

Advanced C# Language Training

4 days (28 hours)

Presentation

[C#](#) is the most versatile programming language in the .NET framework, enabling developers to create Windows, Web and mobile applications. C# enjoys strong community support, with over five million developers using C#.

Our Advanced C# course will teach you advanced C# techniques, how to LINQ queries, and the mechanisms LINQ uses to translate C# code into native queries for specific data sources. You'll also learn about asynchronous processing for modern applications.

After this course, you'll know how to apply C#'s advanced features, including definitive Language Integrated Query (LINQ) coverage, to streamline the use of C# as a first-class object-oriented and data manipulation language.

You'll master the C# features that make asynchronous programs easier to reason about and understand.

As always, we'll be teaching you the latest version of the tool, [C# 12](#).

Objectives

- Apply advanced techniques to your code with C#
- Use reflection to inspect and generate code
- Programming multithreaded applications
- Apply SOAP and REST WebServices
- How to use WPF
- Mastering asynchronous programming

Target audience

- Developers
- Architects
- Technical project managers

Prerequisites

- Basic command of the C# language
- .NET experience a plus

Advanced C# training program

Introduction to advanced C# techniques

- Delegates and events
- Delegates
- Events
- Anonymous types
- Tuples
- The Tuple class
- Value tuples
- Pattern matching
- The expression is
- The switch expression
- Regular expressions
- Corresponding input text
- Subchain search
- Replace parts of a text
- Extension methods

Resource management

- Waste collection
- Finalizers
- The IDisposable interface
- The using instruction
- Platform invocation
- Unsecured code

Windows Presentation Foundation (WPF)

- Introduction to WPF
- Creating Windows Forms
- WPF implementation
- Creation of a contact manager
- Async/Await implementation

REST approach with Web APIs

- Web services and API Rest
- Developing a Web API
- Documentation and testing
- Securing Web APIs

Lambdas, LINQ and functional programming

- Functional programming
- Functions as first-class citizens
- Lambda expressions
- LINQ
- Standard query operators
- Query syntax
- Other functional programming concepts
- Application of partial functions
- CurryingEnclosures
- Monoids
- Monads

Thinking and dynamic programming

- Understanding reflection
- Dynamically load assemblies
- Understanding late binding
- Using dynamic type
- Attributes
- System attributes
- User-defined attributes
- How to use attributes
- Attribute targets
- Assembly attributes
- Attributes in reflection

Multithreading and asynchronous programming

- What is a thread?
- Thread creation in .NET
- Using the ThreadPool class
- Understanding synchronization primitives
- The task paradigm
- Synchronous implementations of asynchronous methods
- Occasional asynchronous methods
- Break task chain - block thread
- Manual task creation
- Breaking the task chain - "fire and forget"
- Tasks and exceptions
- Cancelling a task
- Track task progress
- Task parallelization
- Signaling tasks with the TaskCompletionSource object

- Synchronization context

C# in action with .NET 8

- Using the .NET command line interface (CLI)
- Cross-platform development with Visual Code or JetBrains Rider
- Assembly management with .NET 8
- Using the NuGet package manager
- The .NET 8 upgrade wizard

Installation and publication

- How do I choose a .NET version?
- SDK, runtime and libraries
- Install .NET on a compatible platform
- Prepare application deployment
- Publish an application

Unit testing

- What are unit tests?
- What Microsoft tools are available for unit testing?
- Creating a C# unit test project
- Writing unit tests
- Code coverage analysis
- The anatomy of a test
- Writing data-driven unit tests
- Data from attributes
- Dynamic data
- Data from external sources

Companies concerned

This course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced computer technology, or to acquire specific business knowledge or modern methods.

Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives with regard to the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

Teaching methods

Practical course: 60% Practical, 40% Theory. Training material distributed in digital format to all participants.

Organization

The course alternates theoretical input from the trainer, supported by examples, brainstorming sessions and group work.

Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

Sanction

A certificate will be issued to each trainee who completes the course.