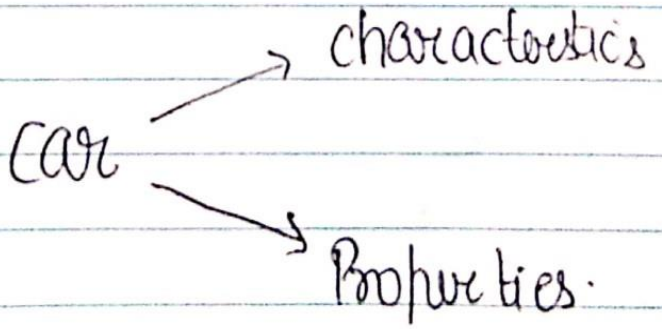
Classes & Objects.

Classes:- A class represents group of similar objects.

Def:- It is also a way bind the data describing an entity and its associated function together.

It is user defined data type, which holds its data member and member function.

for example:- Consider the class of cars. There may be many cars with different names and brand but all of them will share some common properties like they will have 4 wheels, speed limit etc. so here, car is class and wheels, speed are their properties.



⇒ Car is the class.

* Defining class

A class is defined in c++ using keyword class, followed by the name of the class.

The body of the class is defined inside the curly brackets and terminated by a semicolon at the end.

```
class classname
{
  Access specifiers :     // can be Private, Public, Protected
  data member;            // variables to be used
  member functions ()     // methods to access
  {};                             data members
};                        // ends with a semicolon
```

example:

```
class car
{
  public:
  int speed;
  void brakes ()
  { }
};
```

- Data Members:- It describes the characteristics of a class. There may be zero or more data members of any type in a class.
- Member function:- These are the set of operations that can be applied to an object of that class.
  There may be zero or more member func. for a class.
- Access specifier:- These are used to control access to members from within the program. These are of three types as private, public and Protected.

* C++ Objects

To use the data and access functions defined in the class, we need to create objects.

Objects are created from classes. Classes objects are declared in a similar way as variables are declared.

The class name must start, followed by the object name.

Declaring Objects

When a class is defined, only the specification for the object is defined; no memory or storage is allocated.

Syntax

```
classname objectname;
```

example:- `Student s1; // Creating an object of student.`

class name is the name of the class from which an object is to be created.

→ The object name is the name to be assigned to the new object.

An object has same relationship of class and Object.

Relationship of class and Object

```
class classname obj1, obj2, ..... objn;
```

* Access to member variables from Objects

- To access member variables and member functions of an object of a class, the (.) dot operator is used.

- for example, if the name of object is obj and you want to access the member function with the name printname(), then you will have to write obj.printname().

Objname . data-member
Objname . member-function

- The Public data members are also accessed in the same way. Protected
But the private and data members are not allowed to be accessed directly by the object.

- Accessing member variable depends on the access control of that member var.

- This access control is given by Access modifier in C++.

There are three access modifiers.
Public, Private and Protected.

(i) Accessing Public Data member, can be easily accessed using the (.) operator with the object of that class.

Example:

```
class Student
{
  public :
  int rollno;
};
void main()
{
  Student A;
  Student B;
A.rollno = 1;
B.rollno = 2;

cout << "Rollno of A is :" << A.rollno;
cout << "Rollno of B is :" << B.rollno;
getch();
}
```

(ii) Accessing Private member variable or function cannot be accessed, or even viewed from outside the class.

Only the class and friend function can access private members.

By default all the members of a class would be private.

Example :-
```
class Box
{
    int width;   <- private by default
public:
    int length;
    void getdata();
};
```

iii) Accessing Protected data members, can be accessed directly using dot (.) operator inside the subclass of the current class.

// Program for :- class and object relationship
accessing of data member and member fun.

```
#include<iostream.h>
#include<conio.h>
class sample
{
private :
```

```
    int rollno;
public:
    void readdata (int rn)
    {
    rollno = rn
    }
    void show()
     {
        cout<< rollno;
     }
};
 void main()
  {
  class sample s1,s2;
  s1.readdata(101);
  s2. readdata (1501);
 cout<< " Rollno of BCA-I is:";
 s1.show();
 cout<<" Rollno of BCA-II is";
 s2.show();
 getch();
}
```

Output :- Rollno of BCA-I is 101.
Rollno of BCA-II is 1501