

An introduction to LabVIEW

Raj Chaklashiya, Founder-President, February 22, 2018

What is LabVIEW?

- Graphical Programming Environment
- Used for data acquisition, storage, analysis, and presentation
- Controls devices for data collection and analysis
- Use virtual instruments you build and see on-screen
- Automates the whole experimental measurement process!

LabVIEW Usage Examples in Physics Research

- AMO: Efficiently control several devices, integrating MATLAB for automated data analysis alongside data collection
- Condensed Matter (Quantum Materials): Collect data on resistivity of materials as they increase in temperature to find phase transitions hinting at unique properties
- Biophysics (Image Processing): Used for high speed particle tracking for data collection
- Particle Physics (CERN): Measuring and controlling the position of bulk components to absorb high energy particles


Who uses LabVIEW at UCLA in Physics?

- **Prof. Ni** - Condensed Matter - for research on Quantum Materials
- **Prof. Regan** - Condensed Matter - LabVIEW master for graphene research
- **Prof. Arisaka** - Biophysics - for research on C. Elegans connectome

Who uses LabVIEW in test engineering?

- Semiconductors
 - Automotive
 - Aerospace & Defense
 - Wireless Technology
 - Electronics
 - Energy
 - Industrial Machinery
 - Transportation and Heavy Equipment
 - Usage Examples from National Instruments
- 
- The National Instruments logo is a large, semi-transparent watermark in the center of the slide. It consists of the letters 'ni' in a stylized, lowercase font, enclosed within a circular border that has a small ring-like detail at the top.

What you can control with LabVIEW

- Voltmeters
 - Current Sources
 - Function Generators
 - Acoustic Modulators
 - Digital Synthesizers
- 

Other useful resources for learning LabVIEW

- LabVIEW Basics by NI - a step-by-step guide
- National Instruments Forums - where people post their LabVIEW questions
- Google - google search your problem followed by LabVIEW and you'll probably find something

18L Example 1.vi Front Panel on 18L Presentation.lvproj/My Computer

File Edit View Project Operate Tools Window Help

15pt System Font

Controls

Indicators

Numeric Control

Boolean Control

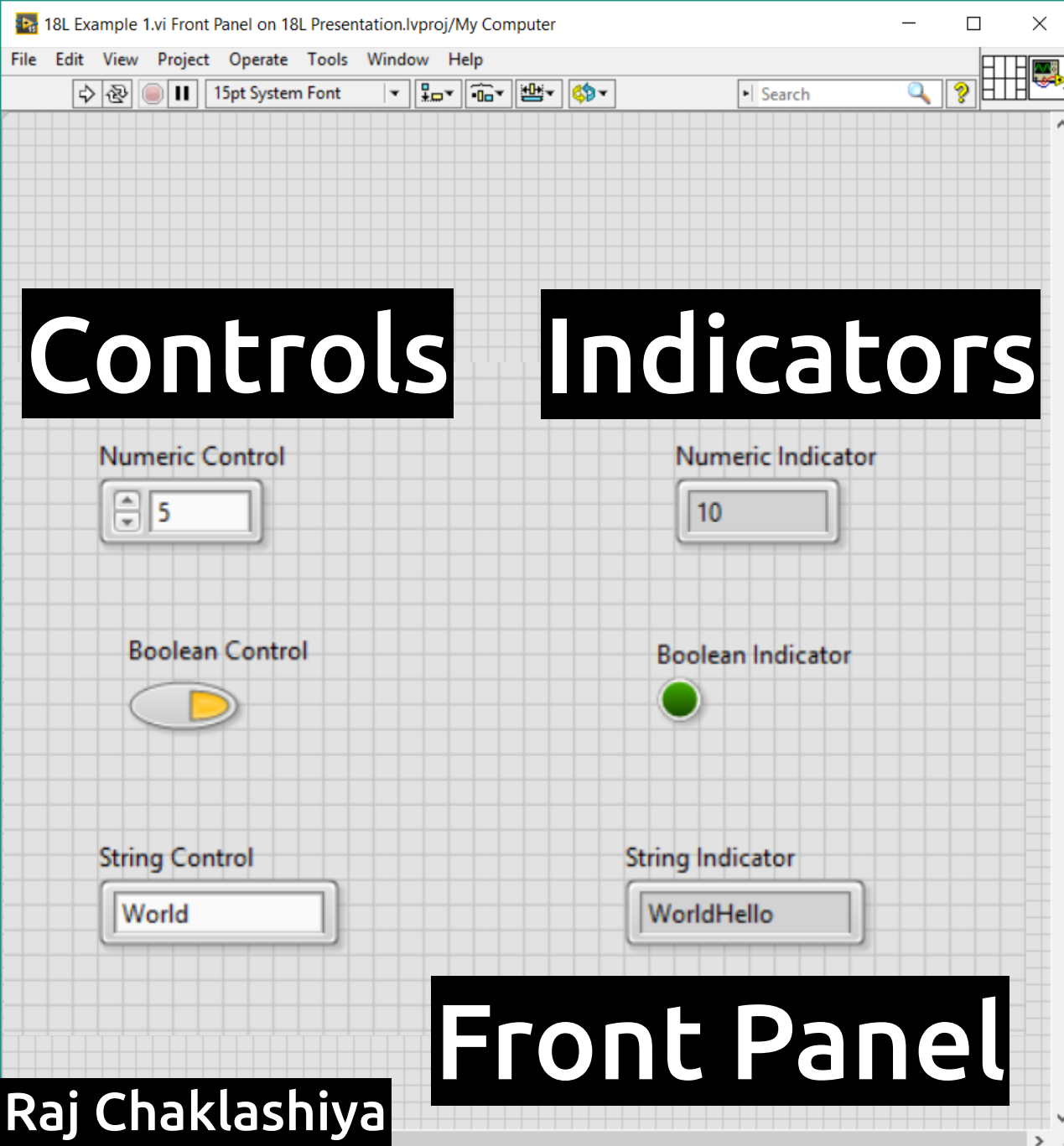
String Control

Numeric Indicator

Boolean Indicator

String Indicator

Front Panel

The screenshot shows the LabVIEW Front Panel with a grid background. It contains six objects: a Numeric Control with the value 5, a Boolean Control (a slider), a String Control with the text "World", a Numeric Indicator with the value 10, a Boolean Indicator (a green circle), and a String Indicator with the text "WorldHello".

Raj Chaklashiya
for Upsilon Lab

18L Example 1.vi Block Diagram on 18L Presentation.lvproj/My Computer

File Edit View Project Operate Tools Window Help

15pt Application Font

Block Diagram

Numeric Control

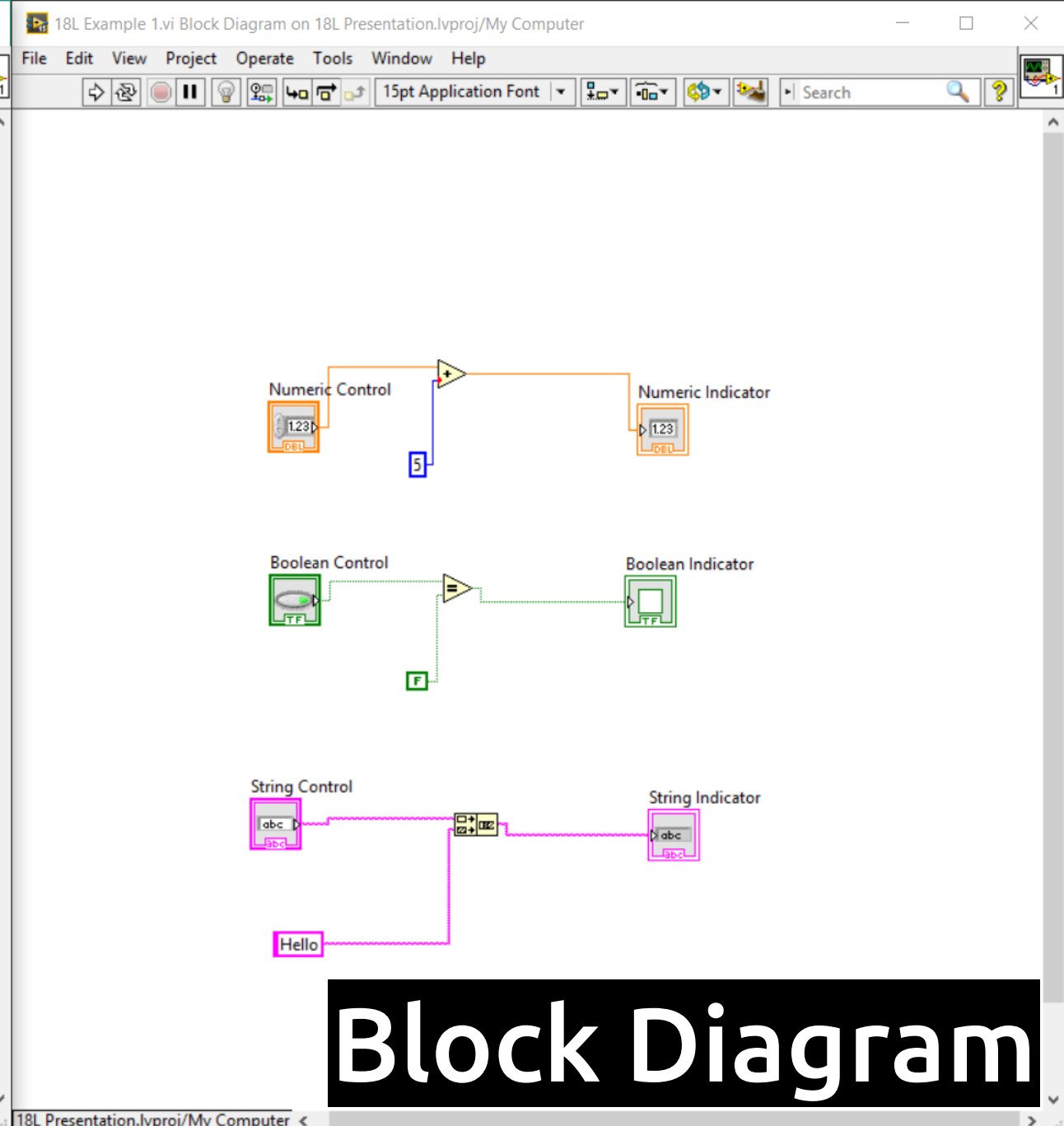
Boolean Control

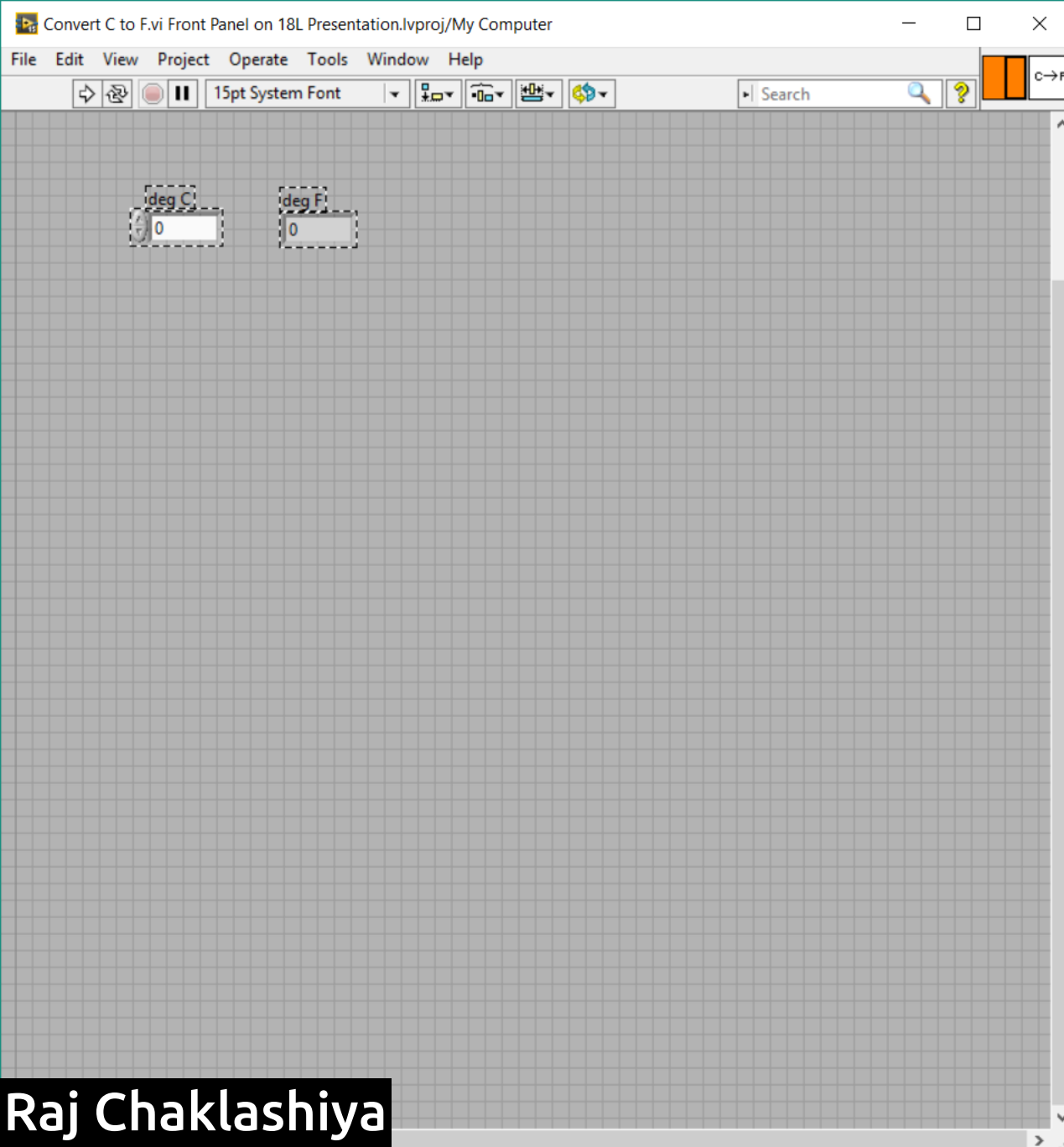
String Control

Numeric Indicator

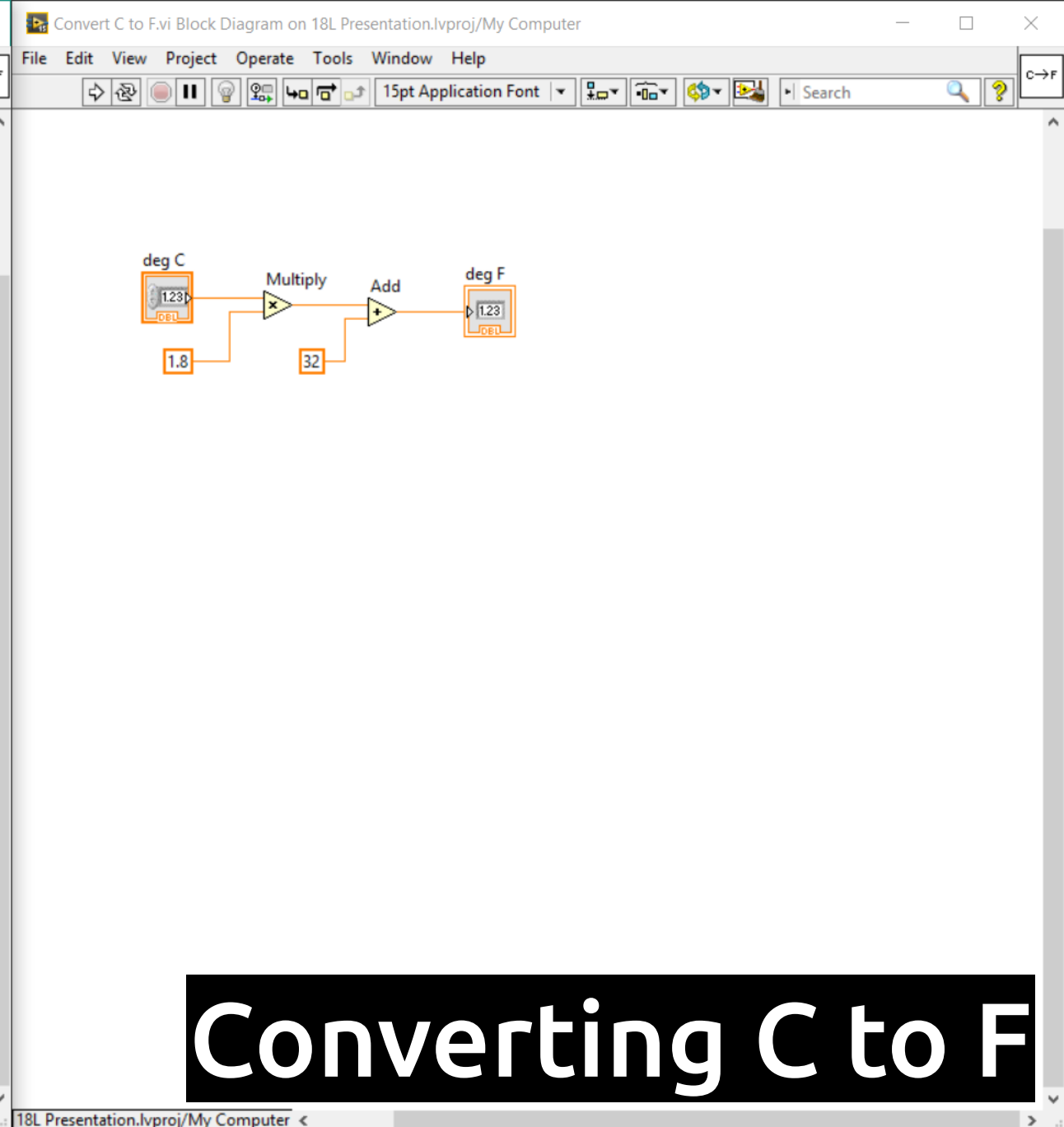
Boolean Indicator

String Indicator

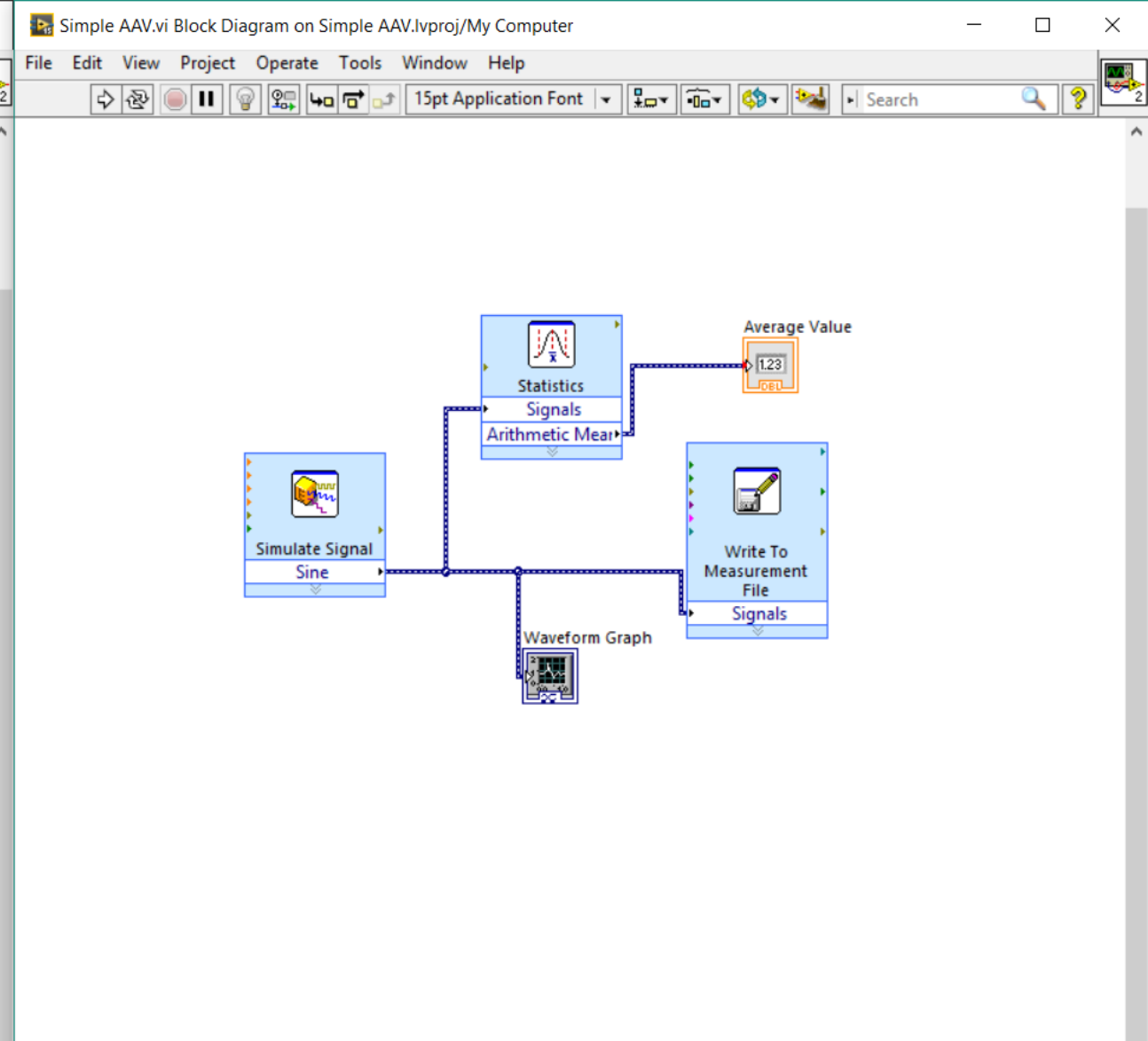
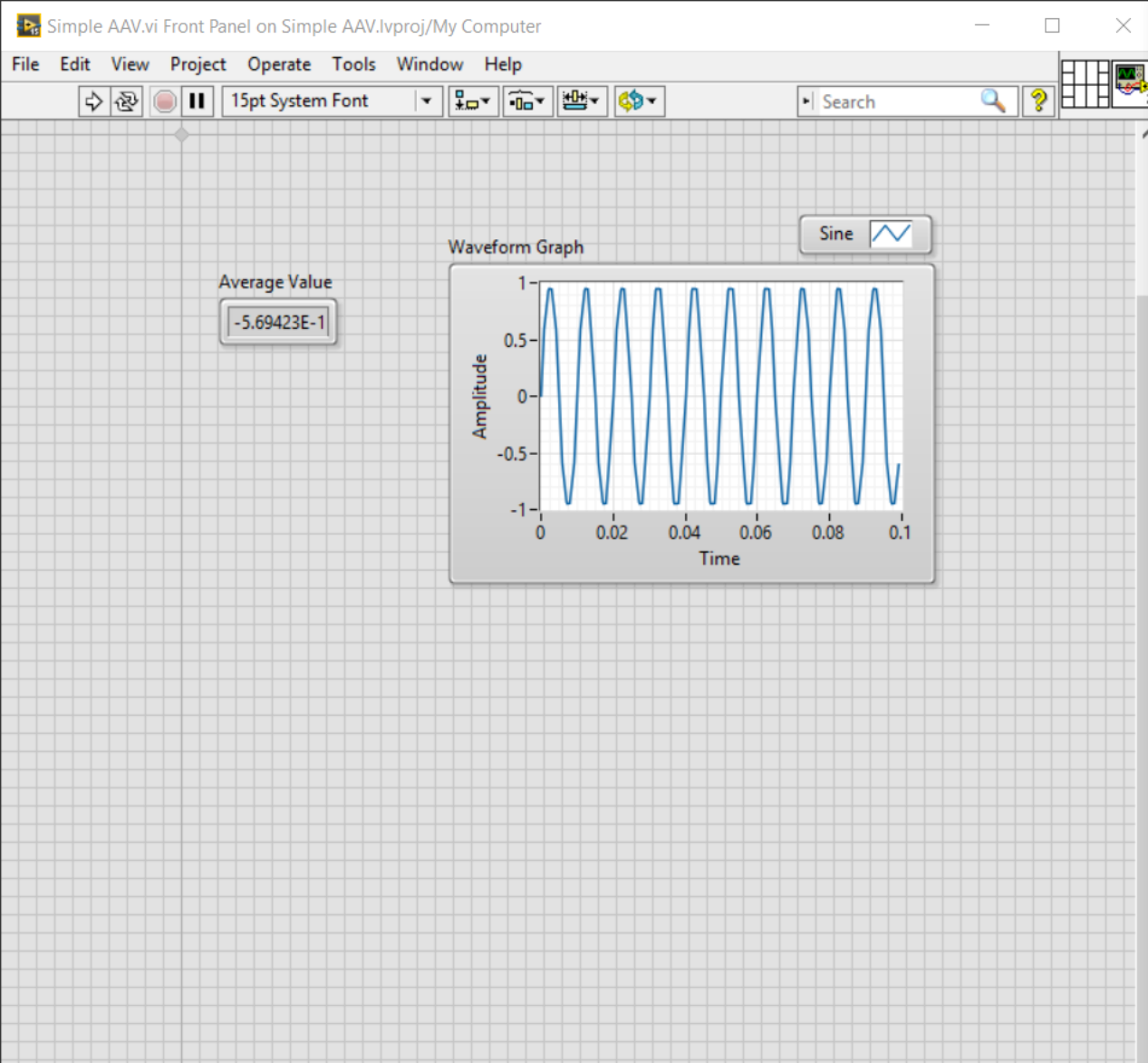
The screenshot shows the LabVIEW Block Diagram. It features three data flow graphs. The first graph connects a Numeric Control (value 123) and a constant 5 to a numeric add block, which is connected to a Numeric Indicator (value 123). The second graph connects a Boolean Control (value T) and a constant F to a Boolean AND block, which is connected to a Boolean Indicator (value T). The third graph connects a String Control (value abc) and a constant Hello to a string concatenate block, which is connected to a String Indicator (value abc).



Raj Chaklashiya
for Upsilon Lab

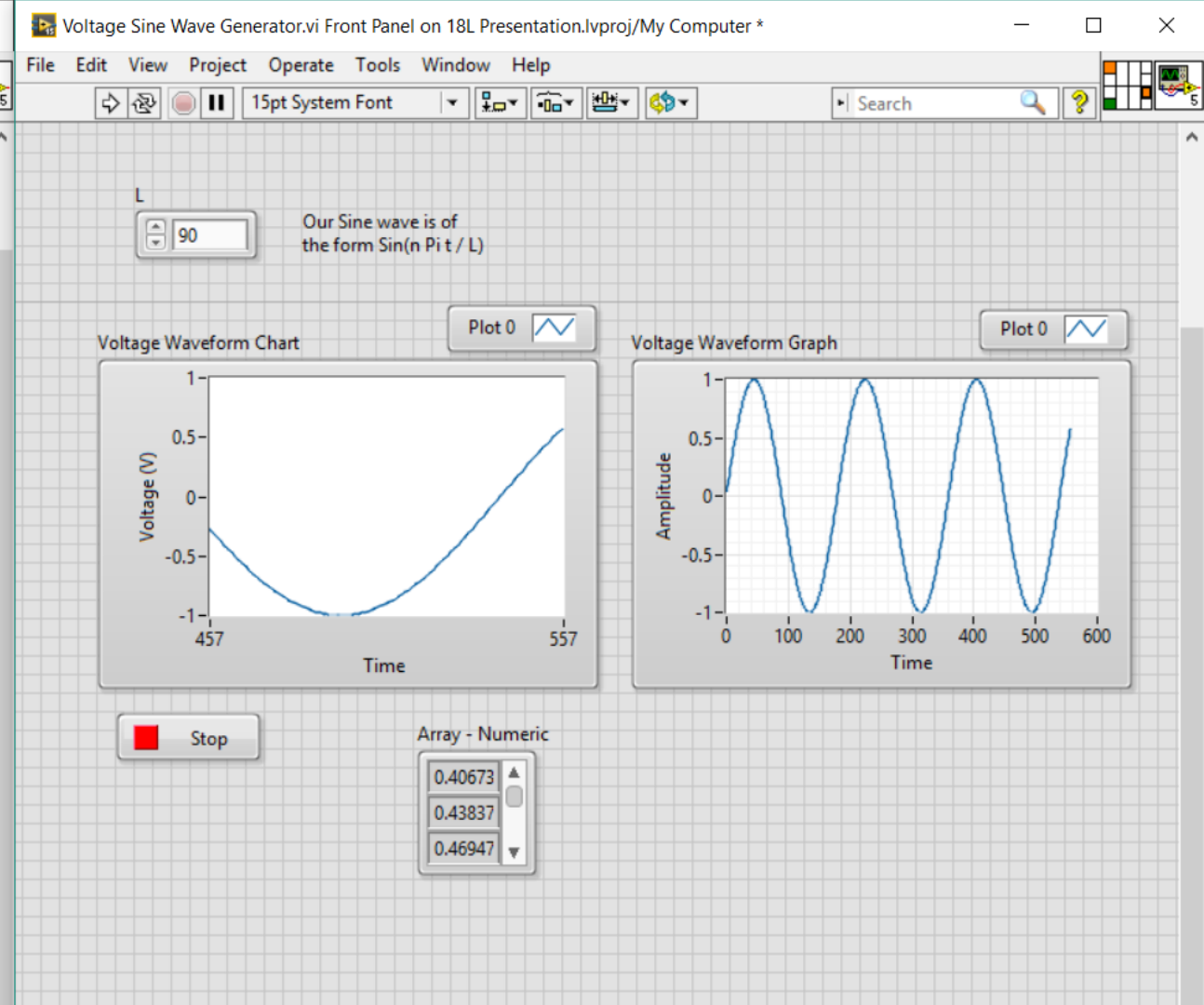
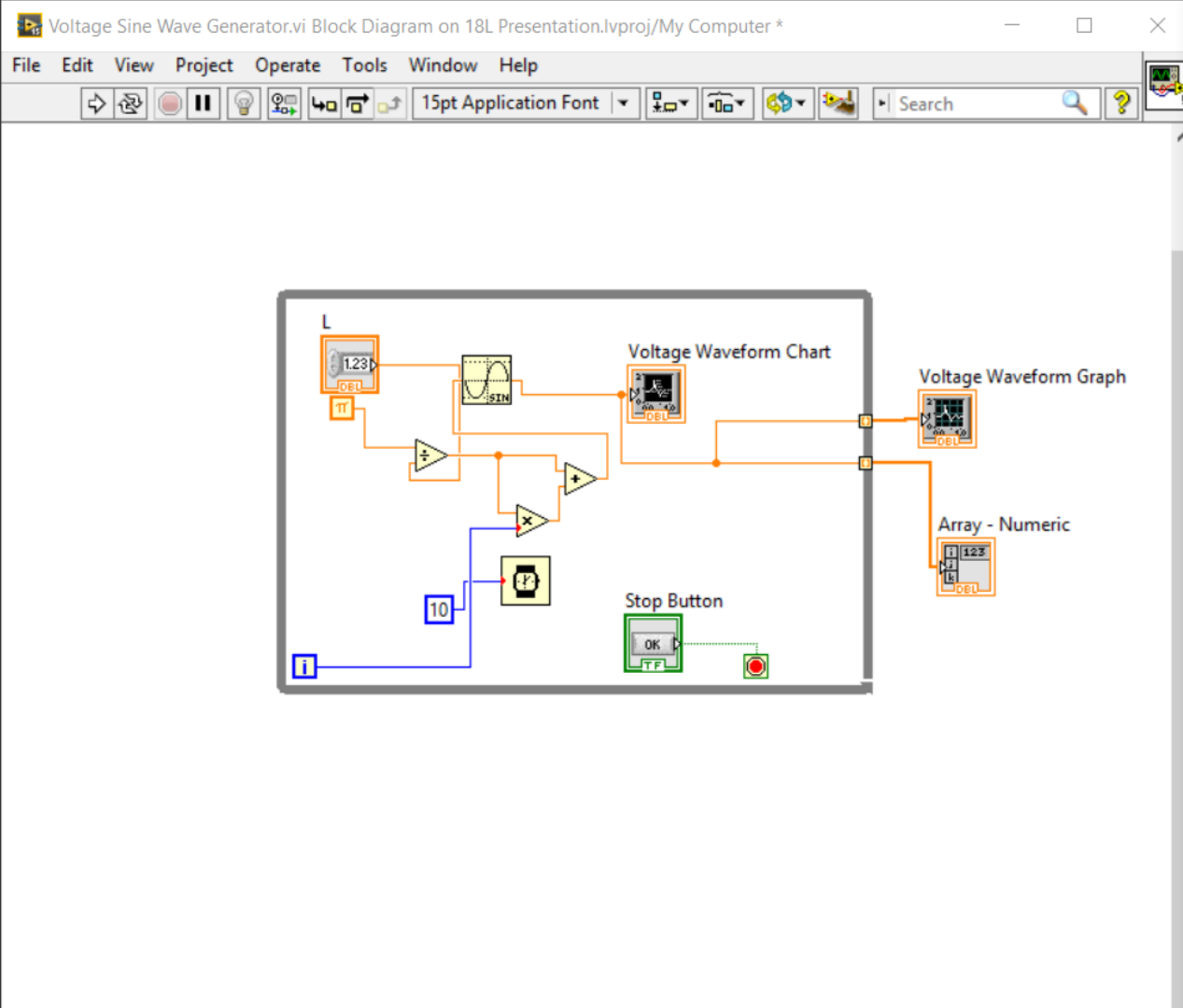


Converting C to F



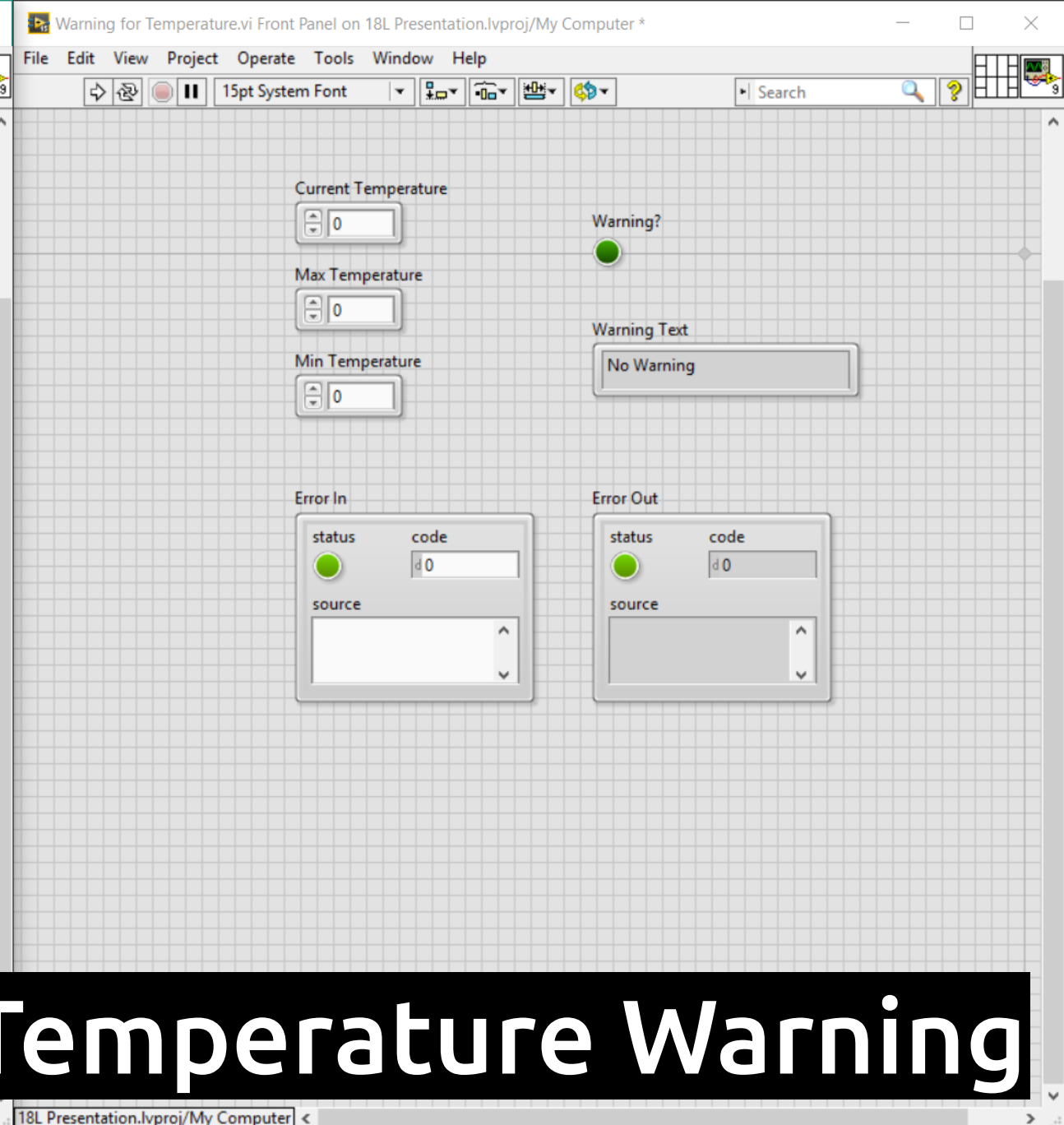
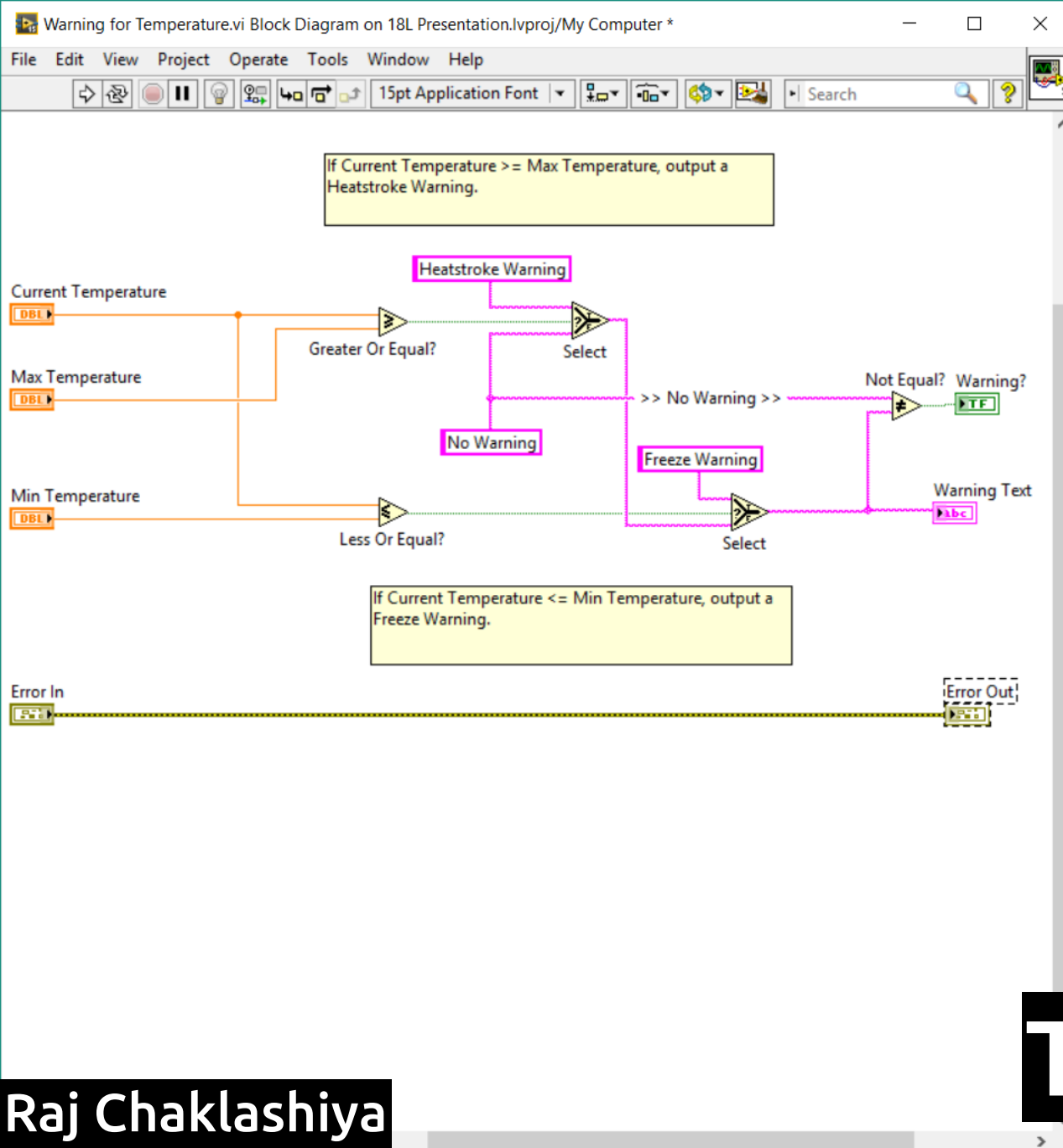
Simple Sine Wave + Average

Raj Chaklashiya
for Upsilon Lab



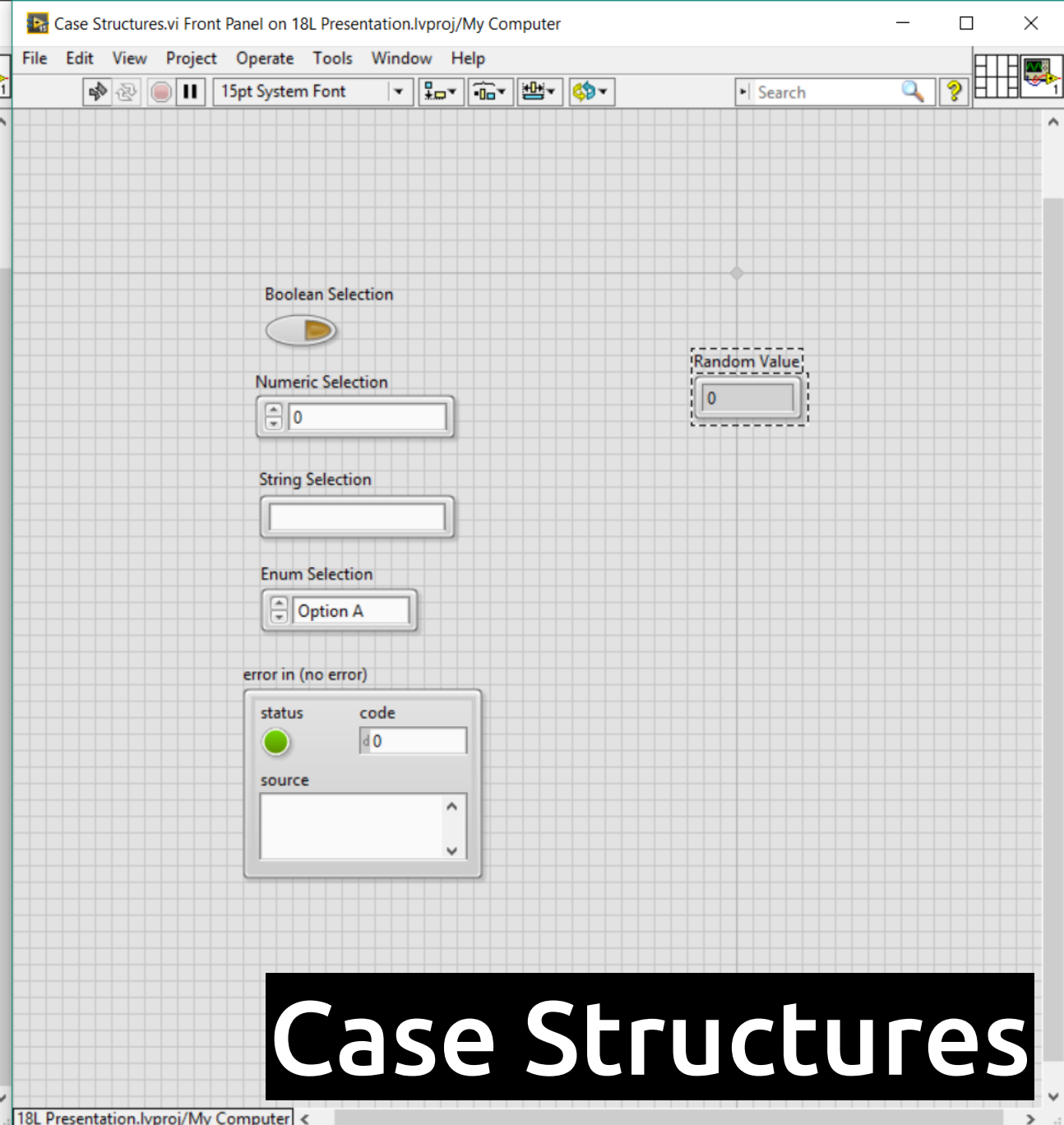
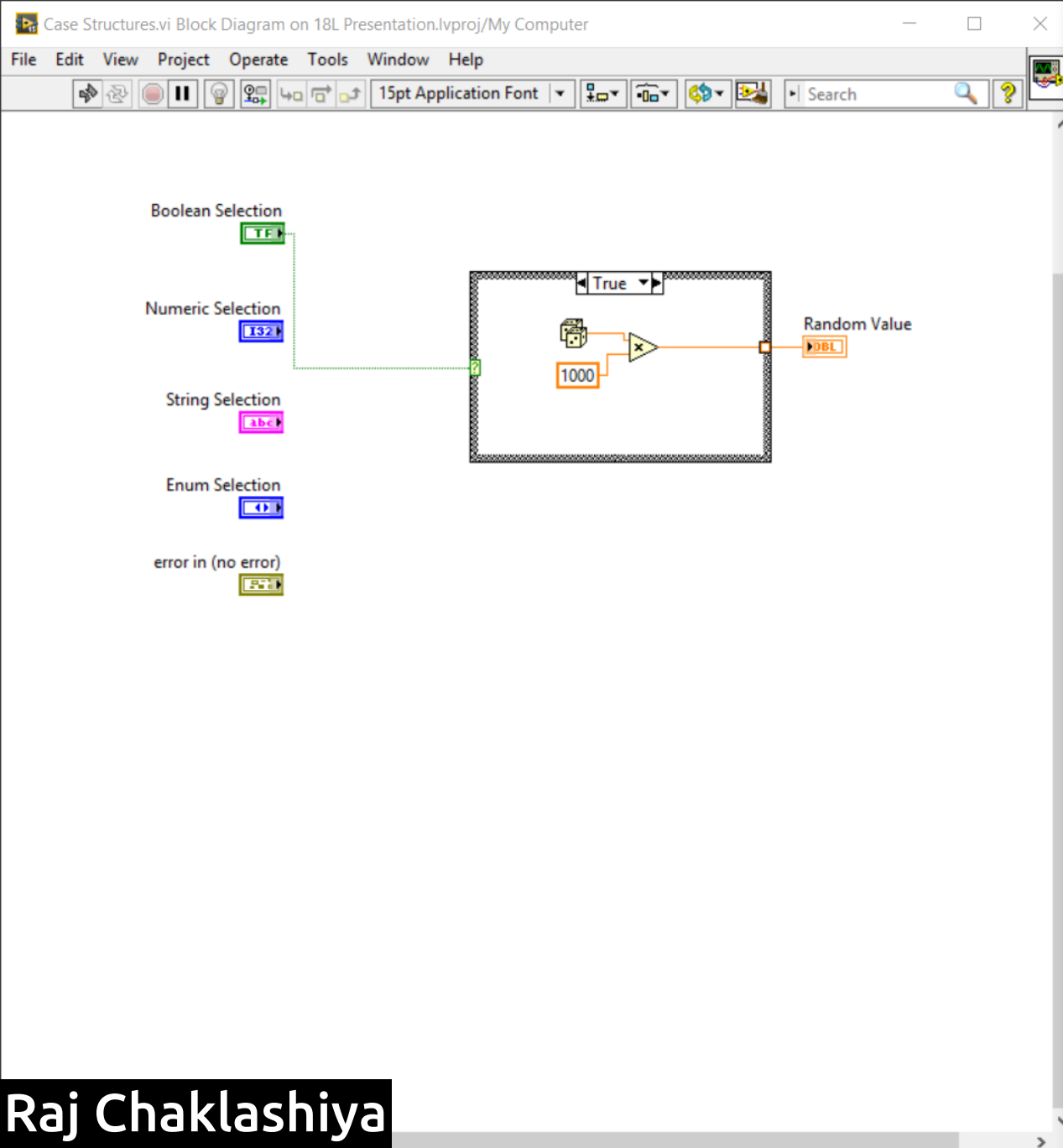
Auto-Generated Sine Wave + While Loop

Raj Chaklashiya
for Upsilon Lab



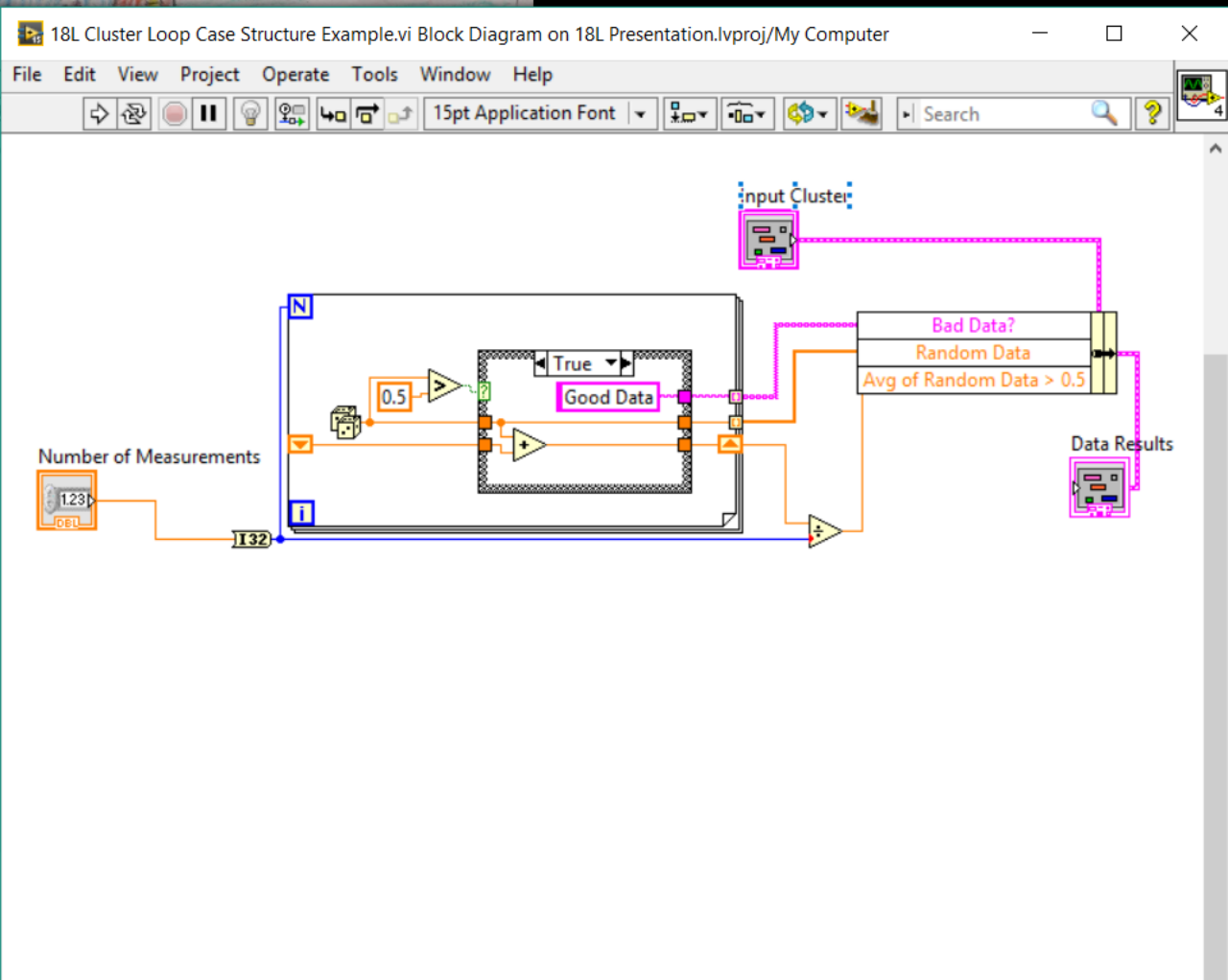
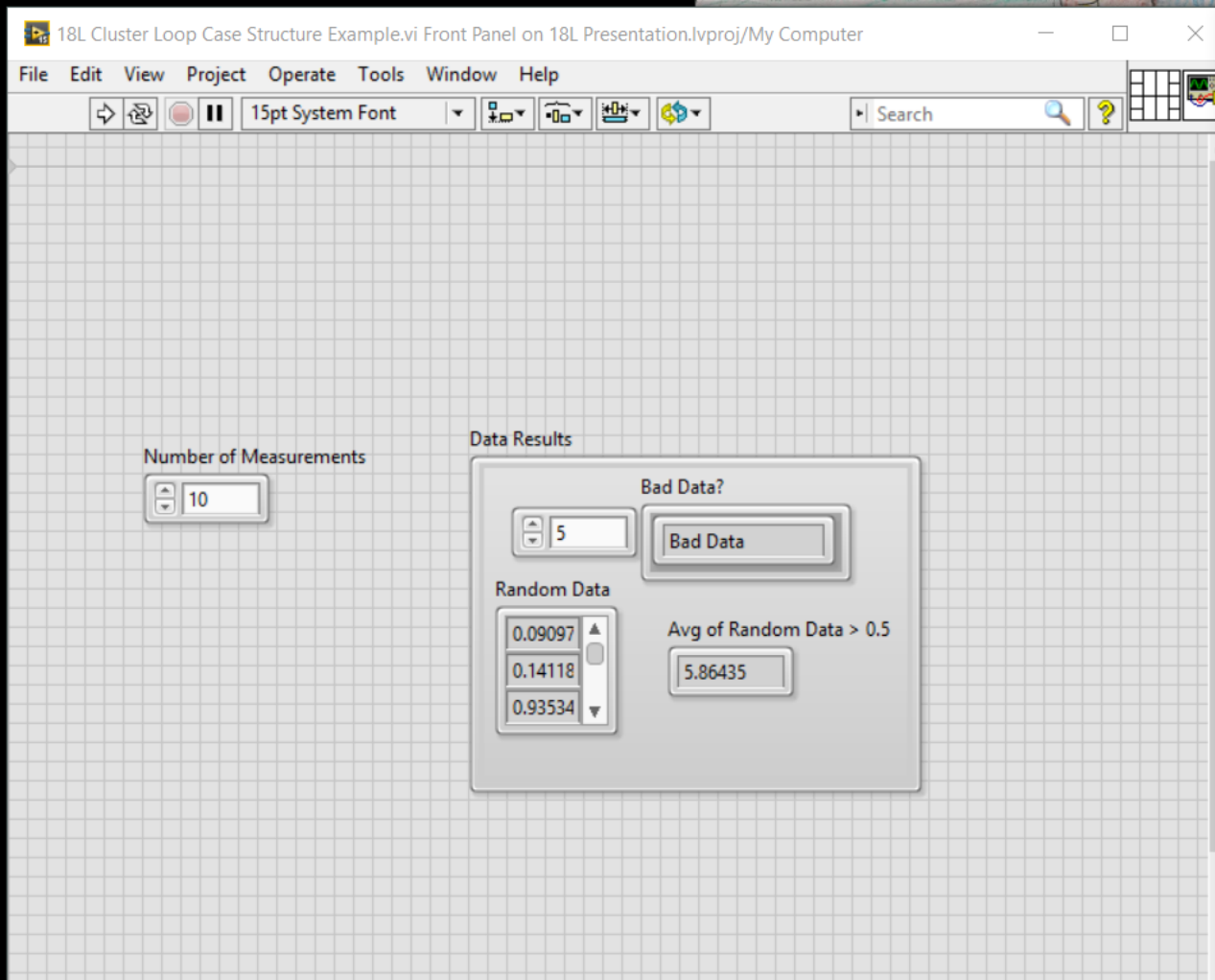
Temperature Warning

Raj Chaklashiya
for Upsilon Lab



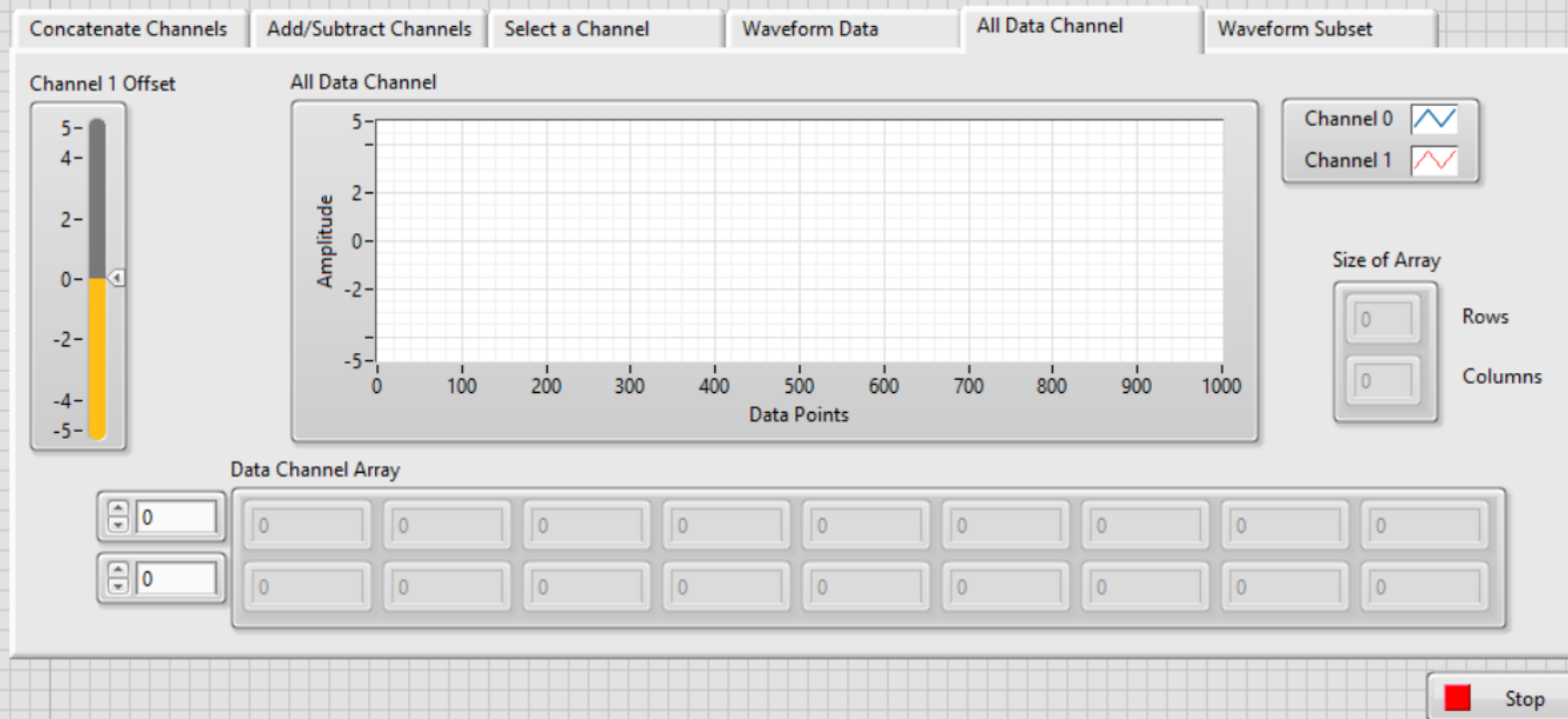
Raj Chaklashiya
for Upsilon Lab

Case Structures



Case Structures, Clusters, Arrays, For Loops

Raj Chaklashiya
for Upsilon Lab



Array Manipulation

