C# Interview Questions and Answers

1. What is C# and what are its key features?

C# is a modern, object-oriented programming language developed by Microsoft. Key features include:

- Strongly Typed
- Object-Oriented
- Platform Independence
- Garbage Collection
- Rich Libraries
- Asynchronous Programming.

2. Explain the basic structure of a C# program.

A C# program consists of:

- Namespaces
- Classes
- Methods
- Main Method.

Example:

```csharp
using System;
namespace HelloWorld {
class Program {
static void Main() {
Console.WriteLine("Hello, World!");
}}
}
```

```

**3. What are the different types of data types available in C#?**

C# supports several data types:

- Value Types

- Reference Types

- Nullable Types

- Dynamic Types.

**4. What is the difference between value types and reference types?**

- Value Types store data directly.

- Reference Types store references to the actual data.

**5. What are nullable types in C#?**

Nullable Types allow value types to hold a null value, useful in scenarios where a value might not be assigned. They are defined using the ? suffix.

**6. Can you describe what namespaces are and how they are used in C#?**

Namespaces are used to organize code into a hierarchical structure, preventing naming conflicts.

**7. Explain the concept of boxing and unboxing in C#.**

Boxing is converting a value type into a reference type (object). Unboxing is the reverse process.

**8. What is Type Casting and what are its types in C#?**

Type Casting is converting a variable from one type to another. Types include Implicit and Explicit Casting.

**9. What are operators in C# and can you provide examples?**

Operators perform operations on variables and values. Types include Arithmetic, Comparison, and Logical Operators.
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10. What is the difference between == operator and Equals() method?

== compares the values, while Equals() can be overridden for custom equality logic.

11. What is the purpose of the var keyword in C#?

The var keyword allows the compiler to infer the type of a variable based on the assigned value.

12. What are the differences between const and readonly keywords?

const values are set at compile time and cannot be changed. readonly values can be set at runtime.

13. How does checked and unchecked context affect arithmetic operations?

Checked context throws an exception on overflow; unchecked ignores it.

14. What are the different ways to handle errors in C#?

Use try-catch blocks, throw exceptions, and finally blocks to handle errors.

15. Explain the role of the garbage collector in .NET.

The garbage collector automatically manages memory, freeing up unused resources to optimize performance.