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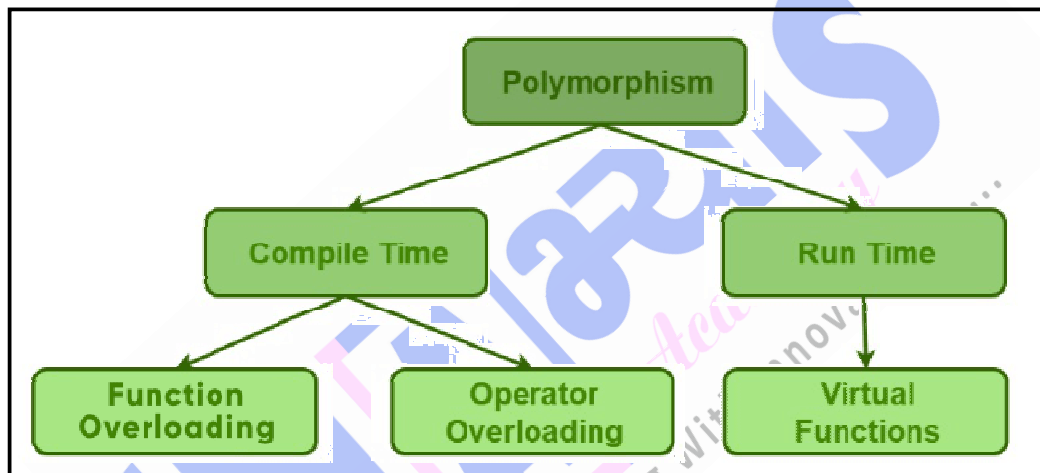
Introduction to 'C++' Language

Polymorphism in C Plus Plus

Module 1 - Introduction to Polymorphism in C Plus Plus

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 real-life example of polymorphism is a person who at the same time can have different characteristics. A man at the same time is a father, a husband, and an employee. So the same person exhibits different behavior in different situations. This is called polymorphism. Polymorphism is considered one of the important features of Object-Oriented Programming.

The word "polymorphism" comes from the Greek words *poly* (many) and *morph* (forms), meaning "many forms."



Types of Polymorphism

1. Compile-time Polymorphism
2. Runtime Polymorphism

1. Compile-Time Polymorphism

This type of polymorphism is achieved by function overloading or operator overloading.

A. Function Overloading

When there are multiple functions with the same name but different parameters, then the functions are said to be overloaded, hence this is known as Function Overloading. Functions can be overloaded by changing the number of arguments or/and changing the type of arguments. In simple terms, it is a

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feature of object-oriented programming providing many functions that have the same name but distinct parameters when numerous tasks are listed under one function name.

B. Operator Overloading

C++ has the ability to provide the operators with a special meaning for a data type, this ability is known as operator overloading. For example, we can make use of the addition operator (+) for string class to concatenate two strings. We know that the task of this operator is to add two operands. So a single operator '+', when placed between integer operands, adds them and when placed between string operands, concatenates them.

Runtime Polymorphism

This type of polymorphism is achieved by Function Overriding. Late binding and dynamic polymorphism are other names for runtime polymorphism. The function call is resolved at runtime in runtime polymorphism. In contrast, with compile time polymorphism, the compiler determines which function call to bind to the object after deducing it at runtime.



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Difference between Inheritance and Polymorphism:

S.NO	Inheritance	Polymorphism
1.	Inheritance is one in which a new class is created (derived class) that inherits the features from the already existing class(Base class).	Whereas polymorphism is that which can be defined in multiple forms.
2.	It is basically applied to classes.	Whereas it is basically applied to functions or methods.
3.	Inheritance supports the concept of reusability and reduces code length in object-oriented programming.	Polymorphism allows the object to decide which form of the function to implement at compile-time (overloading) as well as run-time (overriding).
4.	Inheritance can be single, hybrid, multiple, hierarchical and multilevel inheritance.	Whereas it can be compiled-time polymorphism (overload) as well as run-time polymorphism (overriding).
5.	It is used in pattern designing.	While it is also used in pattern designing.
6.	Example : The class bike can be inherit from the class of two-wheel vehicles, which is turn could be a subclass of vehicles.	Example : The class bike can have method name set_color(), which changes the bike's color based on the name of color you have entered.

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