Getting Started with LabVIEW

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- Overview of the LabVIEW IDE
  - Front Panel and Block Diagram
  - Controls/Indicators and Terminals
- Basic LabVIEW Programming
- Creating and using While Loops
  - Typically all LabVIEW Programs need a While Loop
- Creating and using Plots and Charts
- …

What is LabVIEW?

- LabVIEW is a Graphical Programming Environment and Programming Language
- National Instruments is the vendor of LabVIEW
- It has all the features as an ordinary Programming Language
- You can easily connect hardware, such as DAQ devices, etc.
- You can install and use additional modules and toolkits for specialized applications, such as Simulation and Control, Real-Time Systems, DAQ Systems, Vision Systems, etc.

LabVIEW Example

LabVIEW has the same things as other programming languages, but in a graphical way!

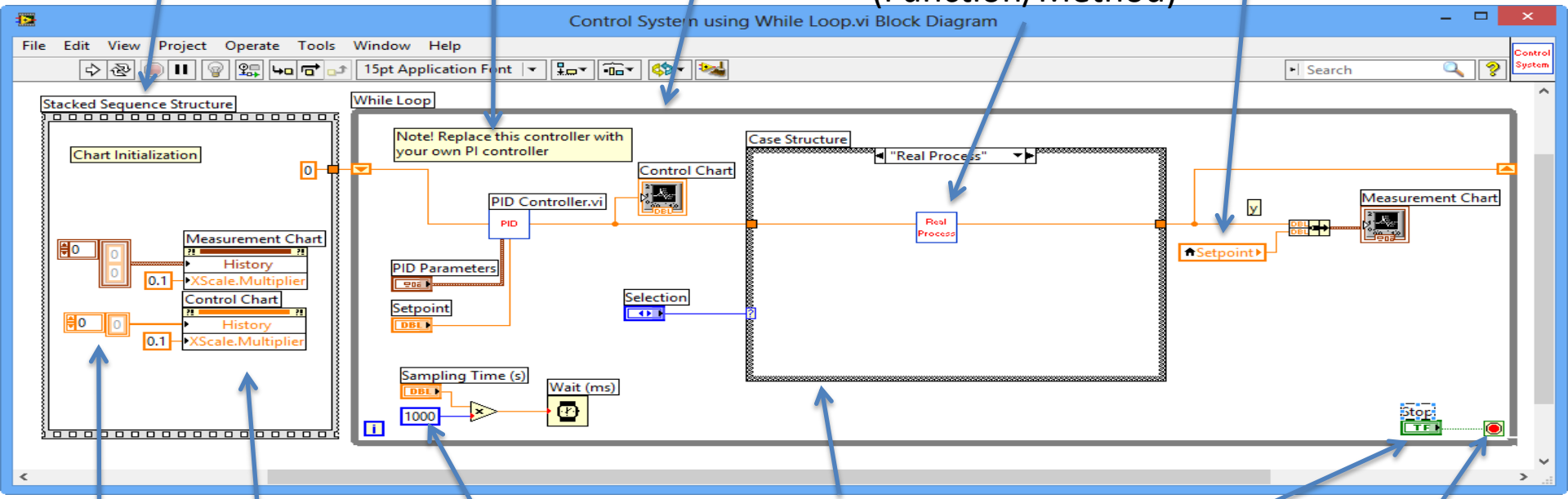
Sequence Structure

Comment

While Loop

Sub VI (Function/Method)

Local Variable



Arrays

Property Nodes

Constants

Case Structure (if-else)

Stop Button

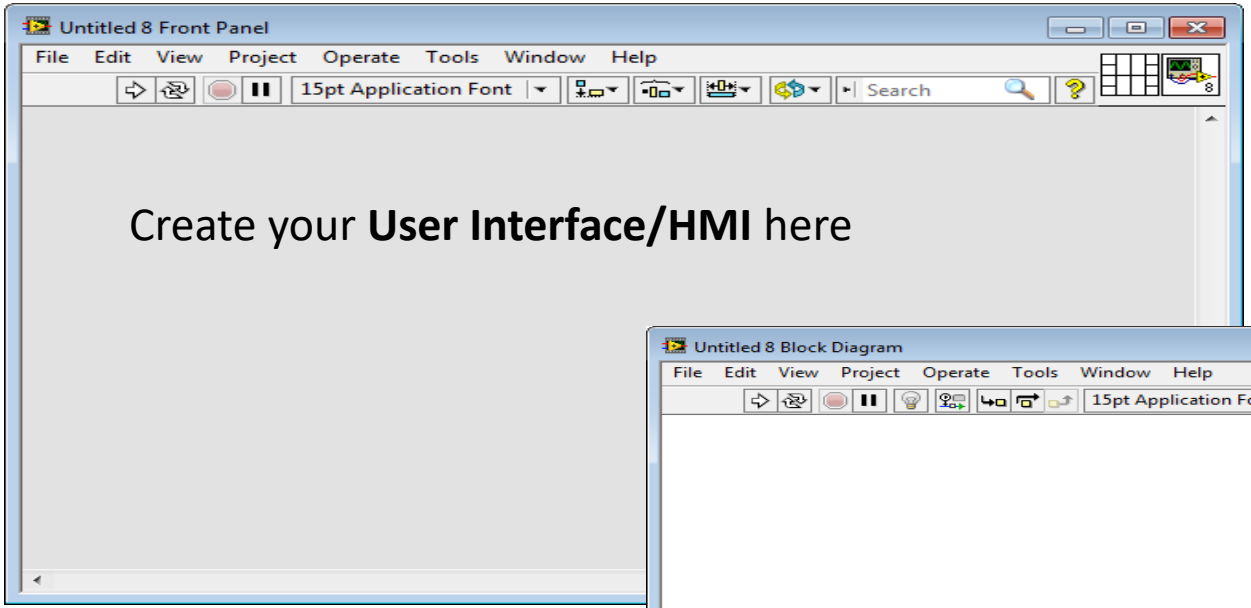
Condition (When shall the loop end?)

Note! To do something with an object – Right-click on it

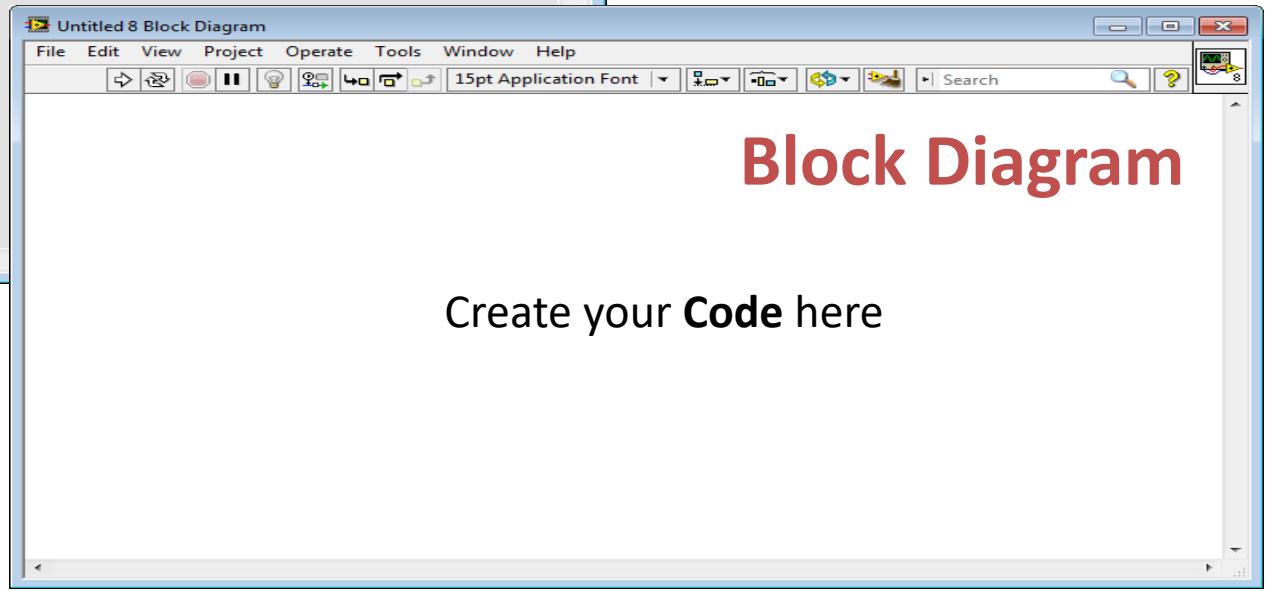
Lets start LabVIEW and create some simple Examples

LabVIEW Environment

Front Panel



Note! Both the Front Panel and the Block Diagram are stored in one single file. These files are called **VIs** (because the file extension is ".vi"). VI = Virtual Instruments

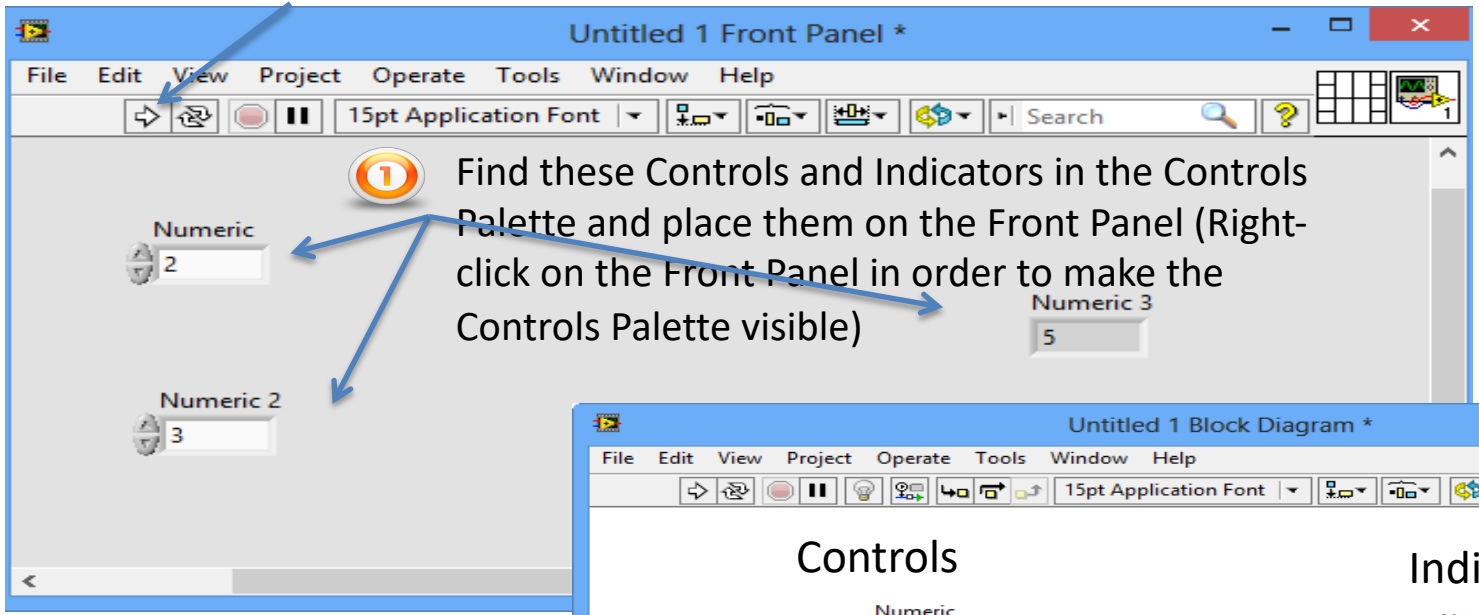


Switch between them: **Ctrl + E**

Simple Example

3 Run the Program

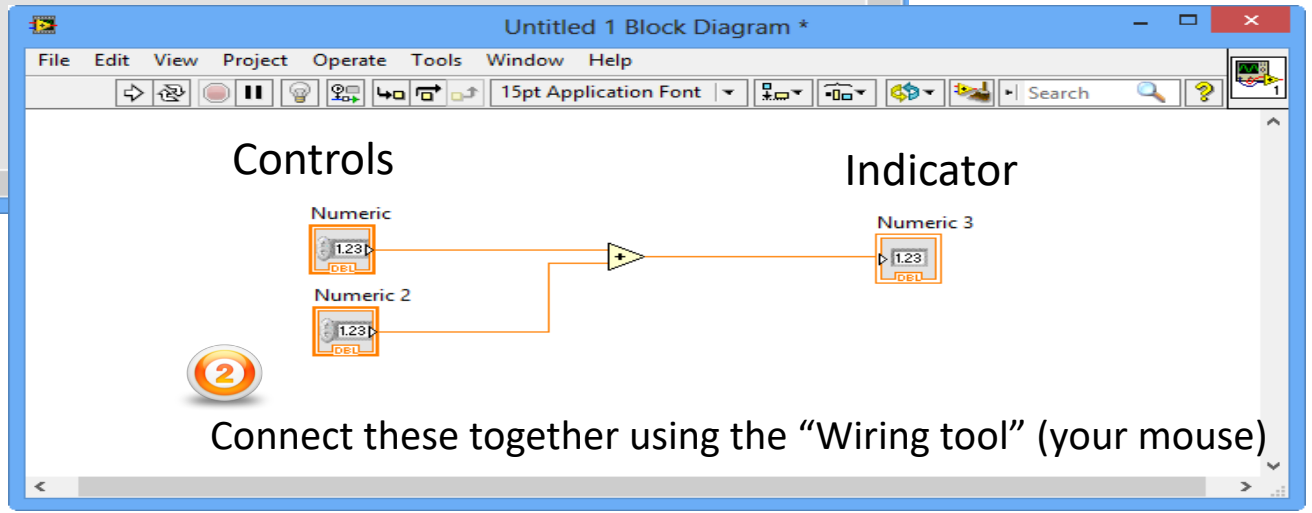
Front Panel



Controls
vs.
Indicators

What is the difference?

Block Diagram

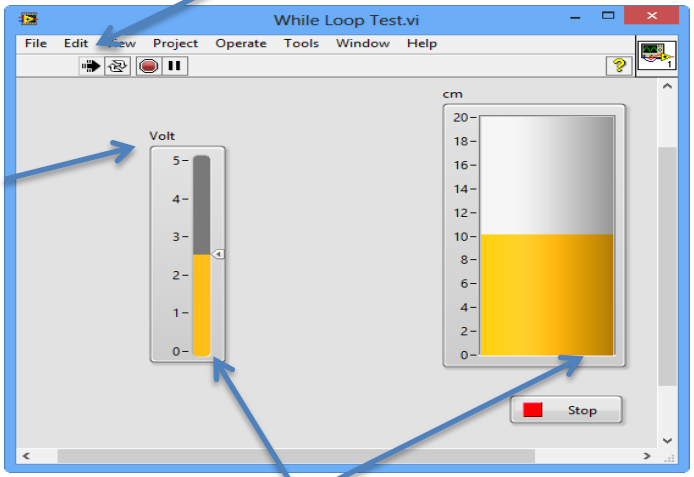


While Loop

Example: A voltage signal [0-5V] from a DAQ device needs to be converted to the equivalent level values in a water tank [0-20cm]

Front Panel

4 Run the Program



Label

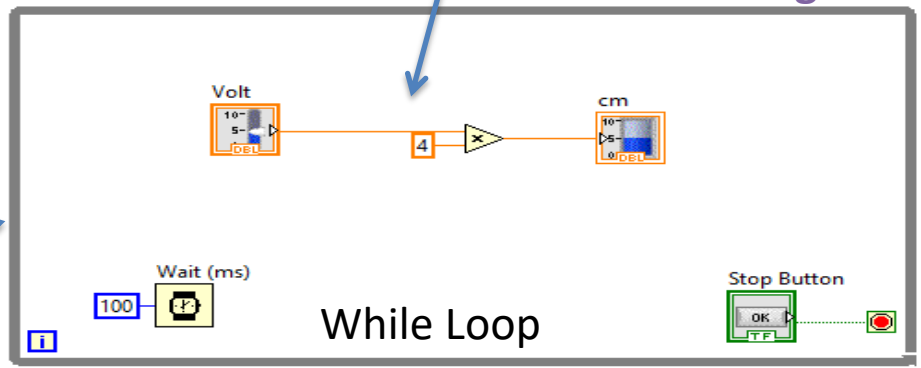
1 **Front Panel**: Find these Controls in the Controls Palette and place them on the Front Panel with proper labels

2 **Block Diagram**: Find the **While Loop** in the Functions Palette and place it on the Block Diagram

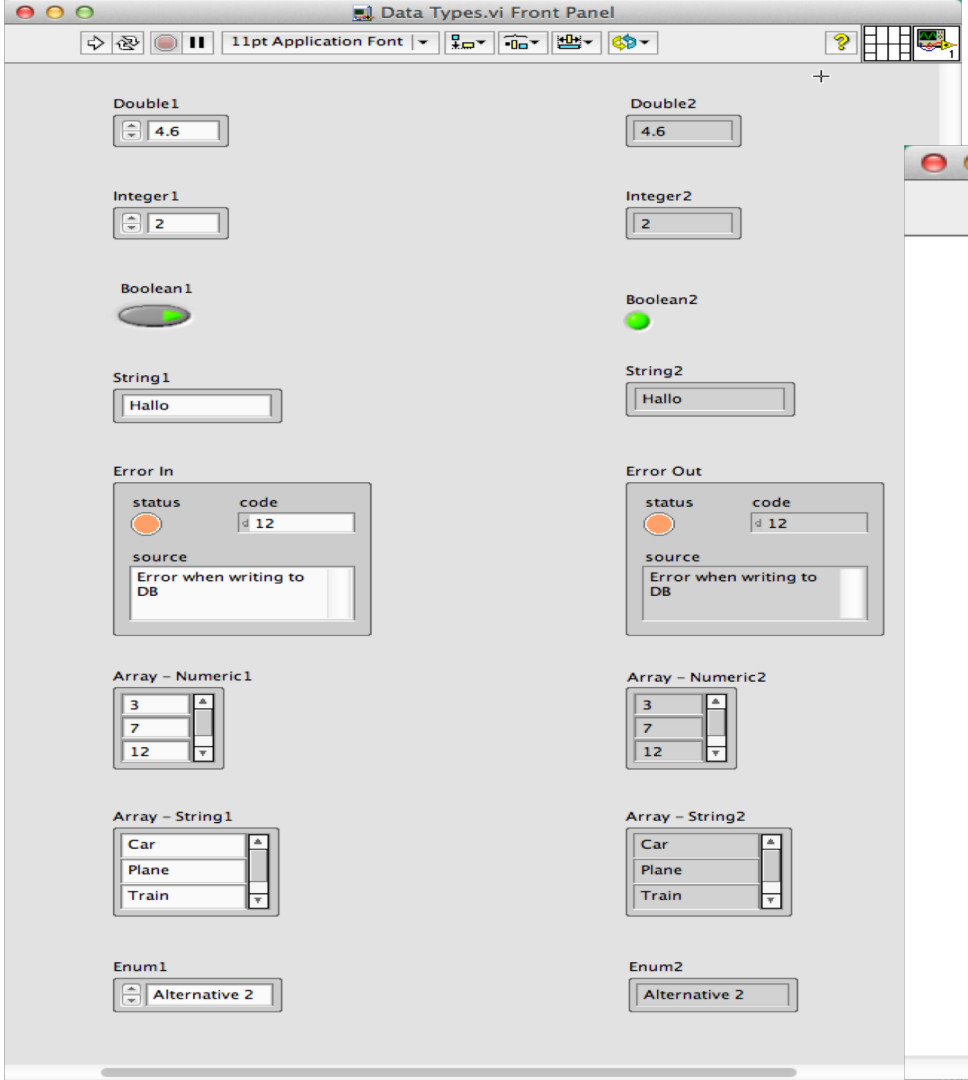
Note! To do something with an object – Right-click on it!

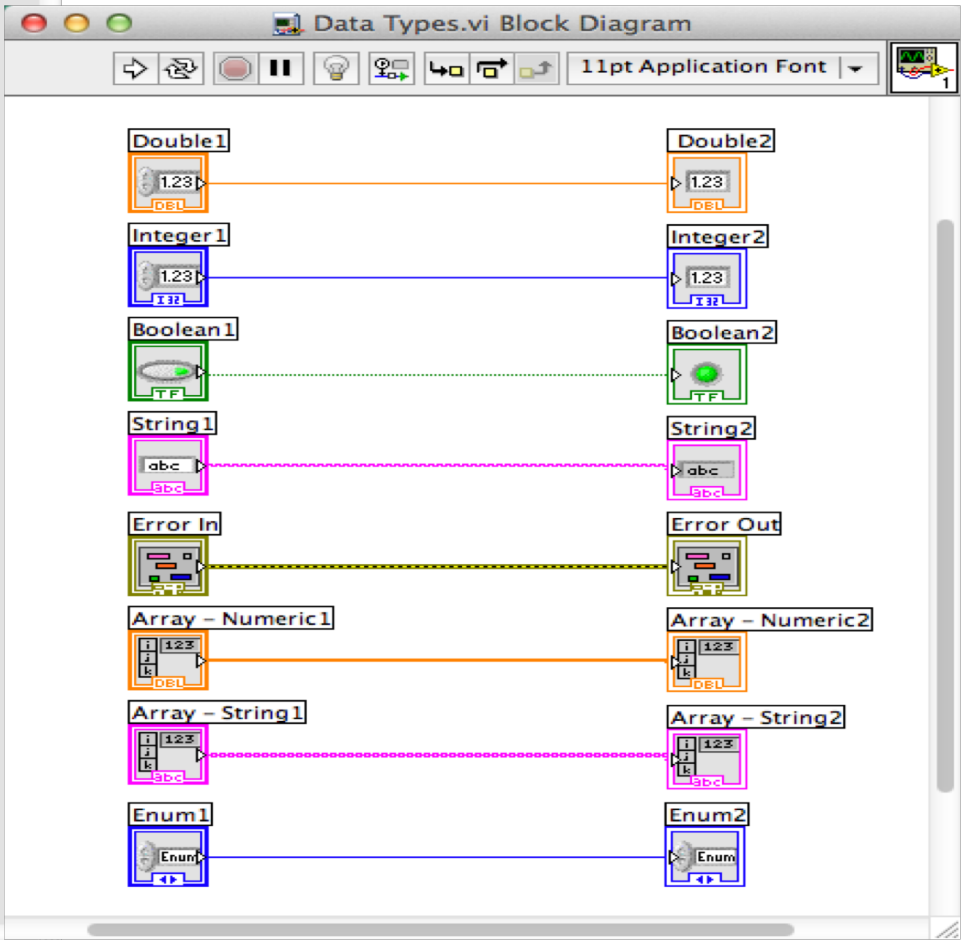
3 **Block Diagram**: Connect these together using the "Wiring tool" (your mouse)

Block Diagram



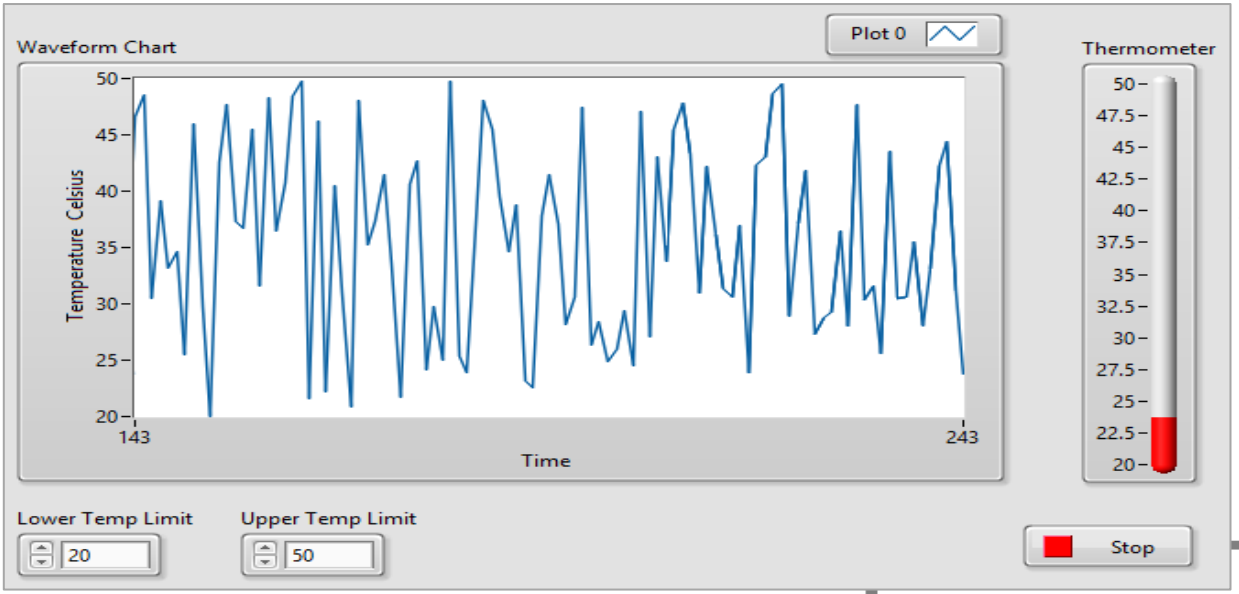
Data Types

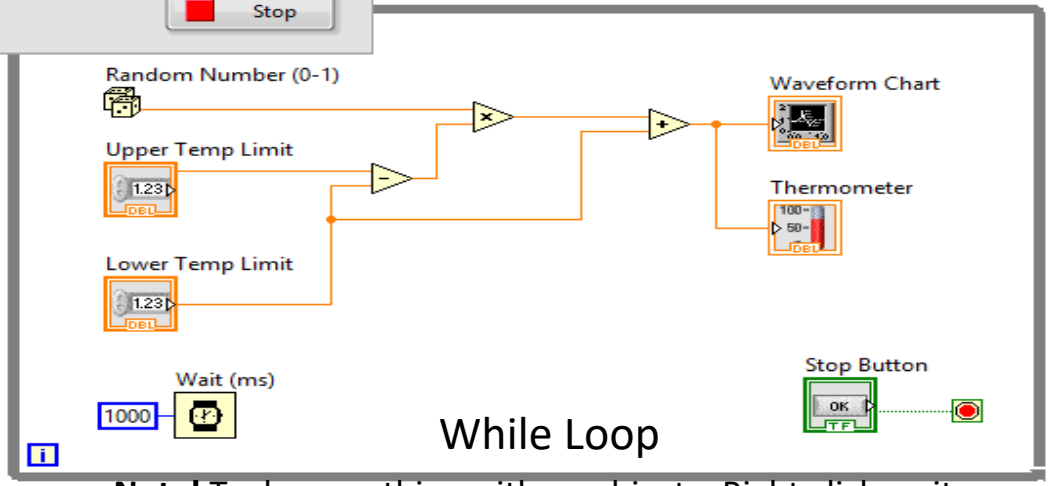

Data Types.vi Front Panel
11pt Application Font
Double1
4.6
Double2
4.6
Integer1
2
Integer2
2
Boolean1
Boolean2
String1
Hallo
String2
Hallo
Error In
status
code
12
source
Error when writing to DB
Error Out
status
code
12
source
Error when writing to DB
Array – Numeric1
3
7
12
Array – Numeric2
3
7
12
Array – String1
Car
Plane
Train
Array – String2
Car
Plane
Train
Enum1
Alternative 2
Enum2
Alternative 2


Data Types.vi Block Diagram
11pt Application Font
Double1
Double2
Integer1
Integer2
Boolean1
Boolean2
String1
String2
Error In
Error Out
Array – Numeric1
Array – Numeric2
Array – String1
Array – String2
Enum1
Enum2

Plotting

This example simulates the Temperature in an “Air Heater” system. The Temperature in the Air Heater should be between 20 and 50 degrees Celsius. We use the **Random Generator** in LabVIEW in this Example





Note! To do something with an object – Right-click on it

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