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Advanced C# Development (4 days)

Course overview

Once you've mastered the core features of C# as a programming language, you're ready to take the next step. The .NET platform offers an incredibly rich and diverse set of APIs that cover all aspects of contemporary development. This course takes a detailed look at the areas of C# and .NET that have particular resonance to developers today, including asynchrony, creating decoupled and adaptable systems, test-driven development, web development, and containerization using Docker. The course covers all the new features in C# 10 and .NET 6.

What you'll learn

- C# language innovations
- Nullable types
- Asynchronous programming techniques
- Parallelization and concurrency
- .NET Core and ASP.NET Core features
- Containerization using Docker
- Dynamic programming
- Dependency injection
- Design patterns
- Test-driven development

Prerequisites

- At least 6 months C# programming experience

Course details

- Introduction to .NET 6: Overview of .NET 6; Using Visual Studio with .NET 6; Understanding top-level statements
- Nullable Types: Nullable reference types; Nullable value types; Null coalescing operators
- C# Language Innovations – Part 1: Tuples; Pattern matching; Additional pattern matching techniques; Record types
- C# Language Innovations – Part 2: Ranges and indices; Disposing objects via using declarations; Default methods in interfaces; Additional new features in C# 9 and C# 10
- Delegates, Events, and Lambda Expressions: Using delegates effectively; Lambda expressions; Standard delegate types; Events;
- Generics in Depth: Generics essentials; A closer look at generics; Generic structs, delegates, interfaces; Generic methods; Contravariance and covariance

- Parallelization and Asynchronous Methods: Parallelization; Async methods; Async streams
- Dynamic Programming: Using the dynamic keyword; Dynamic Language Runtime (DLR)
- Containerizing .NET Applications: Publishing .NET applications; Overview of containerization and Docker; Understanding Docker images; A closer look at images and containers; How to Containerize a .NET application
- ASP.NET Web Applications: Getting Started with ASP.NET; Creating a minimal ASP.NET web app; Containerizing an ASP.NET web app; Using VS support for containerization
- Design Patterns: Overview of design patterns; Pattern classification; Creational patterns; Structural patterns; Behavioural patterns
- Introduction to Unit Testing in .NET: Setting the scene; TDD using Test Explorer; Additional techniques
- Unit Testing with xUnit.net: Getting started with xUnit.net; A closer look at xUnit.net
- Test-Driven Development: Effective test-driven development; Refactoring techniques; Types of test
- Test Doubles: Making code testable; Overview of test doubles; Using stubs; Using mocks
- Dependency Injection: DI concepts; DI frameworks; Using DI in ASP.NET; DI examples