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Chapter 5 Object oriented programming (oop)

1. What is oop? List the advantages and disadvantages of oop.

→ oop (Object oriented programming) is a programming language which focuses on data rather than procedure. It supports inheritance, so it is easy to reuse the code.

Advantages of oop

1. System can be easily upgraded from small to large systems.
2. software complexity can be easily managed.
3. New data and functions can be easily added whenever necessary.
4. code reusability is possible due to the feature of inheritance.
5. The data hiding concept helps the programmer to create secure programs.

Disadvantages of oop

1. Use of oop is wastages of time in the case of small projects.
2. Object oriented programs are ~~high~~ much larger than other programs.

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3. Object oriented programs are slower because of their size.
4. programmers have to think differently.
5. It needs lots of testing procedures.

2. What is OOP? Explain the feature of OOP.

→ OOP is a programming language which focuses on data rather than procedure. It supports inheritance, so it is easy to reuse the code.

The features of OOP are as follows:-

a. Class: (A class is a the collection of similar kinds of objects. A class is a data type.) It is a templete that unites member data and member functions. It is the prototype or modal. (It does not occupy memory location. A class is the well description of object.)

vehicle class; attributes (member data):
Name, model, color, height
Behaviours (member functions):
start(), stop(), accelerate()

b. Object: (An object may be a person, a place, a bank account, or any item that the program must

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handle.) An object is an instance of class. It gives life to a class. It occupies memory location.

c. **Encapsulation:** The wrapping up of member data and member function into a single unit is called encapsulation.) The data is not accessible from outside of class. That is data can be hidden making them private so that it is safe from accidental alternation. only member function can access data on that class.

d. **Data Abstraction:** Abstraction is representing essential features of an object without including the background details or explanation.) In OOP, abstraction is achieved by the help of class, where data and function are combined to extract the essential features only.

e. **Inheritance:** Inheritance is the process by which one class acquires the characteristics or property of another class.) Inheritance is the process of creating new classes from the existing classes. New class is called derived class and existing class is called base class.

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7. **Polymorphism:** The word polymorphism is derived from the latin word 'poly' means 'means' 'many' and 'morph' means 'form'. Polymorphism means "having many forms." (polymorphism means that the same functions may behave differently in different classes.) example of polymorphism in OOP is operator overloading, function overloading.)

3. Differentiate between OOP and structured Programming language (POP).

OOP or event-driven Program	POP or structured Programming language
1. It uses a bottom-up development process.	It uses a top-down development process.
2. class and object are the main ideas of OOP.	Function is the main idea of POP.
3. In OOP, focus is given to data than the procedure.	Focus is given to the procedure.

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4.	It includes features such as data abstraction, encapsulation, polymorphism, and inheritance.	It doesn't include such features.
5.	New data and functions can be easily added when ~~they are required~~ - ever necessary.	Difficult to add new data and function
6.	Easy to reuse program code.	It doesn't have any mechanism for reusing program code.
7.	Example of OOP language: C++, Java, C#, VB.Net, etc.	Example of a structured programming language: C, FORTRAN, COBOL, etc.

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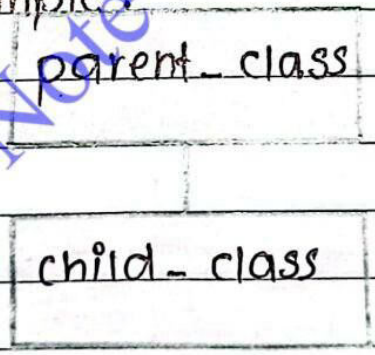
4. Describe the inheritance concept with an example.

→ Inheritance is the property that allows the reuse of an existing class to build a new class.

Types of Inheritance

1. Single inheritance: Under this type of inheritance, there is a derived class with only one base class ie., if a child class is built from only one parent class, then this type of inheritance is called single inheritance.

For example:



2. Multi inheritance: Under these types of inheritance, the derived class has several base classes. If a child class is built from two or more than two parent classes, then this type of inheritance is called multi inheritance.

For example:

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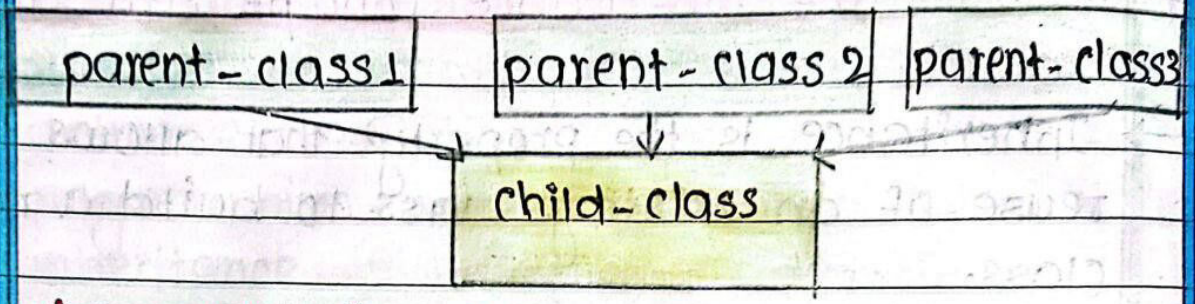

3. Hierarchical inheritance: under this type of inheritance, the behaviour of one class may be derived by more than one class.

4. Multiple inheritance: under this type of inheritance, the mechanism of deriving a class from another derived class.

Example of polymorphism

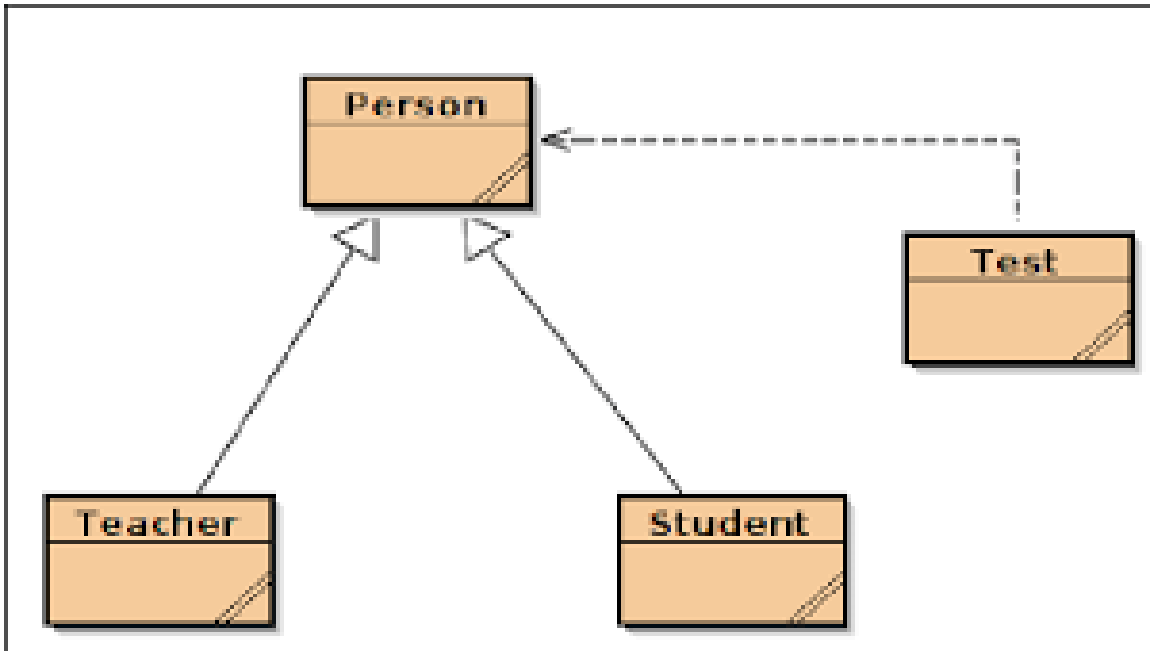

Fig: Polymorphism