.NET Foundations (4012)

Duration: 2 days (16 hours)

This foundational two-day course is designed to provide a sound introduction to.NET for programmers who already know the C# language. It is current to Visual Studio 2022 and .NET 7.0. The course focuses on core portions of the .NET Class Library that are common across many application areas. It starts with an introduction to the architecture and key concepts of .NET. The course then discusses class libraries, packages, metapackages and frameworks. The following chapters discuss important topics in the .NET programming model, including metadata and reflection, I/O and serialization, delegates and events, memory management, processes and threads.

The course concludes with a chapter on threading, which includes an introduction to the Task Parallel Library (TPL). The course is hands-on, with many programming examples. The goal is to equip you with the foundations of this important new technology from Microsoft. The student will receive a comprehensive set of materials, including course notes and all the programming examples.

Benefits

- Gain a thorough understanding of the philosophy and architecture of .NET Core
- Understand packages, metapackages and frameworks
- Acquire a working knowledge of the .NET programming model
- Implement multi-threading effectively in .NET applications

Outline

1. .NET Fundamentals

- What is Microsoft .NET?
- Common Language Runtime
- Framework Class Library
- Language Interoperability
- Managed Code
- .NET Core, .NET 7, and Cross-Platform Development

2. Class Libraries

- Components in .NET
- Class Libraries Using Visual Studio
- Using References

3. Frameworks and Packages

- .NET Implementations and Frameworks
- .NET Standard
- NuGet Packages and Gallery
- Metapackages and Frameworks
- Packages in .NET 7
- Porting from Classical .NET to .NET 7
- Visual Studio Package Manager
- Installing Packages

- Creating Packages

4. Metadata and Reflection

- Metadata
- Reflection
- Late Binding

5. I/O and Serialization

- Directories
- Files and Streams
- XML Serialization

6. Delegates and Events

- Delegates
- Random Number Generation
- Anonymous Methods
- Lambda Expressions
- Events

7. .NET Programming Model

- Garbage Collection
- Finalize and Dispose
- Processes
- Command-Line Arguments
- Threads

8. .NET Threading

- Threading Fundamentals
- ThreadPool
- Foreground and Background Threads
- Synchronization
- Task Parallel Library

System Requirements

Course examples require Microsoft Visual Studio 2022 version 17.4 or later and Windows 10 or higher. The free Visual Studio Community 2022 can be used. See the appropriate course Setup Guide for details.

A good minimal hardware profile for this course consists of a 2 GHz or better CPU, 4 GB of RAM and at least 10 GB of free disk space for tools installation and courseware.

Required Prerequisites

The student should be an experienced application developer or architect with a working knowledge of C#.