

LabVIEW Training

MODULE 1 – LabVIEW VI Basics

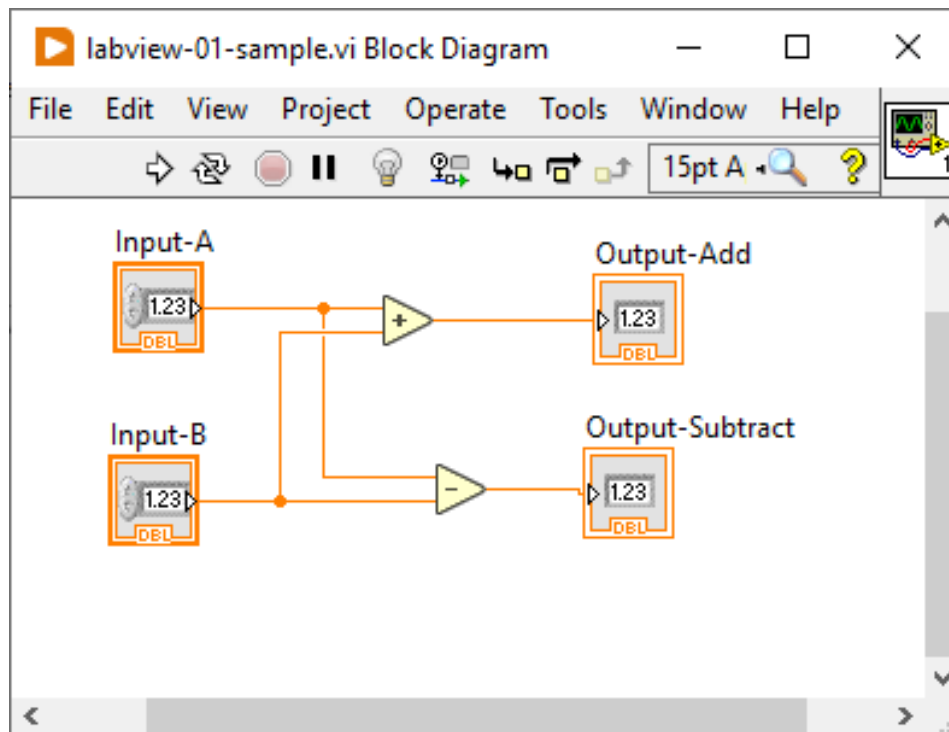
Programming Language Elements

- **Representing Data**
- **Expressions**
- **Assignment**
- **Testing and Branching**
- **Looping**
- **Separation of code into components (sub-programs)**

LabVIEW – Concepts

■ Visual rather than textual

- Visualizes Data Flow
- Execution is automatically ordered and parallelized based on data flow ! (Multi-threading is automatic.)



LabVIEW – Basic Building Blocks

■ VI – Virtual Instrument

- Contains code and user interface
- Can be stand-alone program, or a sub-VI called by other Vis.
- Saved as a separate file on disk. Optionally, file can belong to a project.

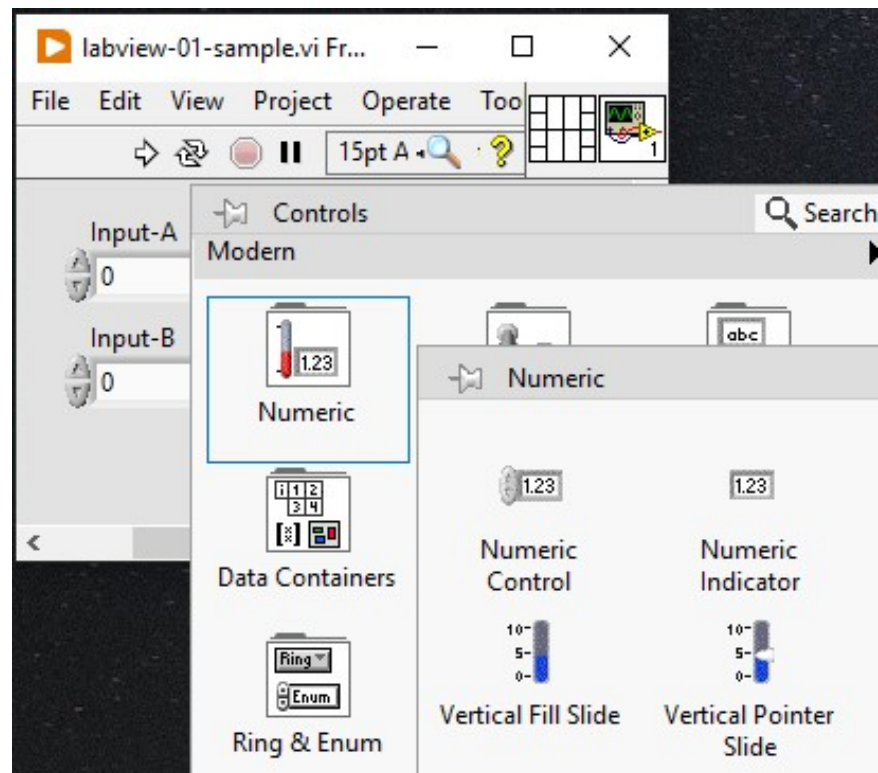
■ CTL – Custom Control

- Can be a custom data type definition, or control.
- More about this in future training.
- Saved as a separate file on disk. Optionally, file can belong to a project.

■ There are others that we won't cover at this time.

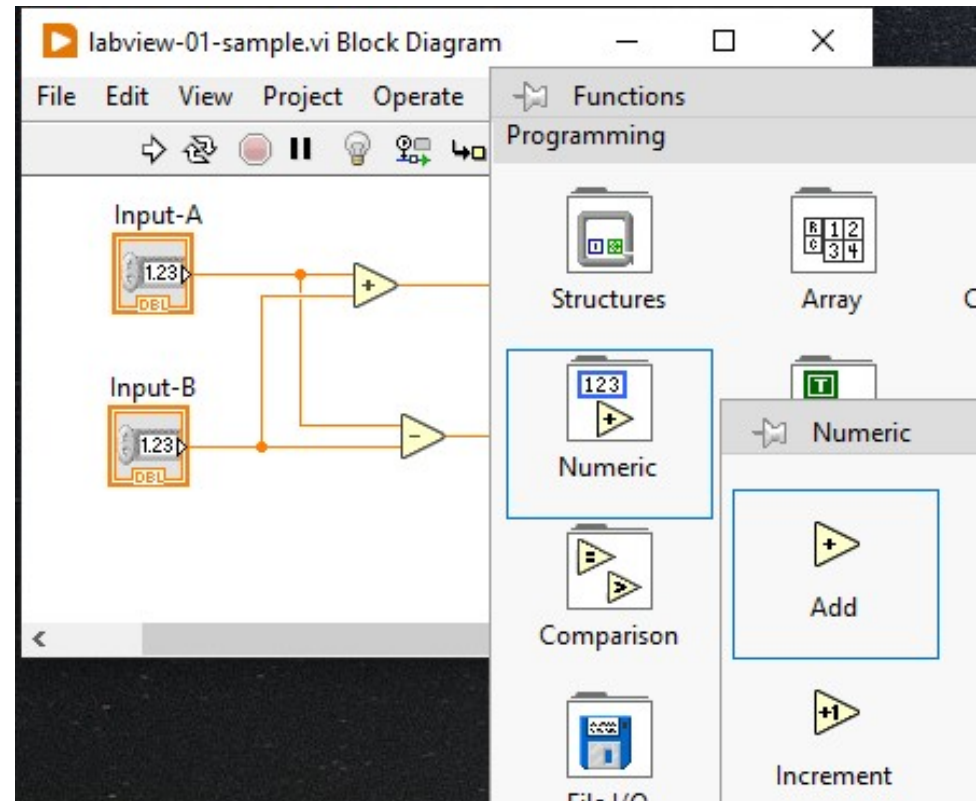
LabVIEW VI Front Panel

- Right click to show Controls Palette
- Controls are inputs
- Indicators are outputs
- Demo



LabVIEW VI Block Diagram

- Right click to show Function Palette
- Ctrl-H to show help for function
- Wiring
- Adding comments
- Cut, Copy, Paste, Move, Delete, Undo
- How code errors are displayed and diagnosed
- Demo



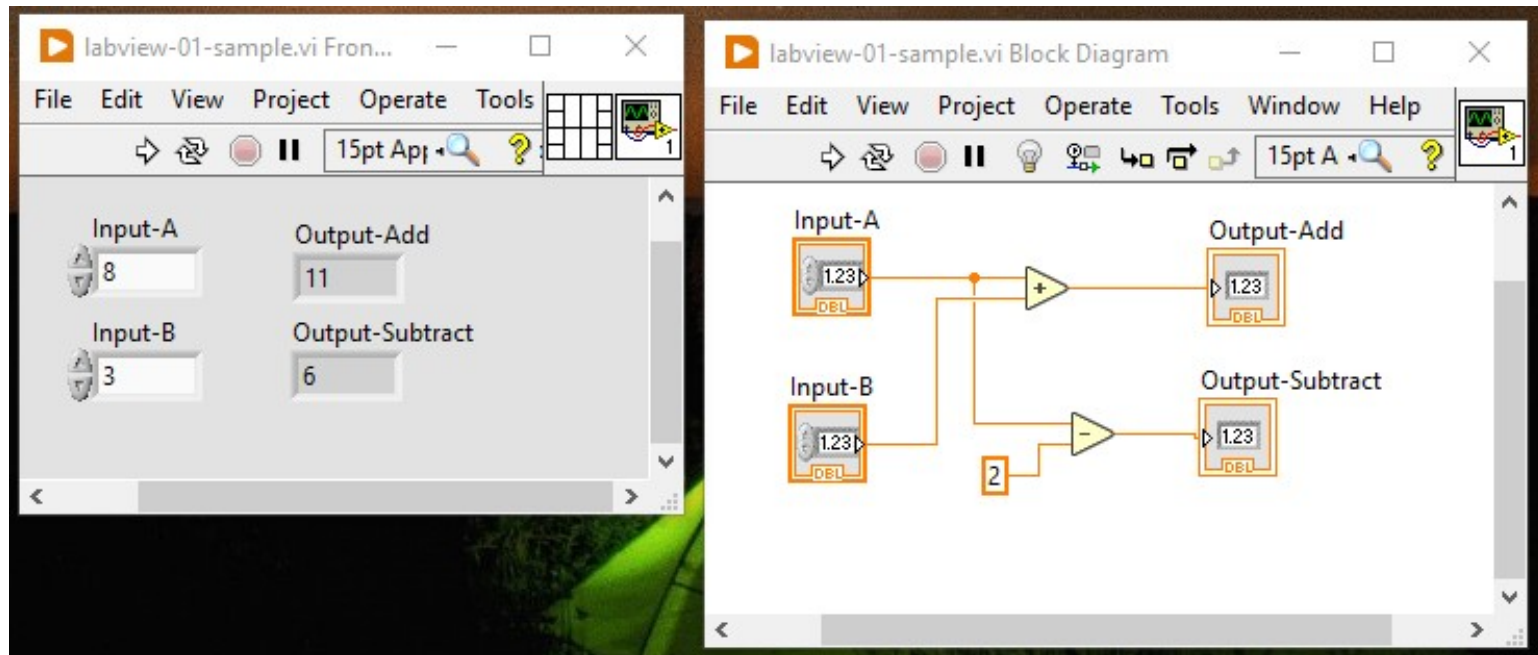
LabVIEW VI Run Menu

- Review the Run, Continuous Run, Stop, and Pause buttons on the Front Panel menu.



Sample 1.1

- Demo of creating a simple VI to add two numbers.
- Modify to add an additional output that subtracts 2 from the first input.



Exercise 1.1 – Calculate Encoder Ft/Count

- **An encoder counts up as a motor or other device rotates**
 - An encoder has a specific number of counts per rotation.
 - Depending on the type of encoder this sometimes has to be multiplied by 2 or 4 to get the number of edge counts per rotation.
- **This encoder is being used on our robot drive. The encoder is connected directly to the wheels (gear ratio of 1:1 [input:output]). The encoder has 1440 edge counts/rotation.**
- **The wheels have a diameter of 6 inches.**
- **Based on user entered – counts/rotation, wheel diameter, and gear ratio, calculate and display the constant to convert counts to feet. (The units of the conversion factor will be Ft/Count).**
- **Add an input for the number of encoder counts traveled. Calculate and display the number of feet traveled.**
- **Todo:**
 - Write the list of inputs and outputs
 - Write a VI to perform these calculations and display the results