Tender Heart High School, Sec-33B, Chandigarh

Class IX   Computer Application

Topic- Elementary Concept of Objects and Classes[Ch-2]

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Objects means a real world entity such as pen, chair, table etc. OOp is a method to design a program using classes and objects. It simplifies the software development and maintenance by providing some concepts:

- Object   * Polymorphism
- Class   * Abstraction
- Inheritance   * Encapsulation

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.

Objects are further categorised in two ways:
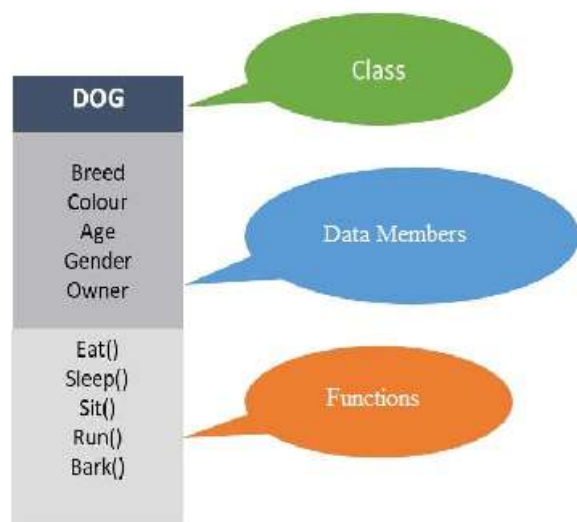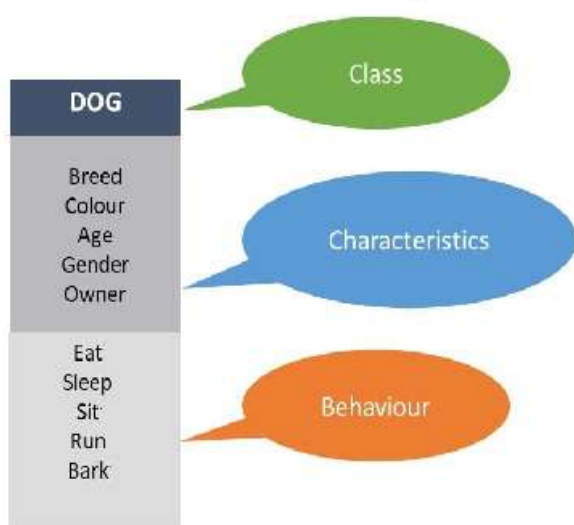 • Real World object
  • Software object

Real world object	Software object
Object Name : Book Characteristics : pages Chapter Paragraphs Topics	Student Data members : Name Roll no. Subject Marks
Behaviour : used to read used for knowledge.	Functions : Accept () Display ()

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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

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Creating objects of a class

An objects is also called an instance of th class. A single class may have any number of instances.

Syntax of creating an object of a class:

<Class Name><object Name> = new <class Name>( );

Eg.   Car Maruti = new Car( );
     Here each object of Class car shows different characteristics but common behaviour as defined within the class Car. The steps to create an object are :
     + Declaration : uses class datatype with object
     + Instantiation: Creating an object
     + New : The keyword 'new' is used for allocating space in memory for storage of an object.

ll a sample program to create different objects through methods:

```java
public class CreateObjectExample1          class name
{
void show()    method/function
{
System.out.println("Welcome to javaTpoint");
}
public static void main(String[] args)
{
//creating an object using new keyword
CreateObjectExample1 obj = new CreateObjectExample1();
//invoking method using the object
obj.show();    calling/invoking of funcion with object obj
}
}
```

When objects passing and receiving information with another object through functions is known as Message passing.

Important terms related to class

1. A class can create objects of itself with different characteristics and common behaviour just like a factory can produce similar items based on a particular design. Hence, class is also referred to as 'Object Factory'.

2. A class is a data type that restricts access to its data to a set of procedures. These procedures control the ways that an instance of a class (an object) is initialized, accessed, and finally deleted when it is no longer needed.

3. An instance of a class is an object. It is also known as a class object or class instance. As such, instantiation may be referred to as construction. Whenever values vary from one object to another, they are called instance variables.

Object	Class
An object is a real-world entity that is used for unique representation. It has a certain behavior, state, and identity.	A Class is a collection of similar types of objects. Classes are composed of names, attributes, and methods.
An object is known as an "instance of a class".	A class is known as "a blueprint of an object"
They are physical entities.	They are logical entities.
Objects are created using the "new" keyword.	Classes are created using the "class" keyword.
It consumes some memory space.	It does not occupy any memory space.
We can create objects as many times as we want according to our requirements.	We can create a class only once.

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Fill in the blanks

1 Class   2 Object .   3 class   4 instantiation   5 blueprint   6 new
7 entities.   8 behaviour.

Answer the following questions

1   An object is an entity having a specific identity, specific characteristics and specific behavior. Taking a car as an example of an object, it has characteristics like colour, model, version, registration number, etc. It has behaviours like start the engine, stop the engine, accelerate the car, apply the brakes, etc.

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(a) Class Employee

Characteristics	Methods
Name	computeSalary()
Employee Number	computeTax()
Pan Number	
Salary	
Income Tax	

(b) Class Bank

Characteristics	Methods
Bank Name	openAccount()
Bank Address	depositMoney()
IFSC Code	
MICR Code	
Accounts	

(c) Class Book

Characteristics	Methods
Book Name	buyBook()
ISBN Number	readBook()
Price	
Author	
Publisher	

3   An object is an entity having a specific identity, specific characteristics and specific behavior. Examples — car, bottle, mobile phone, computer, student.

4   A software object replaces the characteristics and behaviours of a real world object with data members and member methods, respectively.

5   A Class is used to create various Objects that have different characteristics and common behaviours. Each object follows all the features defined within a class. That is why class is also referred to as a blue print or prototype of an object. This way we can say that they are inter-related.

6   A class has the complete description of the data elements the object will contain, the methods the object can do, the way these data elements and methods can be accessed. A class can create objects of itself with different characteristics and common behaviour just like a factory can produce similar items based on a particular design. Hence, class is also referred to as 'Object Factory'.

7   Employee staff = new Employee ( );
This statement creates a new object of class Employee. The newly created object is assigned to a variable named staff which is of Employee type. The object can be accessed using staff variable.

8   A class can create objects of itself with different characteristics and common behaviour. So, we can say that an Object represents a specific state of the class. For these reasons, an Object is called an Instance of a Class.

9   A class can contain data members of various primitive and reference data types. Hence, class is known as composite data type.

10   Computer Keyboard = new Computer();

12   Refer a class structure as shown below:

```
class MySchool {
Name
Address
Principal's name
AcceptData();
PrintData();
}
```

With reference to the above class declaration, indicate whether the following statements are True/False:
1. Acceptdata( ) is the characteristic of the class.-False
2. Address is behaviour of the class.-False
3. Acceptdata( ) and PrintData( ) are the common behaviour of the objects of class 'MySchool'.-True
4. Behaviours are the medium of inter-object communication.-True
5. Creating multiple objects of class 'MySchool' is not possible.-False

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```
class Picnic
{
  public void display1() {
    System.out.println("Venue: Botanical Garden");
    System.out.println("Place: MG Road");
    System.out.println("Reporting Time: 9:00 AM");
  }
  public void display2() {
    System.out.println("Number of Students: 50");
    System.out.println("Name of teacher: Mr. Nagabhushan");
    System.out.println("Bus Number: KA 01 1234");
  }

  public static void main(String args[]) {
    Picnic obj = new Picnic();
    obj.display1();
    obj.display2();
  }
}
```