Technical Training Solutions

ADVANCED C# .NET 2010 (USING VISUAL STUDIO 2010)

(5 Day Course)

Technical Course Outline

Course Summary

During this intensive advanced course, students will go beyond the introductory aspects of C# and explore its more advanced topics and concepts. In addition, advanced features of the Visual Studio development environment and the Microsoft .NET Framework will be covered.

Windows Forms (WinForms), Web Forms (ASP .NET), Class Library, and Console project types will be used to explore the course topics in order to give students the widest possible exposure to the topics covered.

Intended Audience:

This course is intended for those current C# developers, who have mastered the basics C#, Visual Studio, and the .NET Framework and wish to leverage their knowledge to create even more powerful and robust applications using the more sophisticated features of C# 2010, Visual Studio 2010 and the 4.0 .NET Framework.

Prerequisites:

To ensure the best learning experience for all participants, the following pre-requisites ***must be met*** in order to participate in this course:

- Successful completion of, or <u>complete familiarity with</u> the topics in: "***C# Fundamentals***"
- Successful completion of, or <u>complete familiarity with</u> the topics in: "***ASP.NET & ADO .NET Fundamentals (using C# .NET)***"
- At least <u>6 months</u> programming applications using C# .NET and Visual Studio.

Course Contents:

.NET Framework "Under The Hood"

- Memory Management (revisited)
  - Casting vs. Converting vs. Parsing
    - Boxing & Unboxing
  - Garbage Collection In Depth
    - Object Generations
    - Dispose/Finalize Patterns
- Partial Types

Collections & Generics

- The Collection Types In `System.Collections`
- The Generic Types In `System.Collections.Generics`
- Nullable Types

Reflection

- Understanding Reflection
- Compiler Attributes
  - .NET Pre-Defined Attributes
  - Custom Attributes
- Reflecting Classes

The Dynamic Language Runtime (DLR)

- Bypassing Compile-Time Type Checking
- The `dynamic` Keyword & The Dynamic Type
- The `CallSite` Type

Assembly Management

- Creating A Shared Assembly In The GAC
  - Strong Naming An Assembly
  - Assigning Strong Names Using Visual Studio
  - Delay Signing
  - Installing/Uninstalling An Assembly Into The GAC
  - Multiple GAC Versions Of An Assembly
- .NET Security & Configuration
  - web.config Encryption

Win32 Interoperability (COM InterOp)

- Platform Invoke (PInvoke)
- Runtime Callable Wrappers (RCW's)
  - Microsoft Office Primary InterOp Assemblies (Office PIA's)
- COM Callable Wrappers (CCW's)

C# .NET Language & Syntax Elements

- Arrays, Tuples, & Enumerations
  - Copying Arrays
  - Jagged Arrays
  - The `IEnumerator` Interface
  - The `yield` Statement
  - Tuples
- Anonymous Types & Lambda Expressions

Language Integrated Query (LINQ)

- LINQ to Objects
- LINQ to XML
- LINQ to SQL

Advanced Object-Oriented Programming

- Interfaces
  - Designing & Implementing Custom Interfaces
  - Implementing .NET Framework Interfaces
    - IDisposable
    - ISerializable
  - Polymorphism
    - Polymorphism Via Interfaces
- Operator Overloading
- Overriding `System.Object` Methods

Callback Interfaces, Delegates, & Events

- Declaring & Raising Events
- Registering & De-registering Event Handlers
- Multicast Delegates

Asynchronous Calls & Multithreading

- Processes & AppDomains
- Contexts
- Threads
  - The CLR ThreadPool
  - Concurrency & Thread Synchronization
- Invoking Methods Asynchronously
- Invoking Web Services Asynchronously