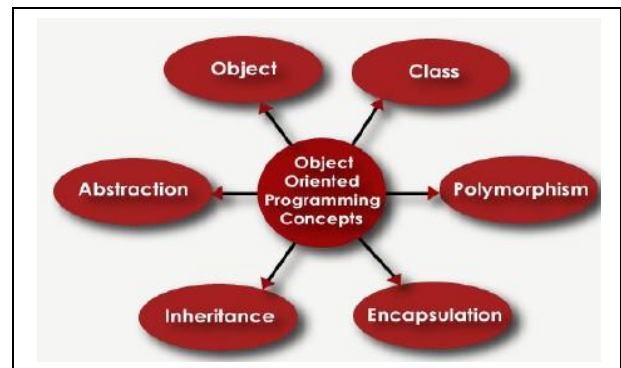


What is OOP? List OOP Concepts.

- OOP stands for Object-Oriented Programming.
- Procedural programming is about writing procedures or functions that perform operations on the data, while object-oriented programming is about creating objects that contain both data and functions.
- OOP treats data as critical element in program development and does not allow it to flow freely around the system.
- In procedural-oriented programming, you cannot reuse the code again in the program, and there was the problem of global data access, and the approach couldn't solve the real-world problems very well.
- In object-oriented programming, it is easy to maintain the code with the help of classes and objects. Using inheritance, there is code reusability, i.e., you don't have to write the same code again and again, which increases the simplicity of the program. Concepts like encapsulation and abstraction provide data hiding as well.

❖ Basic Concepts of Object-Oriented Programming (OOPS).

1. Objects
2. Classes
3. Data abstraction
4. Data encapsulation
5. Inheritance
6. Polymorphism
7. Dynamic Binding

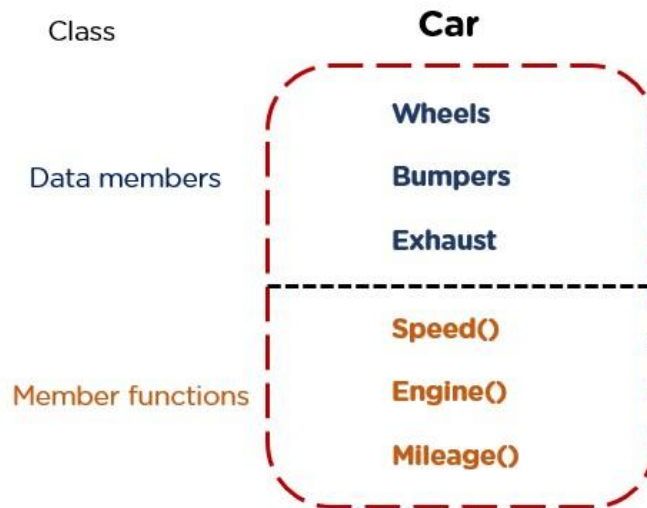


❖ Object

- An Object can be defined as an entity that has a state and behavior, or in other words, anything that exists physically in the world is called an object. It can represent a dog, a person, a table, etc.
- An object means the combination of data and programs, which further represent an entity.

❖ Class

- Class can be defined as a blueprint of the object. It is basically a collection of objects which act as building blocks.
- A class contains data members (variables) and member functions. These member functions are used to manipulate the data members inside the class.



❖ Data abstraction

- Abstraction helps in the data hiding process. It helps in displaying the essential features without showing the details or the functionality to the user. It avoids unnecessary information or irrelevant details and shows only that specific part which the user wants to see.

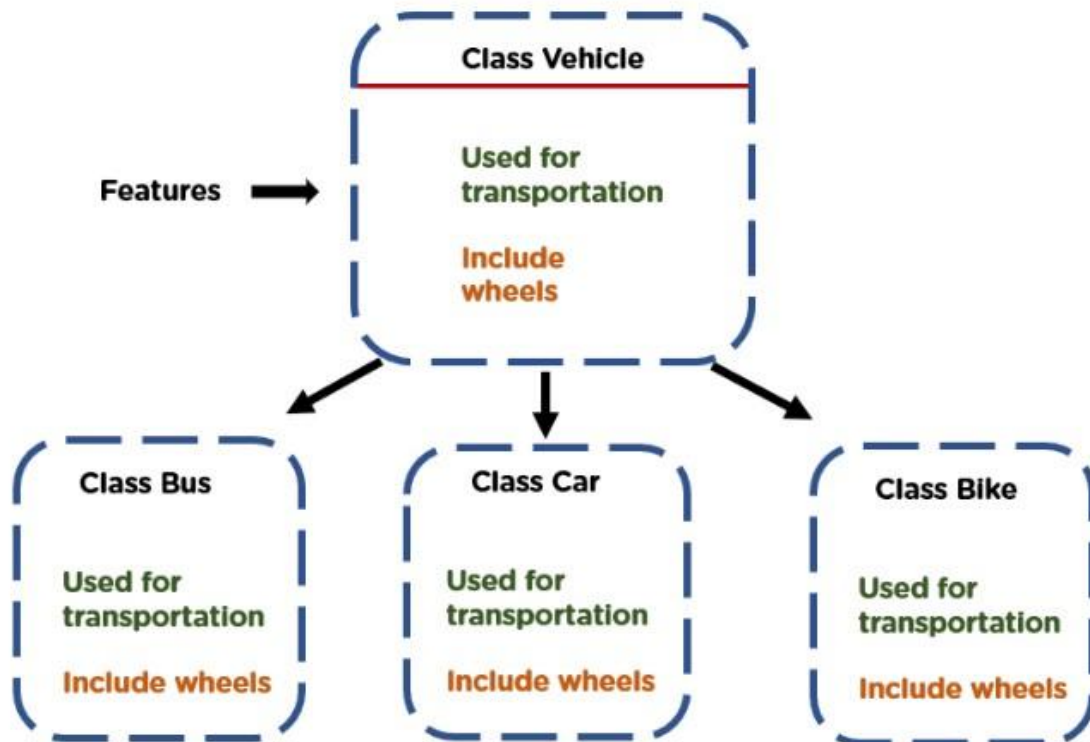
❖ Data encapsulation

- The wrapping up of data and functions together in a single unit is known as encapsulation. It can be achieved by making the data members' scope private and the member function's scope public to access these data members. Encapsulation makes the data non-accessible to the outside world.



❖ Inheritance

- Inheritance is the process in which two classes have an is a relationship among each other and objects of one class acquire properties and features of the other class. The class which inherits the features is known as the child class, and the class whose features it inherited is called the parent class. For example, Class Vehicle is the parent class, and Class Bus, Car, and Bike are child classes.



❖ Polymorphism

- Polymorphism means many forms. It is the ability to take more than one form. It is a feature that provides a function or an operator with more than one definition. It can be implemented using function overloading, operator overload, function overriding, virtual function.

❖ **Dynamic Binding**

- Dynamic binding is the connection between the function declaration and the function call.
- A virtual function is a member function declared in a base class and re-declared in a derived class (overridden). You can execute the virtual function of the derived class when you refer to its object using a pointer or reference to the base class. The concept of dynamic binding is implemented with the help of virtual functions.
- **Usage :-** It is also possible to use dynamic binding with a single function name to handle multiple objects. Debugging the code and errors is also made easier and complexity is reduced with the help of Dynamic Binding.