C# Topics

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- Introduction to C#
  - Features of C#
  - C# Compilation and Execution
  - General Structure of a C# Program
- Data Types and Arrays in C#
  - Data Types in C#
  - Value Types and Reference Types
  - Boxing and UnBoxing
  - Single Dimensional, Multi-Dimensional & Jagged arrays
  - Nullable Types
  - Implicitly Typed Local variables
  - Var vs dynamic
  - Is and as operator
  - Ref vs out keywords
  - The 'object' base class in .net
  - Equals() vs ==
  - String vs StringBuilder
  - Various String class methods
  - Default parameters, named parameters
  - Parse() vs TryParse() vs Convert Class methods

- OOP with C#
  - Structures and enums
  - The architecture of a class in C#
  - Instance, Class & Reference variables
  - Access Modifier
  - Abstract Classes
  - Constructors, Destructors, The GC
  - .NET Base class library
  - Inheritance in C#
  - Method Overloading
  - Method Overriding
  - Operator Overloading
  - Method Hiding
  - Access modifiers : private, pubic, protected, internal, protected internal, new
  - Anonymous types
  - Abstract classes
  - Sealed classes
  - Creating Interfaces
  - Implementing Interface inheritance
  - Declaring properties within Interfaces
  - Namespaces
  - Creating and using Generic classes
  - Indexers & Properties
  - Auto Implemented properties
  - Static Classes
  - Property Accessors
  - Partial types
  - Extension methods
  - Object Initializer
- Evaluating Regular Expressions in C#
  - RegEx Class
  - Forming Regular Expression
  - Methods for Regular Expression
- Exception Handling
  - Exceptions in C#
  - Exception class hierarchy
  - Try block
  - Multiple catch blocks
  - Finally block
  - Purpose of throw keyword
  - Purpose of inner exception
  - Creating Custom Exception
- Garbage Collection in C#
  - Role of a Garbage Collector
  - Garbage Collection Algorithm
  - Finalize vs Dispose

- Anonymous Types, Delegates, Events & Lambda
  - Extension Methods
  - Anonymous Type
  - Var and Dynamic
  - Introduction to Delegates
  - Events in C#
  - Anonymous Methods
  - Lambda Expression
  - Expression Tree
- File I/O and Serialization
  - Using StreamReader, StreamWritter
  - Using BinaryReader, BinaryWriter
  - Using File, FileInfo, Directory, DirectoryInfo
  - Serialization modes: Binary, SOAP, XML
  - JSON serialization
- Threading, Parallel and Async programming with C#
  - Task Parallel Library
  - Threads Vs. Tasks
  - Task Based Asynchronous Model
  - Async and Await
  - Using Locks
- New Features in C# 8.0

  - Readonly members
  - Default interface methods
  - Pattern matching enhancements:
  - Using declarations
  - Static local functions
  - Disposable ref structs
  - Nullable reference types
  - Asynchronous streams
  - Asynchronous disposable
  - Indices and ranges
  - Null-coalescing assignment
  - Unmanaged constructed types
  - Stackalloc in nested expressions
  - Enhancement of interpolated verbatim strings

Dependency Injection

SOLID principles

- Collections & Generics
  - System.Collections Namespace
  - Collection Interfaces
  - Collection Classes
  - The collection API
  - Working with Generics
  - Creating Generic class, Generic Methods, Interfaces, Delegates
  - Collection Initializers
  - Iterators
  - Constraints