LabVIEW Advanced I: Large Application Development

Overview
The LabVIEW Intermediate courses introduce structured practices for designing, developing, testing, and deploying LabVIEW applications. LabVIEW Advanced I extends this knowledge by focusing on developing the skills needed to select and develop templates, architectures, and design patterns that are used for large LabVIEW applications. Advanced LabVIEW features are taught that can be used in large LabVIEW applications. The course teaches common practices for managing large, team-oriented, application development projects from specification to deployment.

Duration
Three (3) Days

Audience
- Advanced LabVIEW programmers who are developing large applications and who wish to use advanced features
- LabVIEW developers working as a team or on a project
- LabVIEW users pursuing the Certified LabVIEW Architect certification

Prerequisites
- LabVIEW Intermediate I or equivalent LabVIEW experience

NI Products Used During the Course
- LabVIEW Professional Development System
- Requirements Gateway
- Express VI Development Toolkit

After attending this course, you will be able to:
- Manage large LabVIEW Projects
- Estimate complexity of the LabVIEW Project
- Leverage tools and techniques to improve the development of large team-based LabVIEW projects
- Architect resources for other LabVIEW developers
- Architect and develop advanced control architectures for large LabVIEW projects
- Architect an API
- Leverage advanced programming concepts such as recursion and XControls
- Evaluate a project to determine the best architecture to implement

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

Part Number
910752-xx
-01 NI Corporate or Branch
-11Regional
-21 Onsite (at your facility)
LabVIEW Advanced I: Large Application Development Course Outline

Part I: Managing LabVIEW Projects

Introduction
This lesson introduces the role of a LabVIEW Architect. In this lesson you will learn about the software development process. Topics include:
- Introduction to the Advanced LabVIEW technologies and techniques
- Understanding the software development process
- Determining the role of a LabVIEW Architect

Planning
This lesson describes how to plan a LabVIEW project. In this lesson you will learn how to generate development plans and time estimates for a LabVIEW project. You will also gain the necessary skills to create quality assurance procedures. Topics include:
- Generating Development Plans
- Analyzing a project to determine time and cost estimation
- Developing style and coding standards for a team development environment

Tools
In this lesson you will use tools in LabVIEW to improve the development of large LabVIEW projects. You will learn about the intricacies of the LabVIEW Project. You will also learn how to track requirements, and use configuration management for multi-developer environments. Topics include:
- Leveraging the LabVIEW Project API
- Determining required code coverage with a requirements documents
- Performing requirements integration and verification using Requirements Gateway
- Using source control in a multi-developer environment
- Understanding the link between source control and project management
- Using the best practices for source control configuration
- Reducing the pitfalls that can be encountered when implementing source code control
- Using and tracking changes
- Understanding the impact of source control on the release of an application
- Using the LabVIEW source control API to automate the source control system

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Part II: Architectures for LabVIEW Projects

Designing and Creating Resources for Developers
In this lesson you will learn techniques and technologies to create resources for LabVIEW developers. You will learn to create customized, re-usable controls using XControls. You will also learn how to promote a consistent programming style with Merge VIs and create Express VIs to create toolkits and improve the team programming environment. Topics include:

- Creating new front panel objects with XControls
- Encouraging and promoting a consistent programming style with Merge VIs
- Learning to create custom Express VIs

Customizing Existing Design Patterns
In this lesson you will learn how to combine and expand existing Design Patterns to create advanced asynchronous custom design patterns that promote scalable, readable, and maintainable applications. You will gain the skills to use advanced communication mechanisms and error handling to enable large LabVIEW application development. Topics include:

- Reviewing existing Design Patterns
- Analyzing asynchronous communication mechanisms
- Applying communication mechanisms to develop advanced LabVIEW custom Design Patterns
- Leveraging customized error handling to proactively and safely control the architecture
- Combining and expanding Design Patterns for advanced custom Design Patterns

Designing API’s for the Development Team and End Users
In this lesson you will learn the techniques to create an API in LabVIEW. This lesson will provide the skills to develop and create an API for custom solutions you are implementing in your organization. Topics include:

- Learning API standards and architectures
- Using Project Libraries to enable API development
- Using Polymorphic VIs to enable API development
- Using Multi-functional VIs to enable API development

Advanced Programming Techniques
In this lesson you will learn advanced programming techniques to develop advanced LabVIEW applications. You will learn how to implement recursion in LabVIEW to create simple and very natural solutions for many problems. You will also learn advanced techniques for using LabVIEW Templates. Topics include:

- Reviewing and discussing the benefits of Dynamic VIs
- Describing the functionality of LabVIEW Templates
- Learning how to dynamically instantiate a LabVIEW Template to improve large LabVIEW applications
- Implementing recursion in LabVIEW to create simple and natural solutions
Part III: Case Studies

Case Studies
In this lesson you will explore multiple practical solutions to the same large LabVIEW application. You will be engaged in a class discussion with a Certified LabVIEW Architect instructor or instructor with equivalent experience to evaluate and judge the solutions while gaining the skills to leverage the LabVIEW techniques in the solutions for your own projects.

Topics include:
- Evaluating producer consumer solutions
- Determining the uses of a three loop asynchronous architecture
- Evaluating the uses of an XControl in a large LabVIEW application
- Evaluating the uses of an asynchronous VI architecture