# 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 date flow ! (Multi-threading is automatic.)**
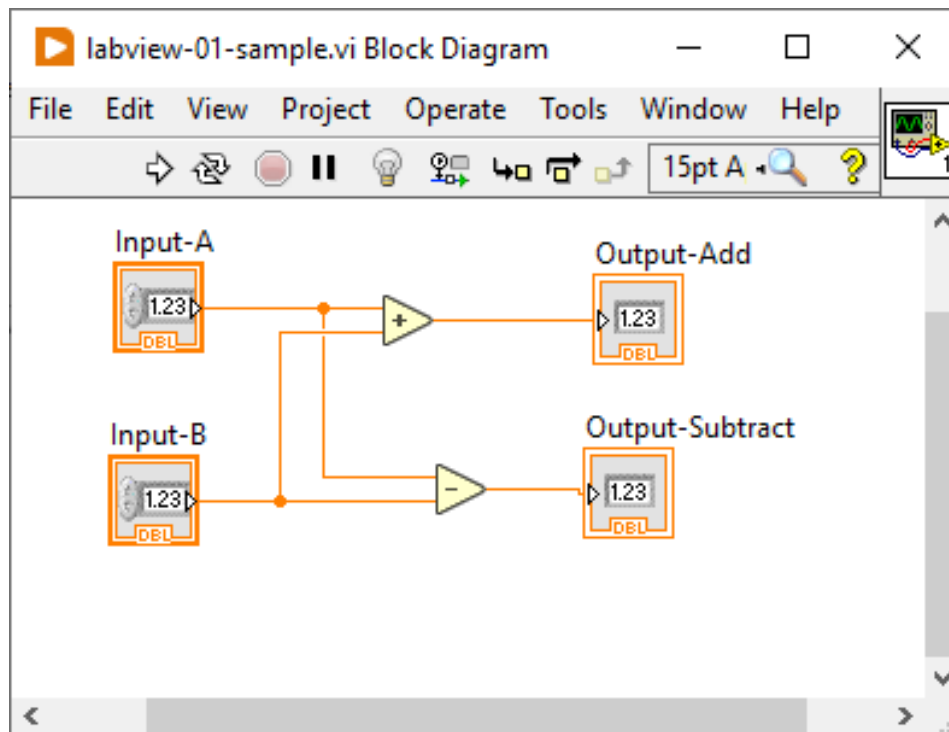
LabVIEW – Basic Building Blocks

- **VI – Virtual Instrument**

    - **Contains and 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.**

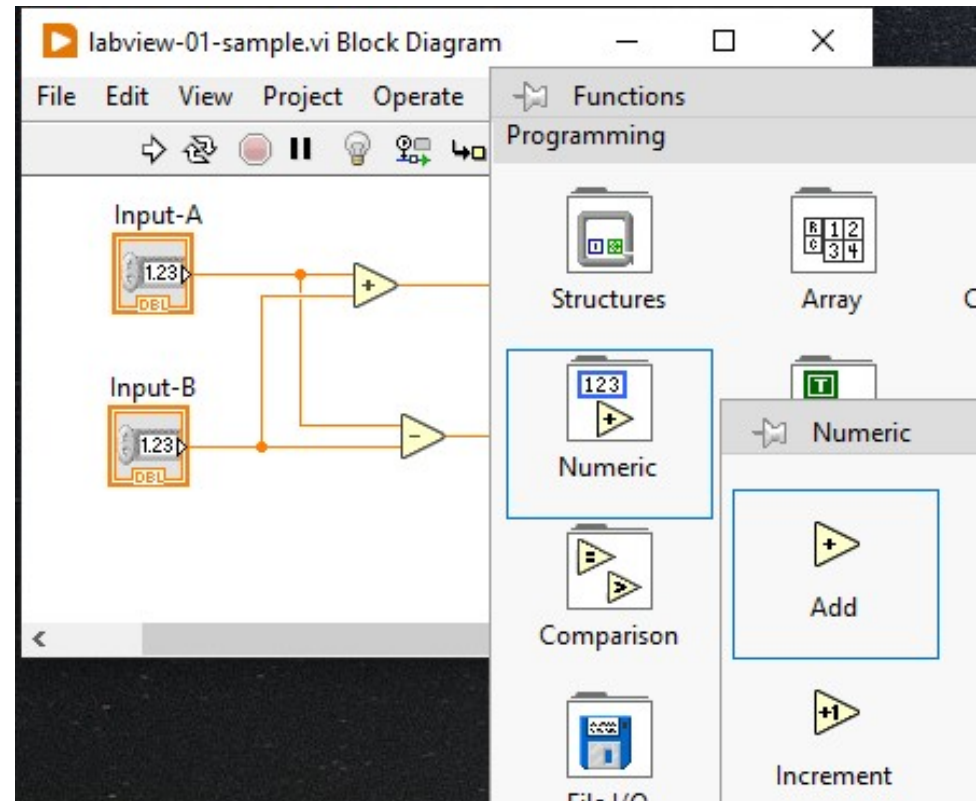- **There are others that we won't cover at this time.**

LabVIEW VI Front Panel

- **Right click to show Controls Pallete**

- **Controls are inputs**

- **Indicators are outputs**

- **Demo**
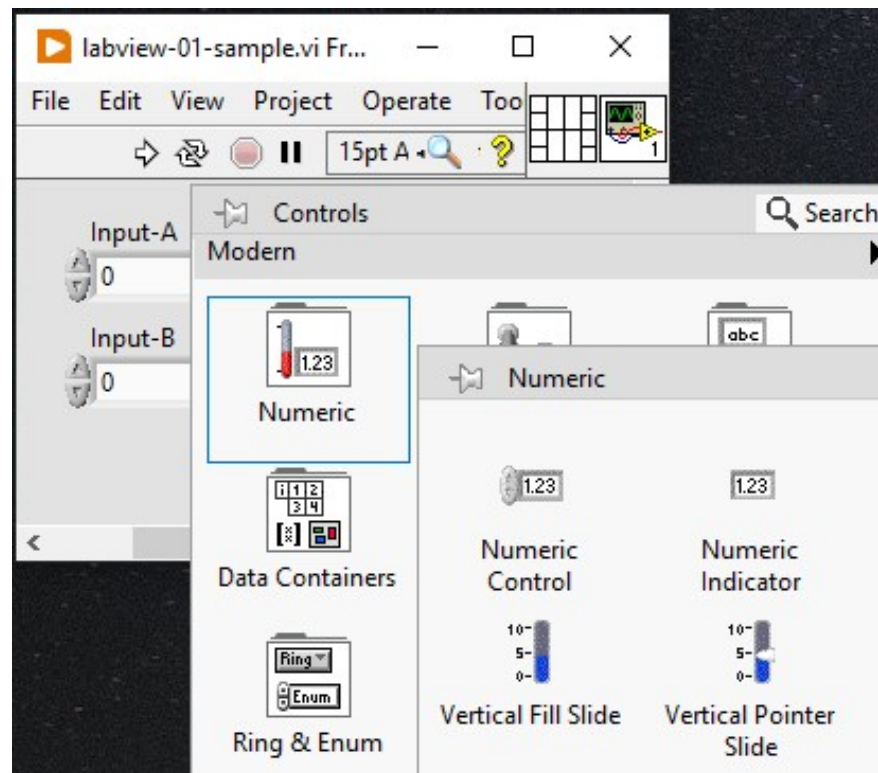
LabVIEW VI Block Diagram

- **Right click to show Function Pallete**

- **Ctrl-H to show help for function**

- **Wiring**

- **Adding comments**

- **Cut, Copy, Paste, Move, Delete, Undo**

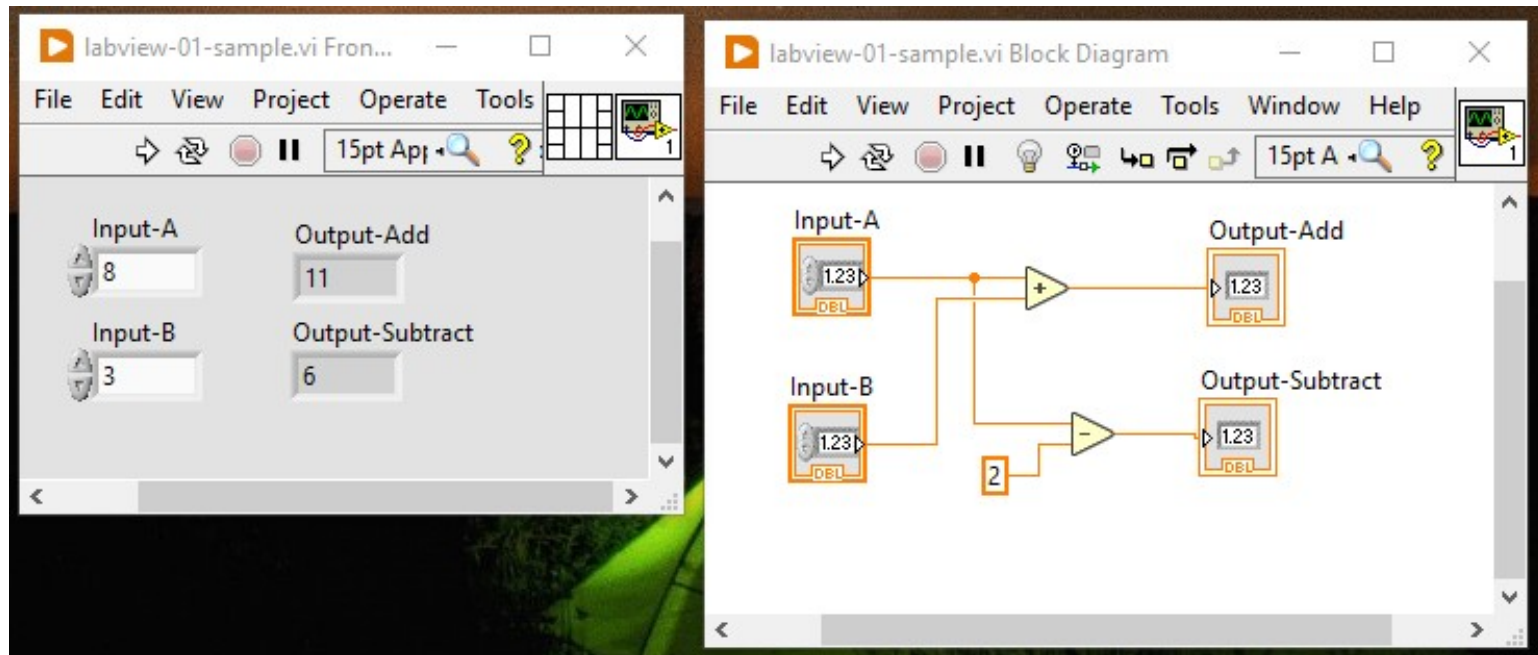- **How code error are displayed and diagnosed**

- **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). The encoder has 1440 edge counts/rotation.**

- **The wheels have a diameter of 6 inches.**

- **To use the encoder to calculate distance traveled in feet, the number of feet for each count needs to be determined. Write a VI to perform this calulation. Allow the VI to take different count edges/rotation, diameters, and gear ratios as inputs.**