What is Gang of Four (GOF)?

In 1994, four authors Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides published a book titled **Design Patterns - Elements of Reusable Object-Oriented Software** which initiated the concept of Design Pattern in Software development.

Design Patterns are best software practices used by Software Developers in solving recurring problems in Software Development. They aren’t code-related but rather a blueprint to use in designing a solution for a myriad of use cases.

* **Creational Pattern:** These are patterns that pertain to object creation and class instantiation they help in the reuse of an existing code. The major creational patterns are Factory Method, Abstract Factory, Builder, Prototype, and Singleton.
* **Structural Pattern:** These are patterns that help simplify the design by identifying a way to create relationships among entities such as objects and classes. They are concerned with how classes and objects can be assembled into larger structures. Some of the design patterns that fall into this category are: Adapter, Decorator, and Proxy.
* **Behavioral Pattern:** These are patterns that are concerned with responsibilities among objects in order to help increase flexibility in carrying out communication. Some of these patterns are Observer, Memento, and Iterator

Oops

## class

It is an identifiable entity that can have some descriptive properties. It is a user-defined data type that holds data members and member functions in a single unit. It is like a blueprint of an object.  
For example, consider an entity “Laptop” , what attributes, you can think of? RAM, OS, memory, manufacturer name, model name and so on.

## Object

Any entity that has state and behavior is known as an object. For example, a chair, pen, table, keyboard, bike, etc. It can be physical or logical.

An Object can be defined as an instance of a class.

**Example:** A dog is an object because it has states like color, name, breed, etc. as well as behaviors like wagging the tail, barking, eating, etc

Inheritance:  
The ability to inherit the properties of one class to another, or inherit the properties from a base class to an inherited class is known as the concept of Inheritance.  
With the help of inheritance, we can use the data members and member functions of a class to another.

[Encapsulation](https://www.geeksforgeeks.org/encapsulation-in-c/): In normal terms, Encapsulation is defined as wrapping up of data and information under a single unit. In Object-Oriented Programming, Encapsulation is defined as binding together the data and the functions that manipulate them.

**Abstraction** means displaying only essential information and hiding the details

[Polymorphism:](https://www.geeksforgeeks.org/polymorphism-in-c/) The word polymorphism means having many forms. In simple words, we can define polymorphism as the ability of a message to be displayed in more than one form.

A person at the same time can have different characteristic. Like a man at the same time is a father, a husband, an employee.

### **Overloading**

Same function name can be used for multiple purpose based of it parameter number and types.

### **Function Overriding in C++**

When a member function of a base class is redefined in its derived class with the same parameters and return type, it is called function overriding