NATIONAL INSTRUMENTS
LabVIEW

LabVIEW Skill Pill

Hardware Integration

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OIST

OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY GRADUATE UNIVERSITY

沖縄科学技術大学院大学

Quick Review – Event Structures

- Event Structures are commonly placed inside
  - While loops
- You shouldn't place a stop Boolean control outside the structure but inside the loop because
  - It will be read when the loop starts running, and the loop won't iterate until the Event Structure is triggered. It will probably not stop until the next iteration, which requires some other event
- User Interface are often handled by the <what> event?
  - Value Change

Quick Review – File I/O

- Name three file types natively handled by LabVIEW
  - Text/ASCII
  - ‘Binary’ with arbitrary data type
  - TDMS (Technical Data Management, Streaming) format

- Give some advantages and disadvantages of different file types in LabVIEW

File Format comparison

- Copied shamelessly from ni.com, which means incredibly biased (but still fairly true)

	ASCII	Binary	XML	Database	TDMS
Exchangeable	✓		✓		✓
Small Disk Footprint		✓			✓
Searchable				✓	✓
Inherent Attributes			✓		✓
High-Speed Streaming		✓			✓
NI Platform Supported	✓	✓	✓	✓*	✓

Quick Review – Queues and Notifiers

- If you want to send a message to multiple receivers, you should use a…
  - Notifier
- If you want to ensure no data is lost by your communication method, you should use a…
  - Queue (it was unlikely both questions would have the same answer…)
- If you want to connect two separate VIs without a ‘wire’ link, you can do what with a Queue or Notifier?
  - Name it and Obtain Notifier/Queue with the same name

Hardware Integration

- Today we'll look at two common forms of interaction with hardware
  - Serial (commonly RS232)
  - DAQmx (for NI hardware, especially DAQ boards)

DAQmx

- The DAQmx driver is provided by NI for interaction with some of their hardware
  - Typically DAQ boards like we'll use today
  - As of this year, also a small subset of cRIO controllers
- It has a variety of terminology, including
  - Tasks
  - Channels
  - Devices

Demo – DAQmx

Exercise – DAQmx

- Use the DAQmx API and the USB DAQ board to acquire the signal generated by the Signal Generator
- Display the signal on a chart or graph

- As an extension, use an Event Structure to allow the acquisition to be stopped and started
- Use File I/O to record data to disk

Serial

Serial Communication

- VISA Serial communication in LabVIEW works via series of nodes, similar to File I/O
  - Open
  - Take actions
  - Close

- To open, you should use “VISA Configure Serial Port”, not “VISA Open”
- Don’t forget to close when done

Not Quite Demo – Serial

SettingsSubpanel.vi in LDV.lvproj

Exercise – Serial

- Use the LabVIEW Serial commands to interface with our ‘device’, an Arduino (helpfully programmed by Jeremie!)
- Set up a VI which allows you to carry out each command detailed in the ‘Documentation’ via the Arduino

As an extension, consider how you might write your code so that you could add more methods if they existed