C# Topics

1. Understanding the CLR (Common Language Runtime)
2. Basic structure of a C# program (Main method, namespaces, assemblies
3. Variables and Data Types (primitive types, reference types)
4. Operators (arithmetic, relational, logical, etc.)
5. Conditionals (if, else, switch)
6. Loops (for, while, do-while, foreach)
7. Methods and Functions
8. Exception Handling (try-catch-finally, throw)
9. Classes and Objects
10. Encapsulation (properties, fields, access modifiers)
11. Inheritance and Polymorphism (base classes, abstract classes, method overriding)
12. Interfaces and implementation
13. Constructors and destructors
14. Static vs. Instance members
15. Arrays and Lists
16. Dictionaries, HashSets, Queues, and Stacks
17. LINQ (Language Integrated Query)
18. Working with Generics (generic methods, generic classes)
19. IEnumerable, IEnumerator, and using the yield keyword
20. Delegates and Events
21. Lambda expressions
22. Anonymous methods
23. Properties (auto-implemented, computed properties)
24. Extension methods
25. Indexers and overloading operators
26. Async and Await
27. Task-based asynchronous pattern (TAP)
28. Parallel programming (Tasks, Threads)
29. Cancellation tokens and handling async exceptions
30. Working with files (File, FileStream, StreamReader/StreamWriter)
31. Reading and writing text/binary data
32. Serialization (JSON, XML, BinaryFormatter)
33. Using libraries like Newtonsoft.Json for JSON serialization
34. The garbage collector (GC) and finalization
35. Memory management patterns in C#
36. IDisposable and the using statement
37. Reference vs Value types and understanding boxing/unboxing
38. Defining and using attributes
39. Reflection (introspection of types, methods, and properties)
40. Dynamic assembly loading
41. Concept of Dependency Injection (DI) in C#

ASP.NET & .NET Core Topics

1. Introduction to ASP.NET Core
2. MVC (Model-View-Controller) pattern
3. RESTful services with WebAPI
4. Routing and middleware
5. Razor Pages, Blazor, and working with Views
6. Common design patterns (Singleton, Factory, Observer, Dependency Injection)
7. SOLID principles
8. Applying patterns in real-world scenarios
9. Writing unit tests in C# using frameworks like MSTest, NUnit, or xUnit
10. Mocking and dependency injection in tests
11. TDD (Test-Driven Development)
12. Calling external APIs using HttpClient
13. Parsing JSON and XML data
14. Creating and securing APIs (JWT, OAuth)
15. ADO.NET basics (SQL commands, DataReader, DataAdapter)
16. ORM (Object-Relational Mapping) with Entity Framework
17. LINQ-to-SQL and LINQ-to-Entities
18. Asynchronous database operations
19. Using built-in DI containers in .NET Core/ASP.NET Core
20. Understanding IoC (Inversion of Control) and services