# C# Programming

## Chapter 1: Introduction and Environment Setup

* Introduction to C# Programming Language
* .NET Environment Setup
* Download and Install Visual Studio 2022
* Creating First Console Application using Visual Studio

## Chapter 2: C#.NET Basics, Input and Output

* Basic Structure of a C# Program
* Methods and Properties of the Console Class in C#
* Data Types, Variables, and Literals in C#
* Type Casting in C#
* Control Flow Statements in C#
* Loop Controls in C#
* Functions and Methods in C#
* Static vs Non Static Members in C#
* Command Line Arguments in C#
* Boxing and Unboxing in C#
* Checked and Unchecked Keywords in C#
* Nullable Types in C#
* Const and Read Only Keywords in C#
* String Handling in C#
* Properties in C#
* Exception Safe Coding Patterns in C#
* Difference Between Convert ToString and ToString in C#
* Stack and Heap Memory in C#
* Immutable Types in C#

## Chapter 3: Object-Oriented Programming in C#

* Classes and Objects in C#
* Encapsulation and Abstraction in C#
* Inheritance and Polymorphism in C#
* Method Overloading and Overriding in C#
* Constructor and Destructor in C#
* Access Modifiers in C#
* Static Classes and Members in C#
* Sealed Classes in C#
* Partial Classes and Methods in C#
* Interfaces vs Abstract Classes in C#

## Chapter 4: Advanced C# Concepts

* Delegates and Multicast Delegates in C#
* Events and Event Handling in C#
* Lambda Expressions in C#
* Anonymous Methods in C#
* LINQ Basics and Queries in C#
* Extension Methods in C#
* Indexer and Enumerators in C#
* Generics collection in C#
* Dynamic Type in C#
* Nullable Reference Types in C#

## Chapter 5: Exception Handling

* Try, Catch, Finally Blocks in C#
* Multiple Catch Blocks in C#
* Throwing Exceptions in C#
* Custom Exceptions in C#
* Using Statements for Resource Management in C#

## Chapter 6: File IO and Serialization

* File and Directory Operations in C#
* Reading and Writing Text Files in C#
* Binary File Operations in C#
* JSON Serialization and Deserialization in C#
* XML Serialization and Deserialization in C#

## Chapter 7: Collections and Data Structures

* Arrays and Lists in C#
* Dictionary, HashSet, Stack, Queue in C#
* SortedList and LinkedList in C#
* IEnumerable and IEnumerator in C#
* ObservableCollection in C#

## Chapter 8: Multithreading and Asynchronous Programming

* Thread Class and ThreadStart Delegate in C#
* Thread Pooling in C#
* Tasks and Parallel Programming in C#
* async and await in C#
* CancellationToken in C#
* Deadlock and Synchronization in C#

## Chapter 9: Unit Testing in C#

* Introduction to Unit Testing in C#
* Test Driven Development in C#

## Chapter 11: C# Best Practices

* SOLID Principles in C#
* Design Patterns in C#