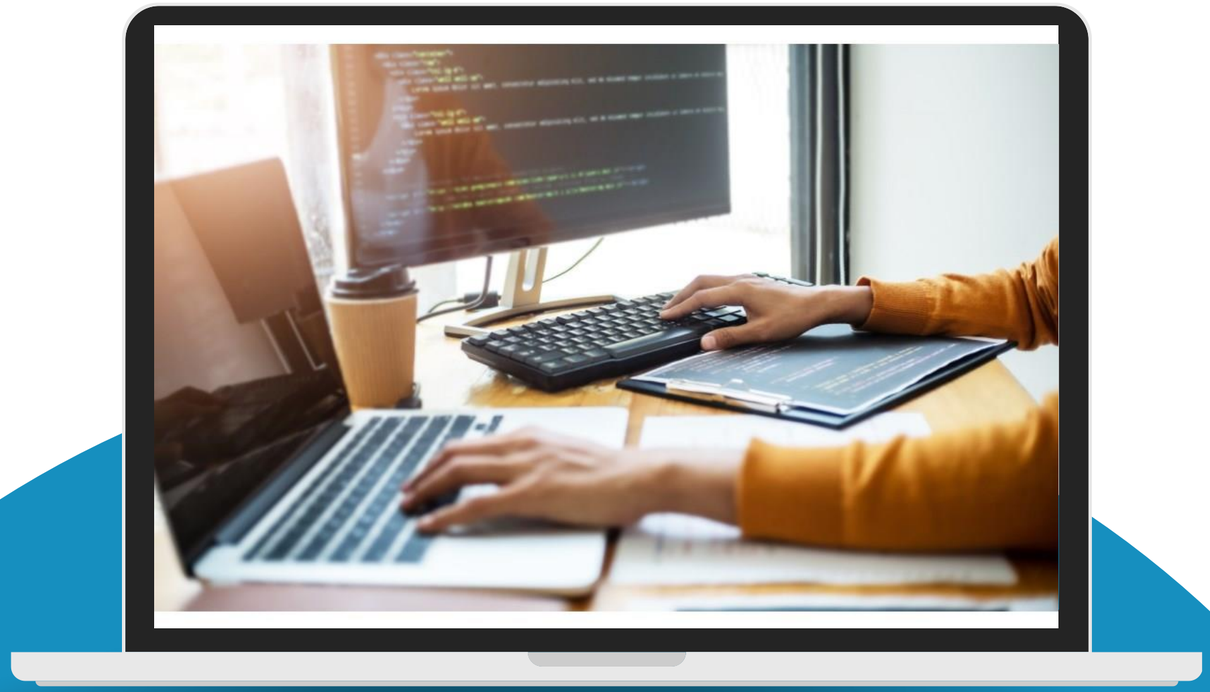
INDUSTRY CONNECT

Gateway to Your IT Career

Software Developer Job Ready Programme



Agenda

Week 1

Day 1

- Object-Oriented programming
- Four basic principles

Day 2

- What is a Class
- Value types versus Reference types
- Class declaration
- Constructors and initialization

Day 3

- SOLID Principles
- Why SOLID Principles

Object-Oriented programming (C#)

Any fool can write code that a computer can understand. Good programmers write code that humans can understand.

- Martin Fowler

Refactoring: Improving the Design of Existing Code by Martin Fowler, Kent Beck (Contributor), John Brant (Contributor), William Opdyke, don Roberts

C# is an object-oriented programming language. The four basic principles of object-oriented

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism

Abstraction

In C#, abstraction is implemented using abstract classes and methods.

An abstract class is a class that cannot be instantiated, and must be inherited by a derived class in order to be used.

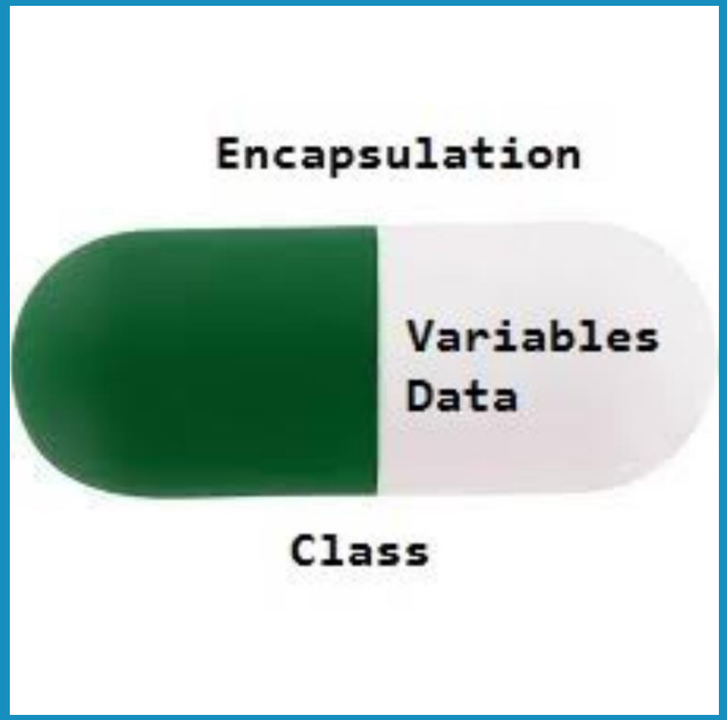
```
abstract class MyAbstractClass
{
    public abstract void Method1();
    public abstract int Method2(int value);
}

class MyClass : MyAbstractClass
{
}
```

Encapsulation

Encapsulation is the hiding the internal state and functionality of an object and only allowing access through a public set of functions.

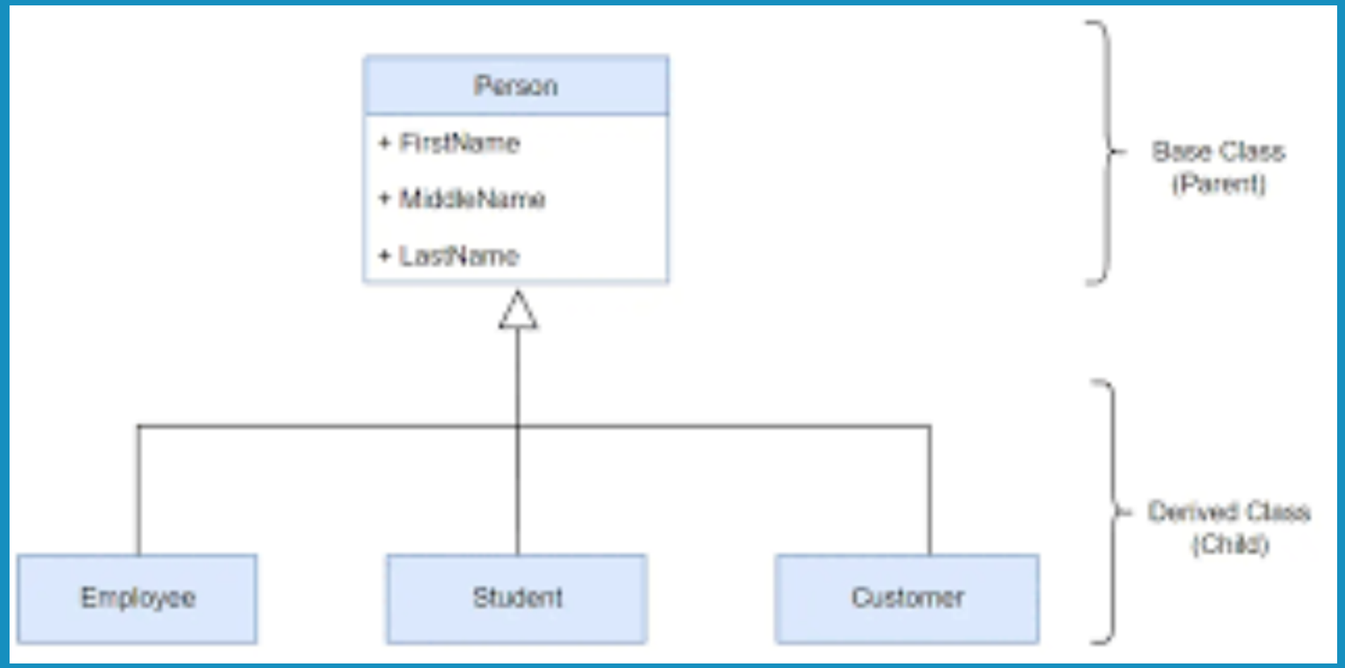
It refers to the bundling of data and related operations into a single unit, or object. In C#, encapsulation is achieved through the use of classes and access modifiers such as public, private, and protected.



Inheritance

Ability to create new abstractions based on existing abstractions.

Conceptually, a derived class is a specialization of the base class. For example, if you have a base class Animal, you might have one derived class that is named Mammal and another derived class that is named Reptile. A Mammal is an Animal, and a Reptile is an Animal, but each derived class represents different specializations of the base class.



Polymorphism

Ability to implement inherited properties or methods in different ways across multiple abstractions.

Polymorphism is a Greek word that means "many-shaped"

That is, the same entity (method or operator or object) can perform different operations in different scenarios.

```
public class Line : DrawObj
{
    public override void Draw()
    {
        System.Console.WriteLine("This is the Draw() method of Line");
    }
}

public class Circle : DrawObj
{
    public override void Draw()
    {
        System.Console.WriteLine("This is the Draw() method of Circle");
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}

public class Square : DrawObj
{
    public override void Draw()
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}
```

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}
```

Advantages of OOP

- Simplifying debugging
- Harnessing code reusability for enhanced efficiency
- Amplifying productivity through OOP practices
- Streamlining data management to reduce redundancy
- Problem-solving capabilities
- Enhanced security measures
- Improved code structuring and organisation

Introduction to C#

The C# language is the most popular language for the .NET platform, a free, cross-platform, open source development environment. C# programs can run on many different devices, from Internet of Things (IoT) devices to the cloud and everywhere in between. You can write apps for phone, desktop, and laptop computers and servers.

C# programs consist of one or more files. Each file contains zero or more namespaces. A namespace contains types such as

- classes
- structs
- interfaces
- enumerations
- delegates

Helpful links

A tour of the C# language - https://learn.microsoft.com/en-us/dotnet/csharp/tour-of-csharp/overview

Fundamentals for beginners - https://learn.microsoft.com/en-us/shows/csharp-fundamentals-for-absolute-beginners/