Tender Heart High School, Sec 33B, Chandigarh

Class X Subject Computer Application Date 08.04.2024

Topic: Revision of Elementary concept of objects and classes

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Good Morning

This lesson is for class 10 for the subject of Computer Application. Topic - Revision of Elementary Concept of objects and classes, values and types, Conditionals and non-nested loops.

Object oriented Programming is a type of programming which uses objects and classes in its functioning. The object oriented Programming (OOP's) is based on real world entities like inheritance, Polymorphism etc and Java is an object oriented Programming. for eg. in real life, a car is an object. The car has attributes, such as weight and colour, and methods, such as drive and brake. A class is like an object constructor, or a "blueprint" for creating objects.

OOP does not allow data to flow freely from function to function and Procedure to Procedure. In this system, the complete problem is broken into number of entities called objects. These objects are created and maintained along with a set of related data.

Features of object Oriented Programming (OOP)

* OOP restricts the free movement of data and the functions that operate on it.
* The program resulting from OOP is collection of objects
* It gives more emphasis on data rather than procedure.
* It makes the complete program simple by dividing it into a number of objects.
* The objects may communicate with each other through functions.

Basic Elements of OOP (Object Oriented Programming)

- Objects
- Classes
- Data Abstraction
- Encapsulation
- Inheritance
- Polymorphism
- Data Hiding

1. Objects

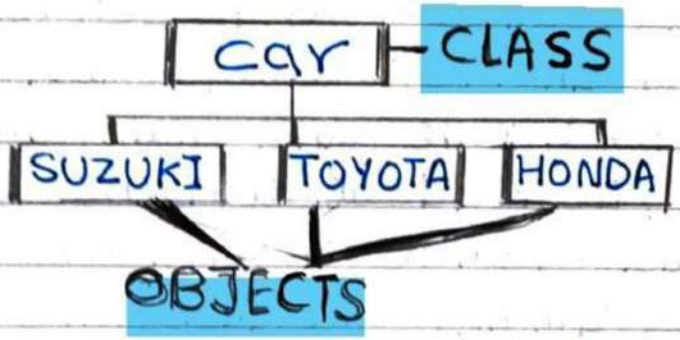
An object is an identifiable entity that has Properties for identifying its State, Methods for Behavior. Data associated at any given instance of time is the state of an object. Every Object will different from other objects either by State or behavior. The objet has the following characteristics:-

1. It has a State (instance variable)
2. It represent behaviour (instance method) such as deposit(), withdraw() etc.
3. object is an Instance of a class.
4. object has a lifetime - It is created, used and destroyed.

In OOP a complete program is split into a number of segments called objects. Each segments contains data and related methods. The data elements of one object are only accessed through methods of the same object. In this way free flowing of data is restricted throughout the program. However objects may interact with each other through the methods. An object acts as a bridge for communication

2. Class

A class is a template / blueprint for creating an object. Class is a collection of the common type of the information or we can say Class is the collection of the objects that has common properties.



With this example we got an idea of class and objects with reference to object oriented programming.

3. Data Abstraction

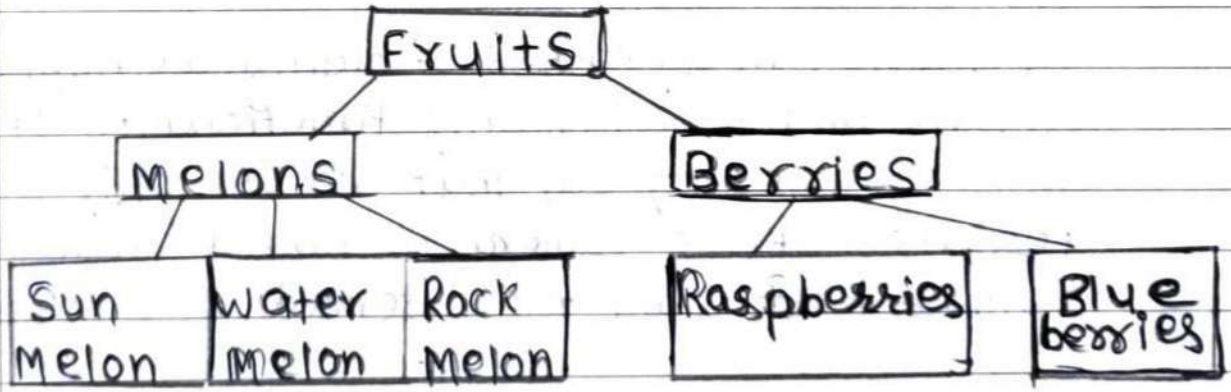
Abstraction is a process of hiding the Implementation details and Showing only functionality of the user. So, we may say that we use only the essential features of the Camera to take a photograph without ~~k~~knowing the internal mechanism.

4 Encapsulation

Encapsulation is a mechanism of wrapping the data (variables) and code acting on the data (methods) together as a single unit. Encapsulation in OOP restrict the free flow of data. However, the data can be accessed through functions which are combined along with the Class.

5. Inheritane

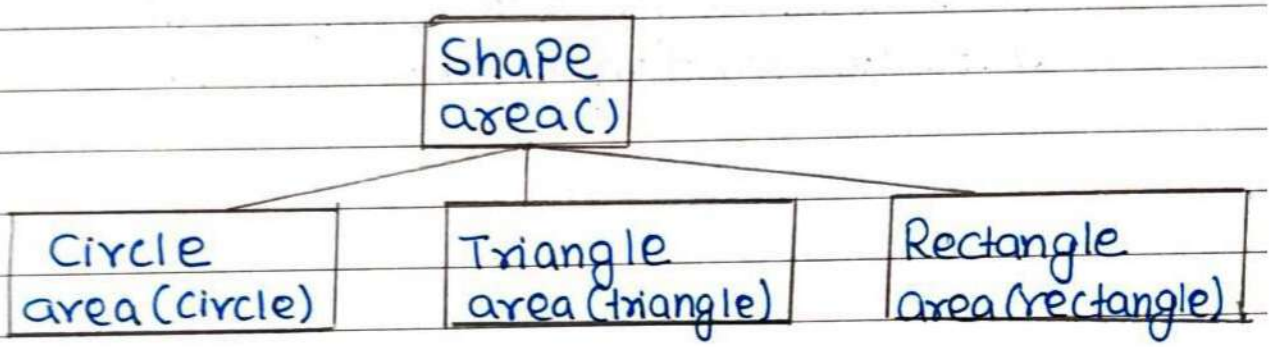
The term inheritane means to link and share some common properties of one class with other class. This can be done by extending the obects of one class into another class and using through it.
Inheritace allows us to define a class in terms of another class, which makes it easier to create and maintain. when creating a class, instead of writing completely new data members and member functions, the programmar can designate that the new class should inherit the members of an existing class. Hence, reusability is one of the important features of inheritance.



So, in this example we see that class 'fruit' which can broadly classified as Melons and Berries. ~~have~~ same properties of the class fruits will be inherited by the clauses Melons and Berries

6. Polymorphism

Polymorphism means "many forms" and it occurs when we have many classes that are related to each other by inheritance. So, we can say polymorphism is the process of using a function/ ~~contact~~ method for more than one purpose.



In this example function name is areaC and we can calculate the area of different figures. Polymorphism is one of the oop principles which supports function overloading because in above example we have same function name areaC() but with different parameters.

7. Data Hiding

The process of creating logical insulation between data and outside world is known as Data Hiding.

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Answer the following:

Q1. What do you understand by the term data abstraction? Explain with example.

Q2 What is the difference between an object and a class?

Q3 What does reusability mean?

Q4 Why is 'data Hiding' required?

Q5 In what ways are Encapsulation and Data Abstraction inter-related?