LabVIEW Intermediate I Course: Successful Development Practices

To be scheduled starting February 2004

Note: Starting February 2004, the LabVIEW Intermediate I and Intermediate II courses replace the LabVIEW Advanced: Performance and Communication course (P/N 910514-xx).

Overview

Whereas the LabVIEW Basics I and II courses introduce you to the LabVIEW environment and application development, the hands-on LabVIEW Intermediate I course teaches you structured practices to design, develop, test, and deploy LabVIEW applications. You learn good LabVIEW application development techniques such as hierarchical VI development, state machines, appropriate user interface design, error handling strategies and effective documentation. After attending the course, you can analyze your application requirements, choose the correct design pattern and data structures for your application, and quickly test your design – reducing development time and improving application performance and scalability. By incorporating these design practices early in your development, you avoid unnecessary application redesign, increase VI reuse and minimize maintenance costs.

Duration – Three Days

Audience

- LabVIEW and NI Developer Suite users who need to increase performance, scalability, or reuse and reduce application maintenance costs
- LabVIEW users pursuing the Certified LabVIEW Developer certification

Prerequisites

- LabVIEW Basics I and II, or equivalent experience

NI Products Used During the Course

- LabVIEW Professional Development System Version 7

REGISTRATION

Register online at ni.com/training or call
(800) 433-3488 • Fax: (512) 683-9300
info@ni.com

Outside North America, contact your local NI office. Worldwide Contact Info: ni.com/global

NI can also hold this class onsite at your facility.

Ordering Information 910718-xx

-01 NI Corporate or Branch, -11 Regional, -21 Onsite

After attending this course you will be able to:

- Analyze your application requirements and choose the correct design patterns and data structures
- Understand state machines and use them in your application
- Implement good programming style to create efficient VIs
- Develop modular applications which are easier to debug, maintain, and re-use
- Effectively document your VIs
- Use LabVIEW tools to evaluate inefficient VIs
- Use the LabVIEW Application Builder to create a standalone application and deploy it on other platforms

Suggested Next Courses

- LabVIEW Intermediate II: Performance and Connectivity
- LabVIEW Advanced Application Development
- Data Acquisition and Signal Conditioning
- LabVIEW Instrument Control

LabVIEW Intermediate I Course Outline

Day 1

Analyze the Project

Analyzing your project and developing a requirements document is the first step to a well structured LabVIEW application. This lesson teaches you how to analyze your project and how to define a set of features which are required to make the application function as specified. Working with a project specification for a sophisticated automation application, you will analyze the project and develop the requirements document. You will use the design and test techniques taught in subsequent lessons and apply them to your project. By the end of the course, you will have developed a fully-functional, sophisticated automation application that you can use as a model for your future projects. Topics include:

- Identifying areas of concern in the project specification relating to LabVIEW
- Communicating with the user/customer to clarify the intent of the project specification
- Determining the project requirements relating to LabVIEW
- Developing a project requirements document
- Defining the application through various flow charting techniques

Produce a Software Design

This lesson teaches you how to create a scalable architecture which is easy to maintain and reuse by selecting the appropriate design pattern for your type of application. You also learn how to design a front panel (user interface). Topics include:

- Designing a user interface
- Identifying a scalable architecture
- Creating a hierarchical architecture
- Identifying data structures, components and interfaces
- Limiting interaction between components

Design a Test Plan

Designing a robust software application requires creating a plan to test the application. In this lesson you learn how to design a test plan before you even start wiring your block diagram. Topics include:

- Creating a test plan for the user interface, block diagram, and error handling
- Designing a test plan for components
- Designing a test plan for software integration
- Designing a software testing plan such as a beta test

Day 2

Implement a User Interface

This lesson teaches you how to create a user interface based on your design. You learn techniques to create a professional and polished user interfaces that meet the project specifications. Topics include:

- Grouping appropriate controls and indicators to build designed data structures
- Learning standard user interface documentation techniques
- Implementing self-describing icons and appropriate scalable connector panes

Implement the VI

This lesson focuses on creating the algorithms and VIs for your application. You learn techniques to modularize your VI, and create VIs that are readable and easy to modify. Topics include:

- Implementing a scalable architecture
- Choosing programming methods to implement scalable algorithms and components
- Developing data structures for an application
- Developing VIs for reusable components
- Developing VIs for performance and memory efficiency
- LabVIEW Style Guidelines
- Creating self-documenting VIs
- Managing inherited LabVIEW applications

Day 3

Implement a Test Plan

In this lesson you will implement the test plan that you designed. You also learn techniques on how to develop automated testers. Topics include:

- Developing testing techniques
- Industry-standard testing implementations

Evaluate VI Performance

Prior to this lesson you have designed, developed and tested your LabVIEW application. This lesson teaches you techniques to improve the performance of your application. Topics include:

- LabVIEW tools to evaluate VI performance
- Identifying optimization needs

Implement Documentation

Proper documentation is critical for future modification to your application and necessary in completing a professional project. Topics include:

- Developing documentation standards
- Using industry-standard documentation techniques

Build a Executable and Installer

This lesson teaches techniques to deploying your LabVIEW application. You gain a deep understanding of the Application Builder and Installer. You learn about deployment issues which arise when moving to other platforms and languages. Topics include:

- Getting the most power out of the application build process
- Developing solutions to software deployment problems
- Caveats which can cause a finished software application to be unsuccessful during the deployment process