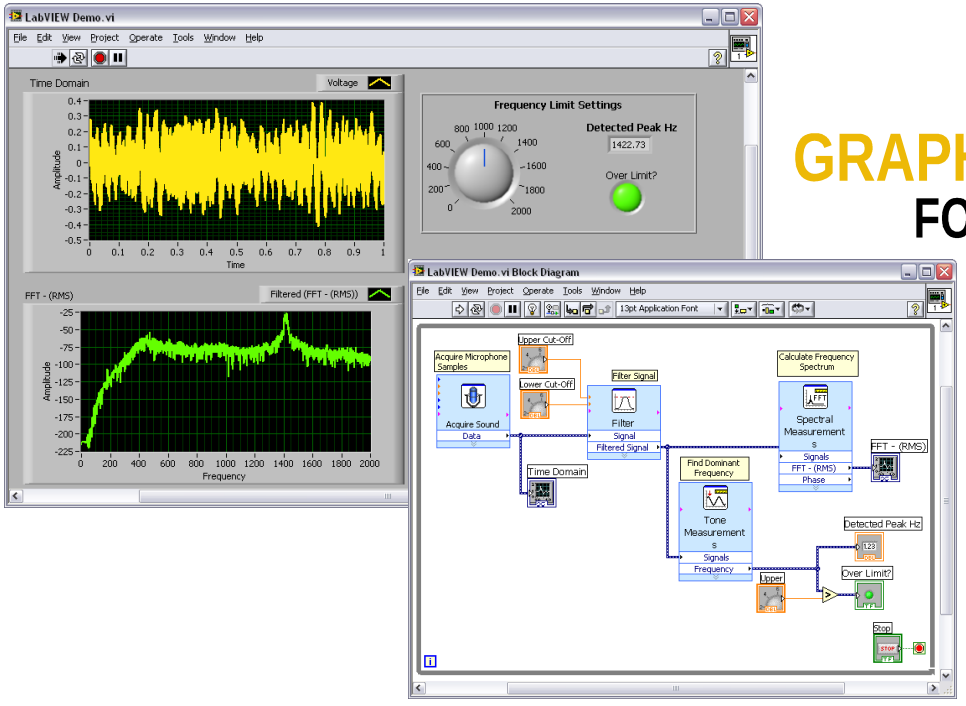
WELCOME TO

REU 2018: Introduction to **LabVIEW**

Instructor: Dr Michael Hasselbeck



GRAPHICAL PROGRAMMING
FOR ENGINEERS AND SCIENTISTS

LabVIEW™

What is the purpose of this workshop?

Get exposure the LabVIEW programming environment

Graphical/object-oriented – very different from text coding

Understand data flow

Elementary VI design (VI = Virtual Instrument)

Hands-on experience with the software

PROS:

Data-flow programming: Parallel execution of code

Graphical: Easy to learn, even for non-programmers; Drag-and-drop icons

Vast library of example code available

Readily integrates with NI hardware and many other vendors

All popular data buses supported (GPIB, PCI, ethernet, USB, wireless...)

Executables can be generated: Use on computers without LabVIEW

CONS:

Proprietary software from National Instruments

No independent standards

Licensing fees ($$$)

Works best on Windows. Less capable on Mac-OSX and Linux

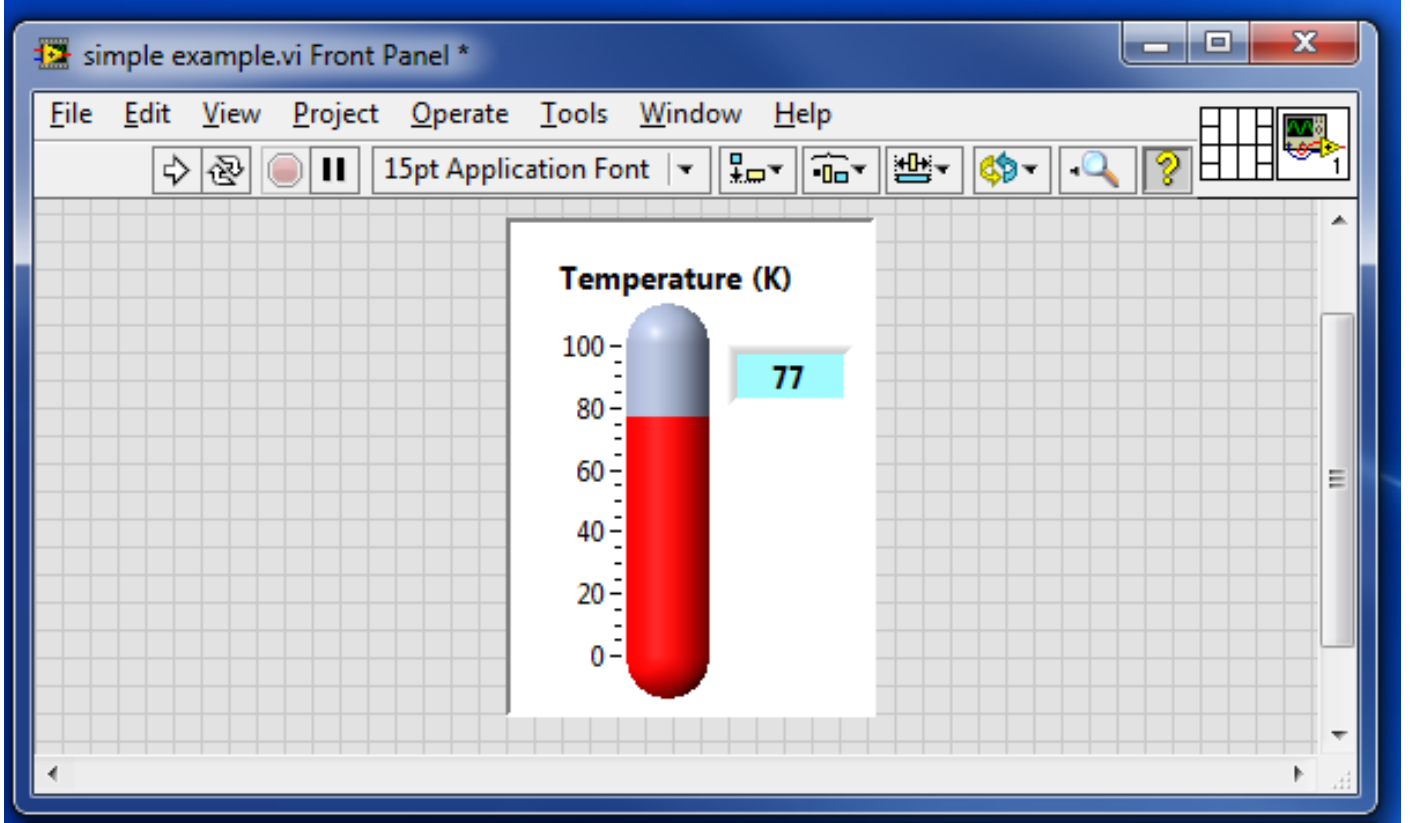
Large applications require high expertise; resource management

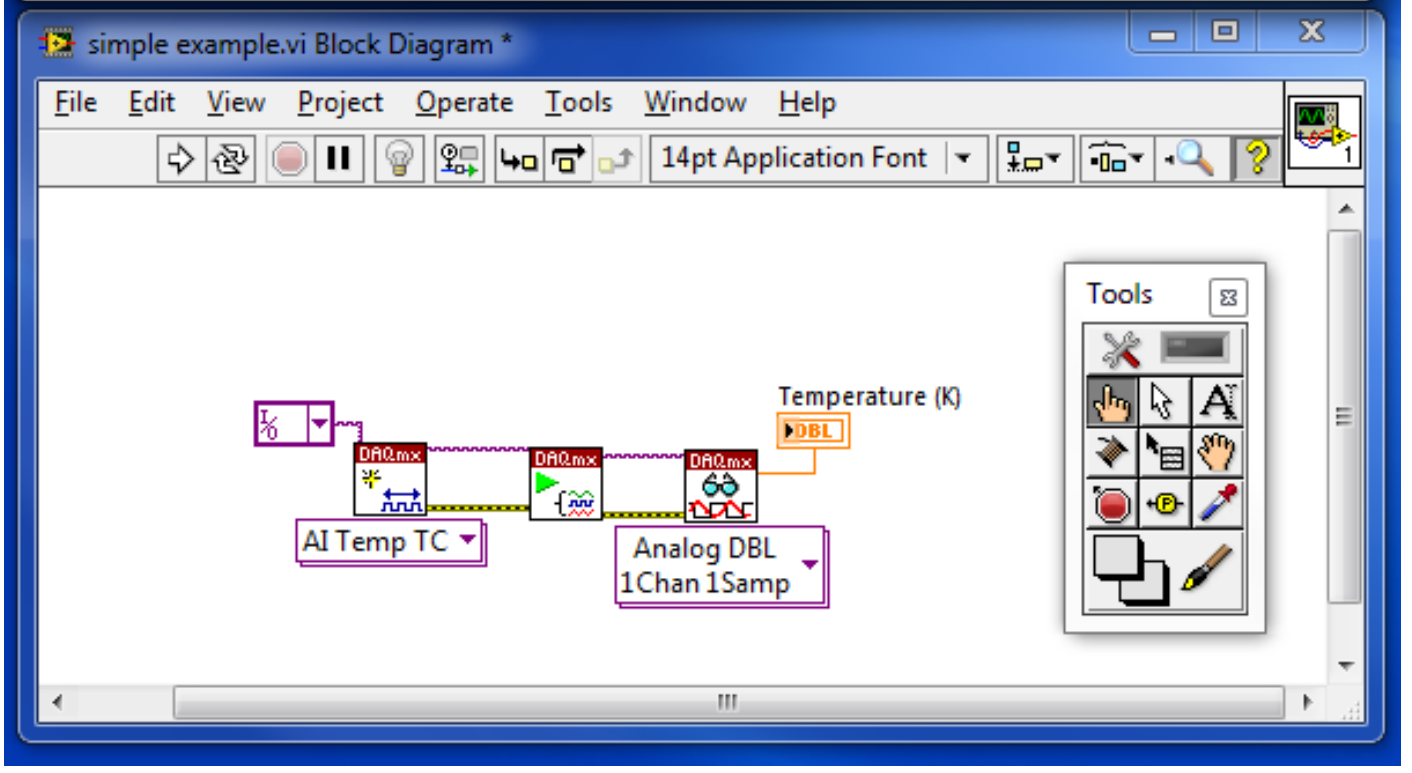
Generally slower than text-based code

Building stand-alone executables requires
Professional Development System (more $$$)

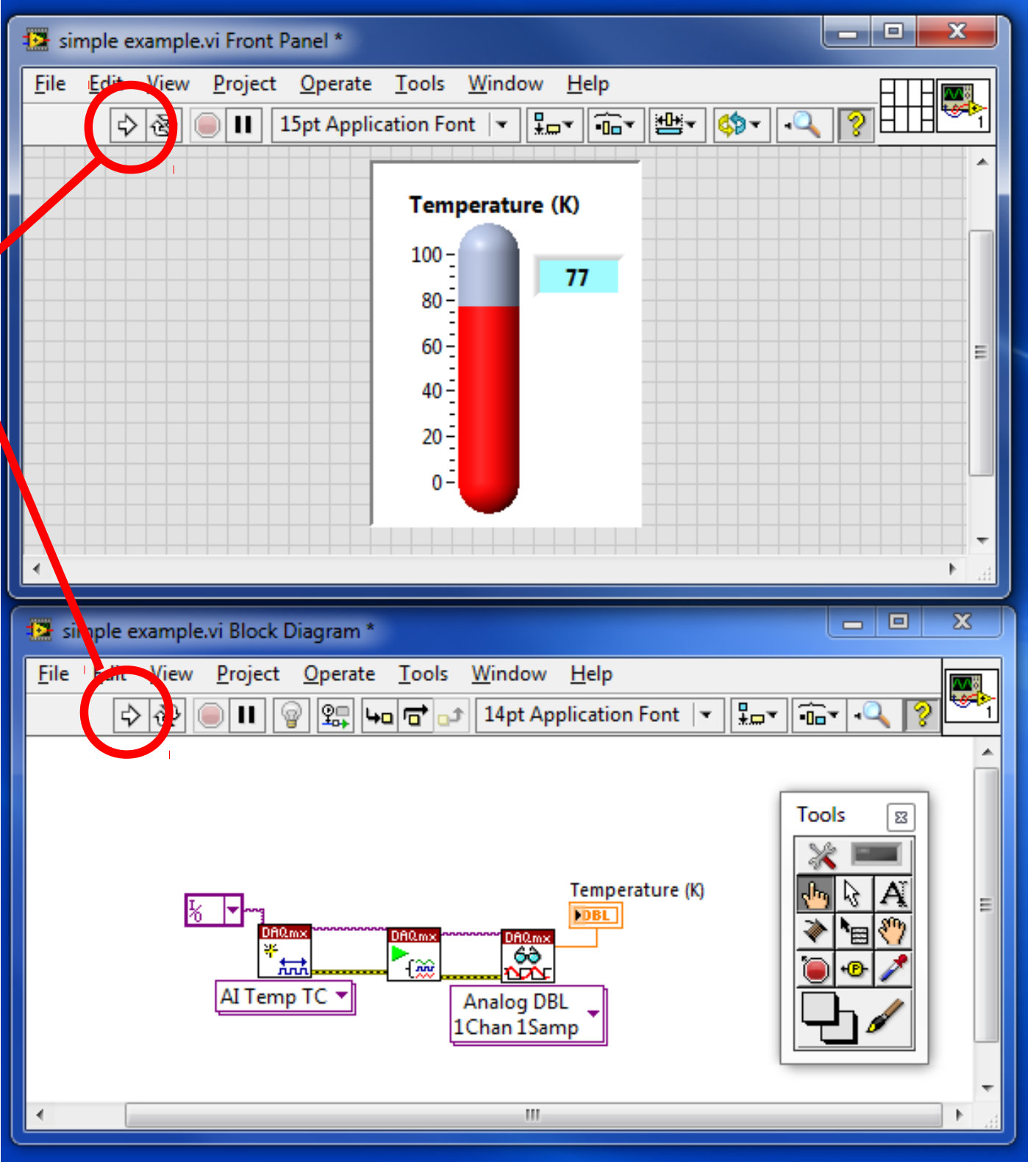
FRONT PANEL

BLOCK DIAGRAM





Run the VI


simple example.vi Front Panel *
File Edit View Project Operate Tools Window Help
15pt Application Font
Temperature (K)
100
80
60
40
20
0
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simple example.vi Block Diagram *
File Edit View Project Operate Tools Window Help
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Temperature (K)
DBL
DAQmx
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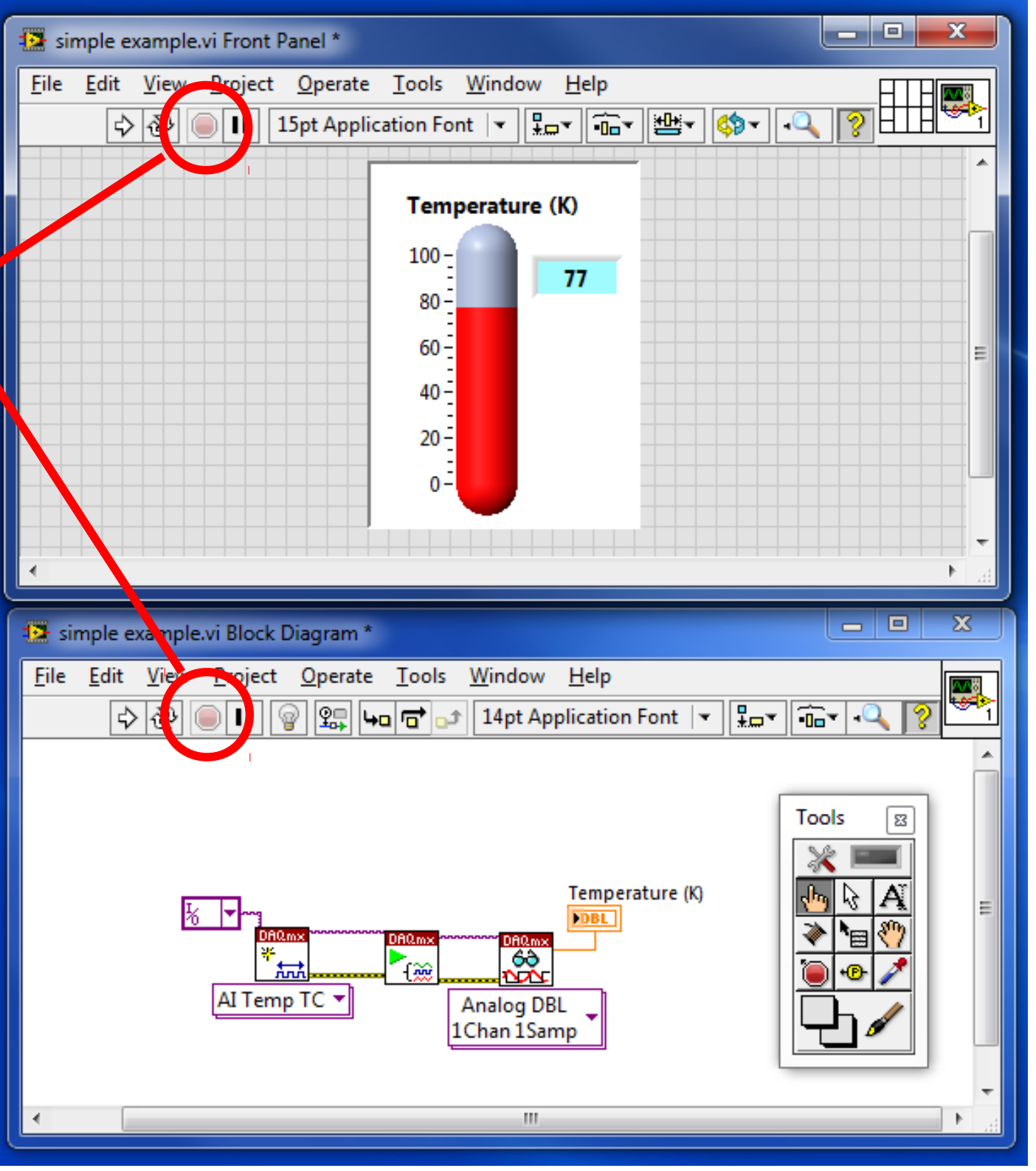
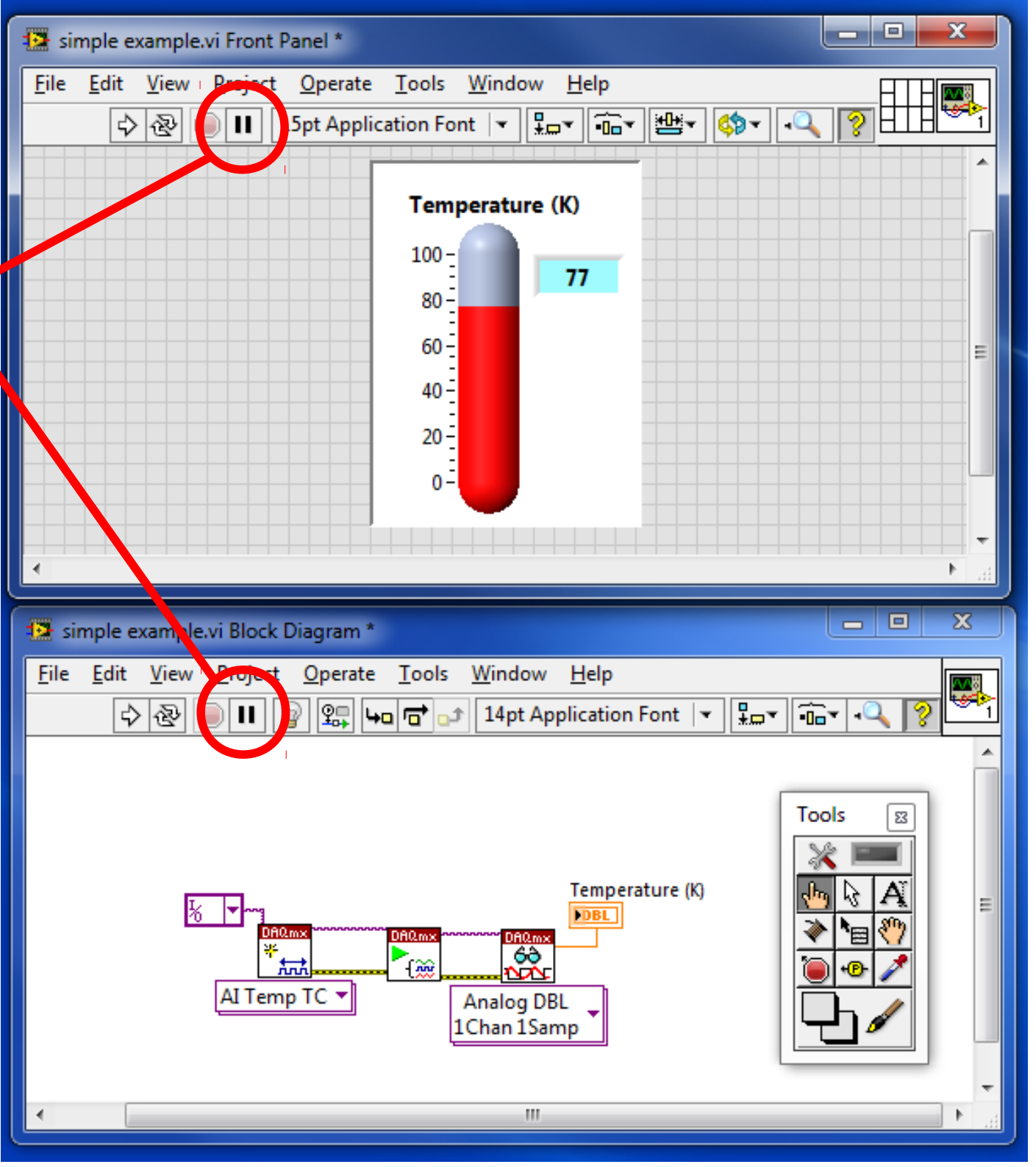
DAQmx
AI Temp TC
Analog DBL
1Chan 1Samp
Tools

Abort the VI*

* Use this only when all else fails



Pause the VI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1Chan 1Samp
Tools

Description of Tools Palette

Description of Tools Palette

Operate Value

Interact with working VI primarily from Front Panel

Description of Tools Palette

Position/Size/Select

Used on both Front Panel and Block Diagram

Opens pop-up menus with right-click

Description of Tools Palette

Edit Text

Works like a word-processor cursor

Description of Tools Palette

Connect Wire

Connects icons and objects on the Block Diagram

Different data types: Block Diagram View

Numeric

Floating point

Numeric

Integer

Boolean

Logical TRUE-FALSE (Binary 0-1)

String

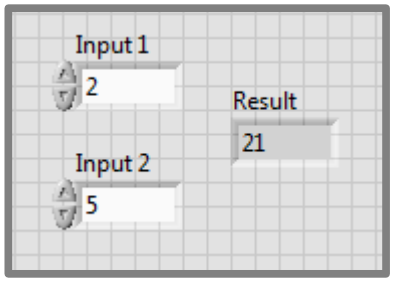
Alpha-numeric characters

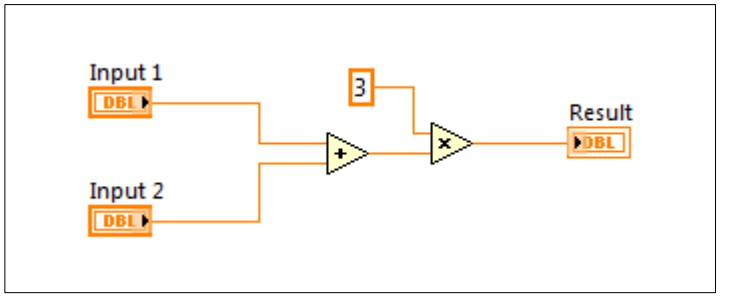
Data-flow programming on the Block Diagram

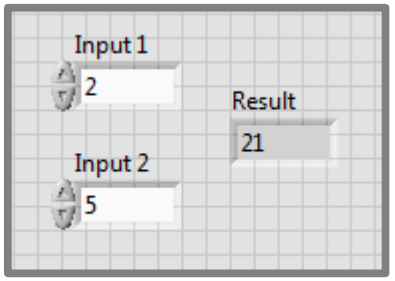
Code does not execute left-to-right

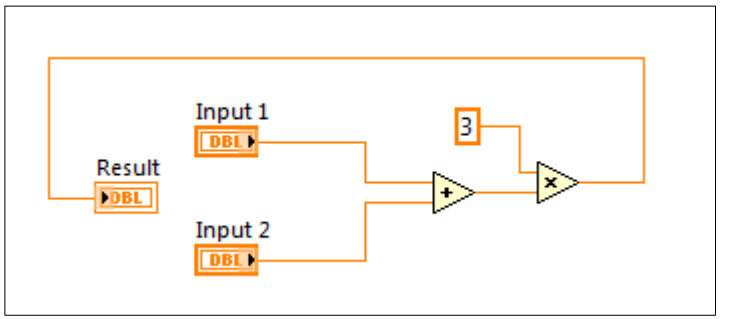
Nodes execute depending on availability of data at input terminals

These two VIs are operationally identical:



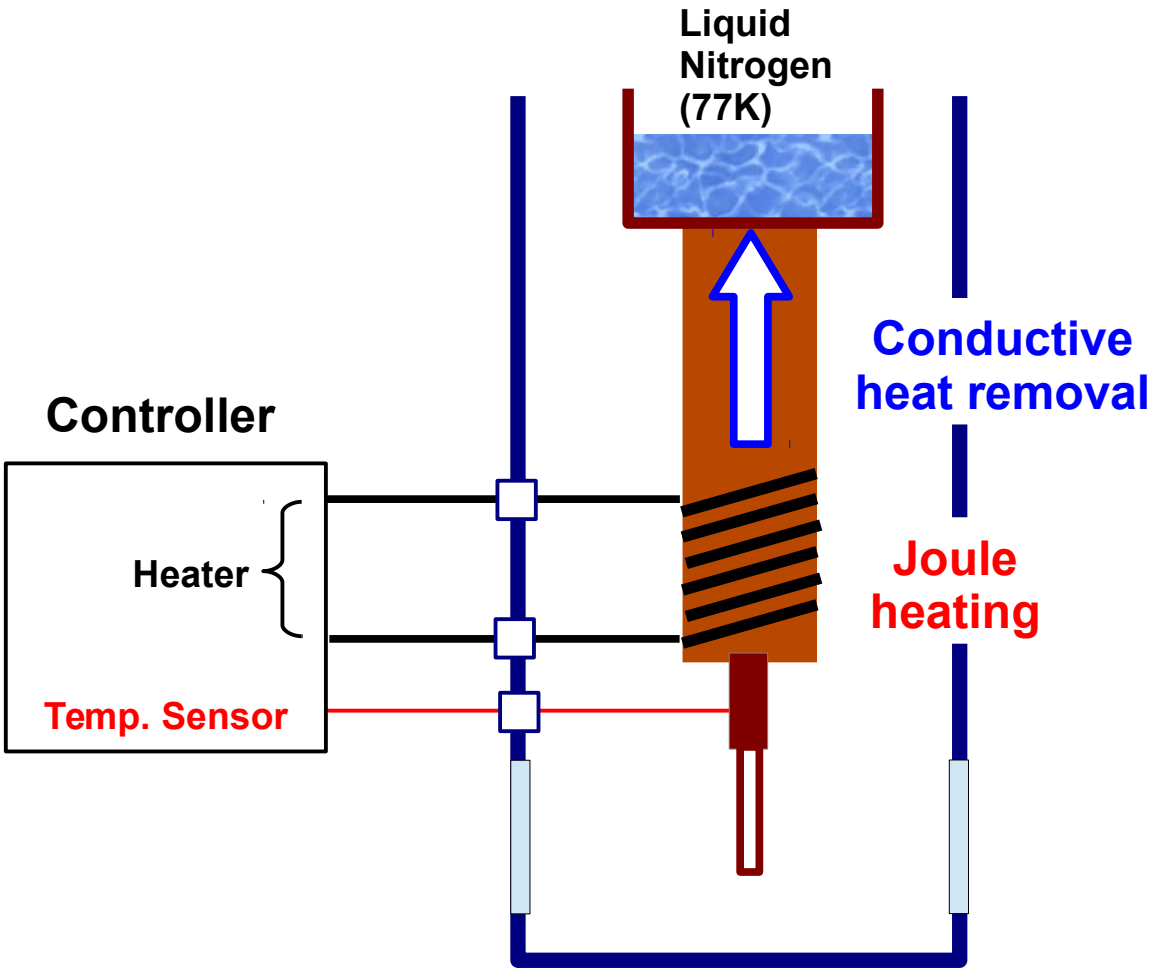






Setting up Block Diagram to flow left-to-right can help visualize logical flow

Cryostat Temperature Controller



About this workshop

Only a glimpse...Much key material has been left out!

Material found at www.unm.edu/~mph/REU/

Students work individually, but collaboration is OK.

Ask for help...any and all questions are allowed!

We will try to work through instructions together