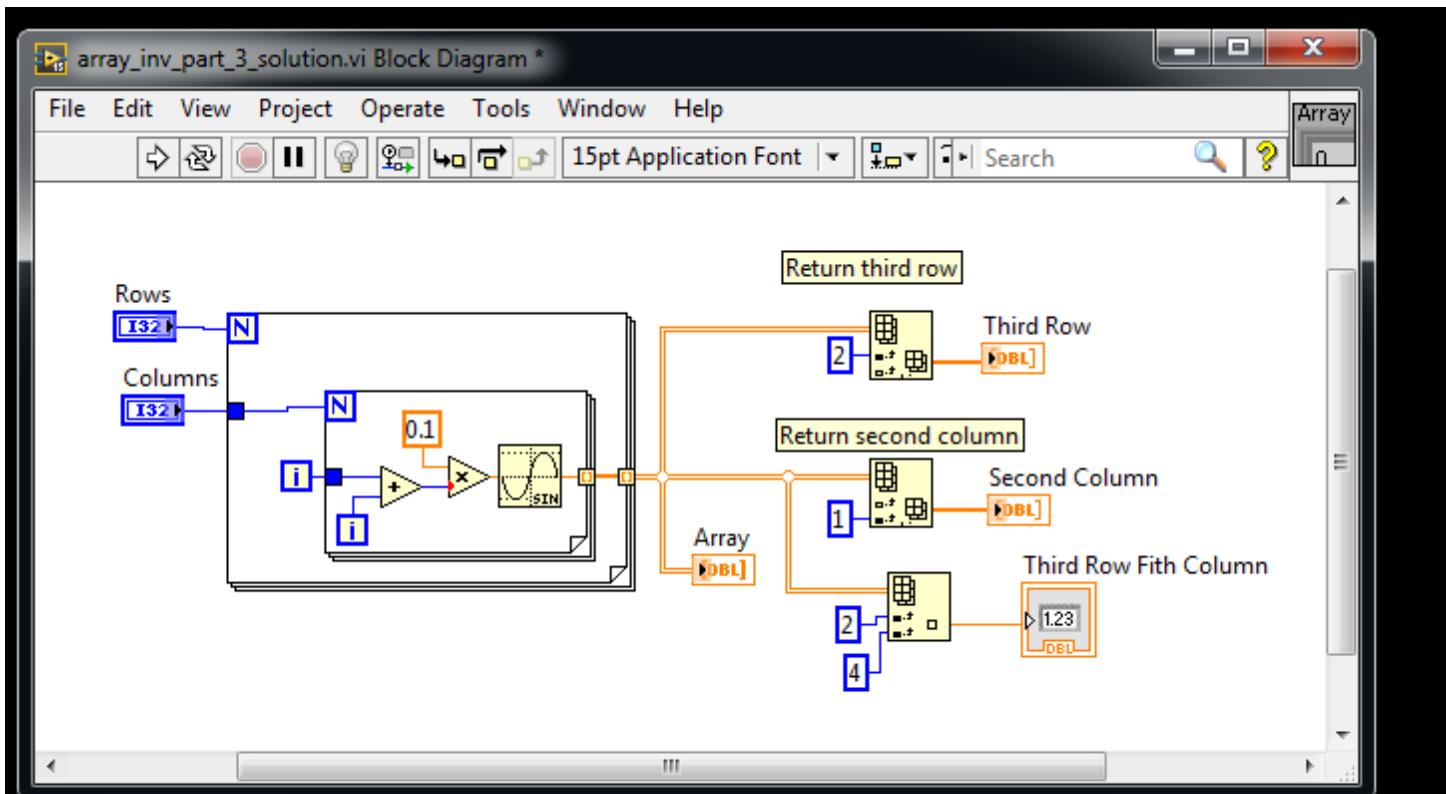
Exercise 3: Event Structures

To give you an introduction to event structures, reproduce the VI demonstrated in the YouTube video <https://www.youtube.com/watch?v=8e064fo3Pho>. You do not need to demonstrate the initial “polling” VI. Just the event structure VI.



Exercise 4: Multi-dimensional array

Read through the Array and Clusters Tutorial at <https://www.youtube.com/watch?v=rz0T1zXBDiE> and https://www.youtube.com/watch?v=_GlQ1riWjPc&list=PLB968815D7BB78F9C. Then reproduce the following exercises. See how a “for loop” can create a multidimensional array and use the Index Array to pull out a single row, a single column, and a single element. Sine is found under Mathematics→Elementary→Trig



Exercise 5: Cluster

Create a Cluster and then produce two Clusters similar to the first.

The screenshot shows the LabVIEW interface with two windows open:

- Front Panel:** The title bar is "cluster_exp_solution.vi Front Panel *". The panel contains four clusters:
 - Cluster:** Contains a Numeric control (1.00), two Boolean controls (Boolean 1, Boolean 2), and a Slide control (0 to 10).
 - Modified Cluster:** Contains a Numeric control (2.00), two Boolean controls (Boolean 1, Boolean 2), and a Slide control (0 to 10).
 - Small Cluster:** Contains a Boolean 1 control and a numeric control labeled "Slide value" (0.00).
 - stop:** A button labeled "STOP".
- Block Diagram:** The title bar is "cluster_exp_solution.vi Block Diagram *". The diagram shows the internal logic for creating and modifying clusters:
 - A "Cluster" input is connected to an "Unbundle" node.
 - The "Unbundle" node has three output wires: one for "Small Cluster", one for "Modified Cluster", and one for "Increment".
 - The "Small Cluster" path consists of a "Bundle" node followed by a "Small Cluster" output terminal.
 - The "Modified Cluster" path consists of a "Bundle By Name" node followed by a "Modified Cluster" output terminal.
 - The "Increment" path uses a "Numeric" control to increment a "Boolean 1" control, which is then combined with other Boolean controls via a "Not" and "Bundle By Name" node.
 - A "stop" button is connected to a "TFT" node.