Chapter 10 – Inheritance(One Question)

One Sentence Question and Answer

1. **What is inheritance?**
   Inheritance is the capacity of class which accepts/inherit the properties from another class is known as an inheritance.
2. **What is Base Class? Or What is Super class?**
   It is the class whose properties are inherited by another class. It is also called Superclass.
3. **What is Derived Class? Or What is Sub class?**
   It is the class that inherits the properties from base class. It is also called Subclass.
4. **Write the advantages of inheritance?**
   - Memory can be utilized properly
   - Faster development time
5. **In order to achieve an inheritance how many minimum class we required?**
   Minimum 2 class we require to achieve an inheritance.
6. **For which class we can create an object in inheritance concept?**
   For derived class we can create an object in inheritance concept.
7. **What is abstract class?**
   An abstract class is one that is not used to create objects. An abstract class is designed only to act as a base class (to be inherited by other classes).
8. **Write the syntax of derived class in an inheritance?**
   classderive_class_name : public base_class_name
   {
   .....
   .....
   };
9. **What is single level inheritance?**
   Is a process of creating a new class from existing base class. One derived class can accepts the properties from only one base class.

10.What is multilevel inheritance?

Is a process of deriving a new class from a class, which is already derived from another class.

11.What is Multiple inheritance?

Is a type of inheritance, in which one derived class can obtained the properties from 2 or more base class.

12.What is hierarchal inheritance?

2 or more derived class can obtained the properties from only one base class is known as a hierarchal inheritance.

13.What is hybrid inheritance?

It is a combination of both multiple inheritance & hierarchal inheritance, is known as a hybrid inheritance.

14. What is virtual base class?

When two or more objects are derived from a common base class, we can prevent multiple copies of the base class being present in an object derived from those objects by declaring the base class as virtual when it is being inherited. Such a base class is known as ***virtual base class***.

Multiple Choice Question and Answer

1. What is inheritance?
   a. **It is the process of acquiring the properties from one class to another.**
   b. It is the process of encapsulating the data
   c. It is the process of hiding the data
   d. All the above
2. _____ whose properties are inherited by another class?
   a. Derived class
   b. **Base class**
   c. Virtual class
   d. abstract class
3. Base class donate the properties to which class?
   a. **Derived class**
   b. Base class
   c. Virtual class
   d. abstract class
4. Base class is also called as?
   a. Derived class
   b. Boss class
   c. **Super class**
   d. Sub class

5. _____ inherit the properties from base class?
   a. **sub class**
   b. super class
   c. Virtual class
   d. abstract class
6. the sub class is the another name for ____
   a. Virtual class
   b. Base class
   c. abstract class
   d. **Derived class**
7. Which operator shows the derivation from base class?
   a. :: b. , c. ↓ d. **:**
8. In order to achieve inheritance how many minimum class we needed?
   a. **2** b. 1 c. 3 d. 4
9. Which is not a visibility mode in inheritance
   a. private
   b. **Base class**
   c. public
   d. protected
10. Which members of base class can't be inherited to derived class?
   a. Public members
   b. Default members
   c. **Private members**
   d. Protected members
11. If a class is derived from a single base than it is known as ?
   a. Multiple inheritance
   b. Multilevel inheritance
   c. Hybrid inheritance
   d. **Single level inheritance**
12. Which mode of inheritance it is?
   a. Hierarchical inheritance
   b. **Multilevel inheritance**
   c. Hybrid inheritance
   d. Single level inheritance

13. How many types of inheritance are there?
   a. 1 b. 4 c. 3 d. **5**
14. If a class is derived from more than one base class than it is known as ?
   a. **Multiple inheritance**
   b. Multilevel inheritance
   c. Hybrid inheritance
   d. Single level inheritance
15. In inheritance for which class object can be created?
   a. Base class
   b. Abstract class
   c. **Derived class**
   d. Virtual class

16. Capability of one class acquiring properties from another class is called _____

a. Polymorphism b. Abstraction c. Overloading d. Inheritance

17.Base class is called _____

a. Sub class b. Super class c. Inherited class d. Built-in class

18.Derived class is called

a. Sub class
b. Super class
c. Main class
d. First class

19.A class whose properties are inherited by another class is

a. Sub class b. Base class c. Inherited class d. Derived class

20.A class which derives properties from another class

a. Main class
b. Base class
c. Super class
d. Derived class

21.Advantages of inheritance is

a. Reusing existing code
b. Easy to extend
c. Memory utilization
d. All the above

22.Symbol used while defining derived class

a. ::
b. ;
c. .
d. :

23.Visibility mode defines

a. Type of derivation
b. Type of data types
c. Type of function
d. None of the above

24. If no visibility mode is specified, then by default the visibility mode is
    a. Public
    b. Protected
    c. Private
    d. None of the above
25. In private inheritance public members of base class becomes members of derived class.
    a. Public
    b. Protected
    c. Private
    d. All of the above
26. _____ is a class which is not used to create an objects?
    a. Base b. derived c. abstract d. virtual
27. _____ is used In order to avoid the duplication properties inherited by same base class
    a. abstract b. virtual c. base d. derive
28. Which type of class is designed only to act as a base class?
    a. Base b. derived c. abstract d. virtual

Two or Three marks questions

1. **What is inheritance?**
   Inheritance is the capacity of class which accepts/inherit the properties from another class is known as a inheritance.
   Base Class: It is the class whose properties are inherited by another class. It is also called Super class.
   Derived Class: It is the class that inherits the properties from base class. It is also called Sub class.
2. **Write the advantages of inheritance?**
   The main advantages of Inheritance are:
   - Reusing existing code
   - Faster development time
   - Easy to maintain
   - Easy to extend
   - Memory Utilization

3. **How to create a derived class?**
   Syntax:

```
class base // base class
{
    public : data_member;
             member_function();
};
class derive : public base //derive class
{
    public : data_member;
             member_function();
};
```

4. **Explain public mode of inheritance?**
   - When a base class is inherited as public, all public members of the base class become public members of derived class.
   - The private members of the base class remain private & can't be inherited.
   - The protected members of base class become protected in derived class.
5. **Explain private mode of inheritance?**
   - When a base class is inherited as private, all public members of the base class become private members of derived class.
   - The private members of the base class remain private & can't be inherited.
   - The protected members of base class become private in derived class.
6. **Explain protected mode of inheritance?**
   - When a base class is inherited as public, all public members of the base class become protected members of derived class.
   - The private members of the base class remain private & can't be inherited.
   - The protected members of base class become protected in derived class.

7. What is virtual base class (2M/3M)

When two or more objects are derived from a common base class, we can prevent multiple copies of the base class being present in an object derived from those objects by declaring the base class as virtual when it is being inherited. Such a base class is known as ***virtual base class***.

E.g:

```
class A
{
    ----------
};
class B : virtual public A
{
    ----------
};
class C : virtual public A
{
    ----------
};
class D : public B, public C
{
    ----------
};
```

Five Marks Questions

1. **Write a simple program to demonstrate inheritance in OOPs (5M)**

```
#include<iostream.h>
#include<conio.h>
class base // base class
{
    int a; // data member
    public : void display() // member function
            {
                    a=10;
                    cout<<" value of a = "<<a<<endl;
                    cout<<"this is inside the base class\n";
            }
};
class derive : public base // derived class
{
    int b; // data member
    public : void display1() // member function
            {
                    b=20;
                    cout<<" value of b = "<<b<<endl;
                    cout<<" this is inside the derived class\n";
            }
};
void main()
{
    derive d; //object has to create for derived class only
    d.display(); // accessing base class member function using object of class
    d.display1();// accessing derived class member function using object of class
    getch();
}
```

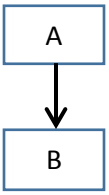
2. What is inheritance? Explain the types of inheritance?

Inheritance is the capacity of class which accepts/inherit the properties from another class is known as a inheritance.

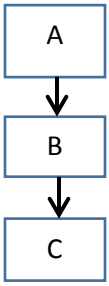
Base Class: It is the class whose properties are inherited by another class. It is also called Super class.

Derived Class: It is the class that inherits the properties from base class. It is also called Sub class.

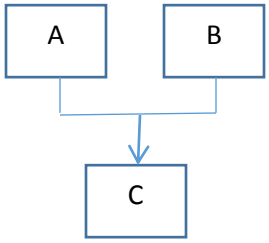
Types of Inheritance

- **Single level Inheritance :**
  - ***Single Inheritance is the process of creating a new class from existing base class.***
  - One derived class can accept the properties from base class
  - The data members and member function of the base class are data member and member function of the derived class.
  - 

  - ```
    class A // base class
    {
       …..
    };
    class B : public A // derived class
    {
       …..
    };
    ```
- **Multilevel Inheritance :**
  - ***Derivation of a class from another derived class is called multilevel inheritance.***
  - One derived class can inherit the properties from another class which is already derived.
    ```

- 

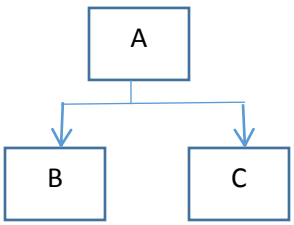
- class A // base class
  {
  …..
  };
  class B : public A // intermediate class
  {
  …..
  };
  class C : public B // derived class
  {
  …..
  };

- **Multiple Inheritance :**
  - ***A class can be derived from more than one base class is known as multiple inheritance.***
  - 

  - class A // base class 1
    {
    …..
    };
    class B // base class 2
    {
    ……
    };

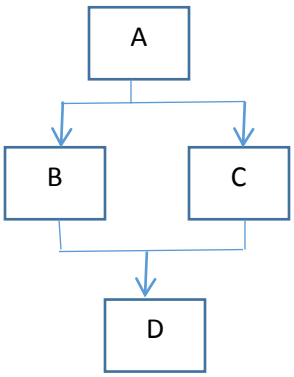
```
class C : public A, public B // derive class
{
    ……
};
```

- **Hierachical Inheritance :**
  - ***If a number of classes are derived from a single base class, it is called as hierarchical inheritance.***
  - Hierarchical model exhibits top down approach by breaking up a complex class into simpler class.




```
class A
{
    ….
};
class B : public A
{
    ……
};
class C : public A
{
    …..
};
```

- **Hybrid Inheritance :**
  - ***Hybrid Inheritance is combination of Hierarchical and multilevel inheritance.***

- 


- ```
  class A
  {
      ……
  };
  class B : public A
  {
      …..
  };
  class C : public A
  {
      ……
  };
  class D : public B, public C
  {
      …..
  };
  ```

3. Write a simple program to demonstrate single level inheritance (5M)

```
#include<iostream.h>
#include<conio.h>
class base // base class
{
   int  a;
   public : void display() // member function of base class
            {
```
```

```
                a=10;
                cout<<" Value of a ="<<a<<endl;
                cout<" this is inside the base class\n";
        }
};
class derive : public base // derive class inherits base class publically
{
   int b;
   public : void display1() // member function of derive class
        {
                b=20;
                cout<<" Value of b ="<<b<<endl;
                cout<" this is inside the derive class\n";
        }
};
void main()
{
   derive d; // object of derive class is created
   d.display(); // accessing member function of base class using object
   d.display1(); // accessing member function of derive class using object
   getch();
}
```

4. **Write Program to accept student details & to accept marks from user and calculate the total and display it back to user using single level inheritance.**

```
#include<iostream.h>
#include<conio.h>
class base
{
   private:
        int rollno;
```

```
        char name[10];
    public:
        void read( )
        {
            cout << " Enter Roll Number and Name "<<endl;
            cin >> rollno >> name;
        }
        void display( )
        {
            cout << " Roll No : " << rollno <<endl;
            cout << " Name : " << name <<endl;
        }
};
class derived : public base
{
    private:
        int m1, m2, t;
    public:
        void read1( )
        {
            cout << " Enter Maths and Computer marks "<<endl;
            cin >> m1 >> m2;
            t = m1 + m2;
        }
        void display1( )
        {
            cout << " Maths : " << m1 <<endl;
            cout << " Computer : " << m2 <<endl;
            cout << "Total Marks : " << t <<endl;
        }
};
void main( )
```

```
{
    derived obj;
    clrscr( );
    obj.read( );
    obj.read1( );
    obj.display( );
    obj.display1( );
    getch( );
}
```

OUTPUT:

```
Enter Roll Number and Name
1234
Kiran
Enter Maths and Computer marks
80
90
Roll No : 1234
Name : Kiran
Maths : 80
Computer : 90
Total Marks : 170
```