C# Essentials (4002)

Length: 3 days

Microsoft .NET is an advance in programming technology that greatly simplifies application development, both for traditional, proprietary applications and for the emerging paradigm of Web-based services. .NET 6 is a unified platform, for browser, cloud, desktop, IoT, and mobile apps. It is based on .NET Core, the package-based implementation that is cross-platform, running on Mac and Linux besides Windows. It completes the unification of the .NET platform begun with .NET 5.

This three-day course is designed for the experienced programmer to help you quickly come up to speed on the C# language. It is current to Visual Studio 2022, .NET 6 and C# 10. Important newer features such as dynamic data types, named and optional arguments, tuples, asynchronous programming keywords, nullable reference types, record types and top-level statements are covered.

This course concisely covers the essentials of programming using Microsoft's C# programming language. It starts with an overview of .NET architecture and the basics of running C# programs in a .NET environment. The next two chapters cover C# language essentials and object-oriented programming in C#. The next chapter discusses how C# relates to.NET. The following chapter covers delegates and events. The course includes a succinct introduction to creating GUI programs using Windows Forms. The course concludes with a chapter covering the newer features in C#. Appendices provide a tutorial on Visual Studio 2022, an overview of LINQ, and coverage of unsafe code and pointers in C#.

The course is practical, with many example programs and a progressively developed case study. The goal is to quickly bring you up to speed in writing C# programs. The student will receive a comprehensive set of materials, including course notes and all the programming examples.

Benefits

- Acquire a working knowledge of C# programming

- Learn about important interactions between C# and.NET

- Learn how to implement simple GUI programs using Windows Forms

- Gain a working knowledge of important newer features in C#

Outline

1. Introduction to NET

- What is .NET?

- .NET Framework, NET Core and .NET 6

- Application Models

- Managed Code

- Visual Studio 2022

- Console Programs and New Console Template

- GUI Programs

2. C# Overview for the Sophisticated Programmer

- First C# Console Application

- Namespaces

- Data Types

- Conversions

- Control Structures

- Subroutines and Functions

- Parameter Passing

- Strings

- Arrays

- Implicitly Typed Variables

- Console I/O

- Formatting

- Exception Handling

3. Object-Oriented Programming in C#

- Classes

- Access Control

- Methods and Properties

- Asymmetric Accessor Accessibility

- Static Data and Methods

- Constant and Readonly Fields

- Auto-Implemented Properties

- Inheritance

- Overriding Methods

- Abstract Classes

- Sealed Classes

- Access Control and Assemblies

4. C# and.NET

- Components

- Interfaces

- System.Object

- .NET and COM

- Collections

- IEnumerable and IEnumerator

- Copy Semantics in C#

- Generic Types

- Type-Safe Collections

- Object Initializers

- Collection Initializers

- Anonymous Types

- Attributes

5. Delegates and Events

- Delegates

- Anonymous Methods

- Lambda Expressions

- Random Number Generation

- Events

6. Introduction to Windows Forms

- Creating Windows Applications Using Visual Studio 2022

- Partial Classes

- Buttons, Labels and Textboxes

- Handling Events

- Listbox Controls

7. Newer Features in C#

- Dynamic Data Type

- Named and Optional Arguments

- Variance in Generic Interfaces

- Asynchronous Programming Keywords

- New Features in C# 6 and C# 7

- Nullable Reference Types

- Record Types

- Top-level Statements