Assignment (1)

Course : Object Oriented programming using C++.

~~Name~~ :

Course Code: CAP 444

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(1.) Why copy constructor is required ? Can we overload constructor in c++? ~~Disscuss~~ Discuss with the help of example.

Ans:- When we create a new object as a copy of an existing object no other any constructor do this task that why copy constructor is required in c++.

A copy constructor is member function that initializes an object using another object of the same class. A copy constructor has, copy an object to pass it as an argument to a function and copy an object to return it form a function.

Syntax :- classname (const classname &obj)
{
// body of constructor
}

/* Demo program to illustrate copy constructor. */

#include <iostream>

using namespace std;

```
Class Copy
{
  public:
  private:
    int x, y;
  public:
    COPY ( int x1, int y1 ) // copy constructor
    {
      x = x1;
      y = y1;
    }
    // COPY constructor
    COPY ( const & c1 )
    {
      x = c1.x;
      y = c1.y;
    }
    int getdataX ( )
    {
      return x;
    }
  int getdatY ( )
  {
    return y;
```

```
    }
};
int main()
{
    COPY C1(10, 15); // Normal constructor is called
    COPY C2 = C1; // Copy constructor is called
    cout << "C1.X = " << C1.getdataX() << ", C1.Y = "
         << C1.getdataY();
    cout << "\n C2.X = " << C2.getdataX() << "C2.Y = "
         << C2.getdataY();
    return 0;
}
```

Output:

C1.X = 10, C1.Y = 15

C2.X = 10, C2.Y = 15

In C++, we have more than one constructor in a class with same name. Each has a different list of arguments. This concept is known as ~~operator~~ constructor overloading.

```
/* Demo program to illustrate constructor
overloading */

#include <iostream>
using namespace std;
class construct
{
    public:
    float area;
// constructor with no parameter
construct()
{
    area = 0;
}
// constructor with two parameters

construct(int a, int b)
{
    area = a*b;
}
void showdata();
{
    cout << area << endl;
}
```

```
};
int main()
{
construct Ob1;
construct Ob2 (10, 20);
Ob1.Shoudata();
Ob2.Shoudata();
return 1;
}
```

Output :

0
200

(3.) Differentiate between single and multiple inheritance. Also discuss about the ambiguity in the multiple inheritance. Give a program to solve the ambiguity.

Ans:- In C++, Single Inheritance and multiple inheritance ~~are~~ differences are given below :-

	Single Inheritance	Multiple Inheritance
(I)	Derived class inherits a single base class.	Derived class inherits two or more than two base class.
(II)	Syntax is :- class derived_class : access_Specifier base class.	Syntax :- Classname derived_class : access_specifier base_class1 , access_specifier base_class2, - - - .
(III)	Derived class access the features of single base class	Derived class access the combined features of inherited base classes
(IV)	visibility if Single Inheritance is public, Private and protected	visibility is public , private and protected.
(V)	It is require small amount of run time over head.	it require additional runtime overhead as compased to single inhesitance.
(VI)	It construct single Inheritance tree.	It construct Directed Acyclic Graph (DAG)

Ambiguity comes in multiple inheritace when we ~~two~~ call the function with derived class's object the compiler can't figure out which of the two functions is meant.

The ~~base~~ two base classes have functions with the same name, while a class derived from both base classes has no function with this name then ambiguity is arises.

Ambiguity can be solved with the help of scope resolution operator (::).

Syntax :-

```
Objectname.BaseClassName :: functionName();
```

```
/* Demo program to resolve ambiguity */
#include <iostream>
#include <conio.h>
class A
{
public:
void show ()
{
    cout<<"ClassA";
}
```

P.T.O

```
};
class B
{
public:
void show()
{
cout << "class B";
}
};
class C : publicA, publicB
{
};
void main()
{
C Objc; // Object of class C

Objc.show(); // give ambiguity
Objc.A::show(); // ok
Objc.B::show(); // ok.
```

(2.) Suppose there is software company and there are different departments like development, marketing, production and sales. CEO of the company want to know about the detail of the employees who are highly paid in each of department. write a program using the concept of classes to implement the same.

Ans:- /* Demo program to illustrate above concep */.

```
#include <iostream>
using namespace std;
Class Employee
{
   public:
      string name;
      double salary;
      string department;
      Employee()
      { }
   Employee(string n, double s, string d)
   {
      name = n;
      salary = s;
```