Object Oriented Programming in C++

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Static Data Members:

- Static data members are class members that are declared using **static** keyword
- Static data members have following characteristics:

i. Only one copy of that static member is created for entire class and it is shared by all the objects of that class, no matter how many objects are created

ii. Its lifetime is entire program however scope is within the class

iii. Static data members are used to maintain values common to the entire class

Static Data Members:

Syntax for declaring static data member:

```
static data_type data_member_name;
```

Syntax for static member definition:

```
datatype class_name::static_data_member_name;
```

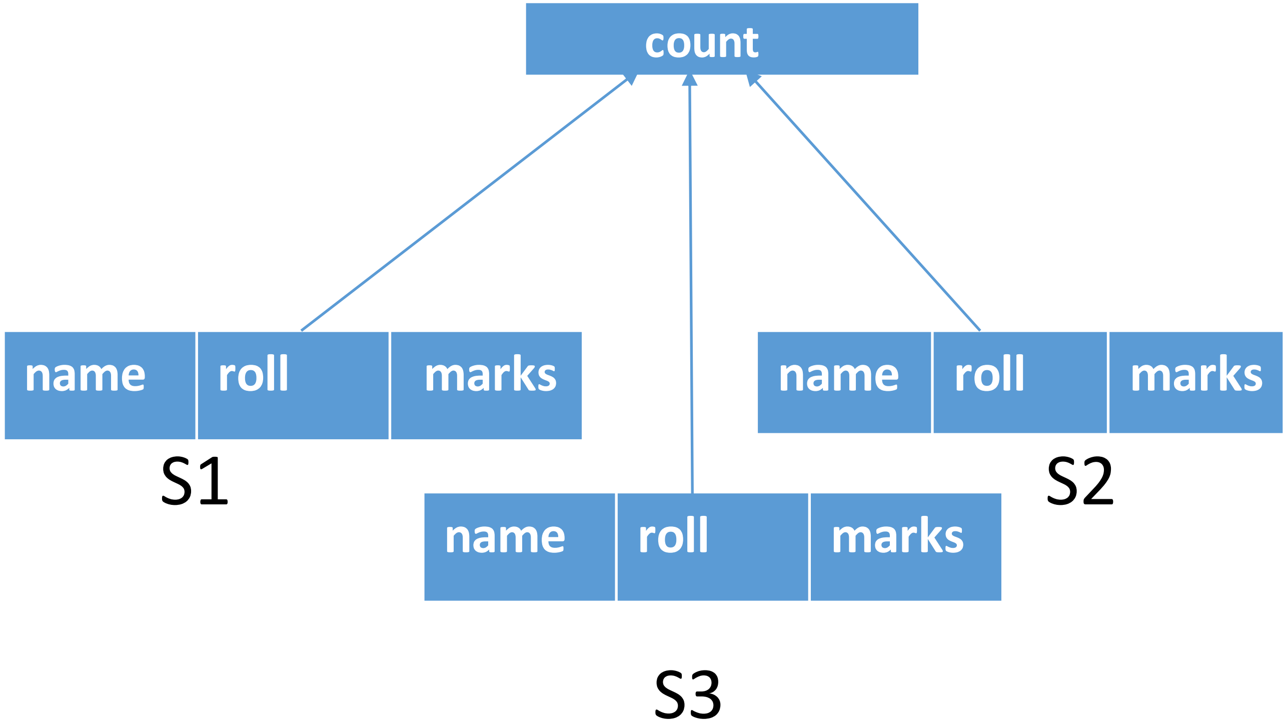
OR

```
datatype class_name::static_data_member_name=initial value;
```

Example:

```
 class Student
{
char name[20];
int roll;
int marks;
static int count; // static data member
                  // declaration

…
};
 int Student:: count; //static member definition
```



Example Program:

Compile and run the program of next page.

```
class Test
{
private:
            int num;
            static int count; //static member variable
 public:
            void getDetails()
             {
            num=++count;
              }
             void displayNum()
             {
            cout<<“Number:"<<num<<endl;
             }
            void displayCount()
             {
            cout<<"count : "<<count<<endl;
            }
};
int Test::count; //static data member definition
```

```
void main()
{
  Test t1,t2,t3;
  t1.getDetails();
  cout<<endl;
   t1.displayCount();
   t2.displayCount();
   t3.displayCount();
   cout<<endl;
   t2.getDetails();
   t1.displayCount();
   t2.displayCount();
   t3.displayCount();
   cout<<endl;
   t3.getDetails();
   t1.displayCount();
   t2.displayCount();
   t3.displayCount();
   t1.displayNum();
   t2.displayNum();
   t3.displayNum();
 getch();
}
```

Static Member Function:

- A class can also have static member functions
- We use static keyword to declare a static member function
- Syntax for declaring static member function:

```
    static return_type functionName (parameters);
```

Static Member Function:

Characteristics of static member function:

1. A static member function is independent of any particular object of class
2. Static member function can be called even if no object of a class exist
3. It is accessed by using class name and scope resolution operator(::)

Syntax:

```
className:: functionName();
```

1. Static member function can only access static data members and other static member functions declared in same class
2. It can’t access non static members

```
class Test
{
private:
            int code;
            static int count; //static member variable
 public:
            void setCode()
             {
            code=++count;
              }
             void showCode()
             {
            cout<<"object number :"<<code<<endl;
             }
              static void showCount() //static member function
             {
            cout<<"count : "<<count<<endl;
            }
};
```

```
int Test::count; //static data member definition

void main()
{
            Test t1,t2;
            t1.setCode();
             t2.setCode();
            Test::showCount(); // accessing static function
            Test t3;
             t3.setCode();
            Test::showCount();
            t1.showCode();
            t2.showCode();
             t3.showCode();
 getch();
}
```

```
void main(){
        Test t1,t2;
        t1.setCode();
         t2.setCode();
        Test::showCount();
        Test t3;
         t3.setCode();
        Test::showCount();
        t1.showCode();
        t2.showCode();
         t3.showCode();
}
```

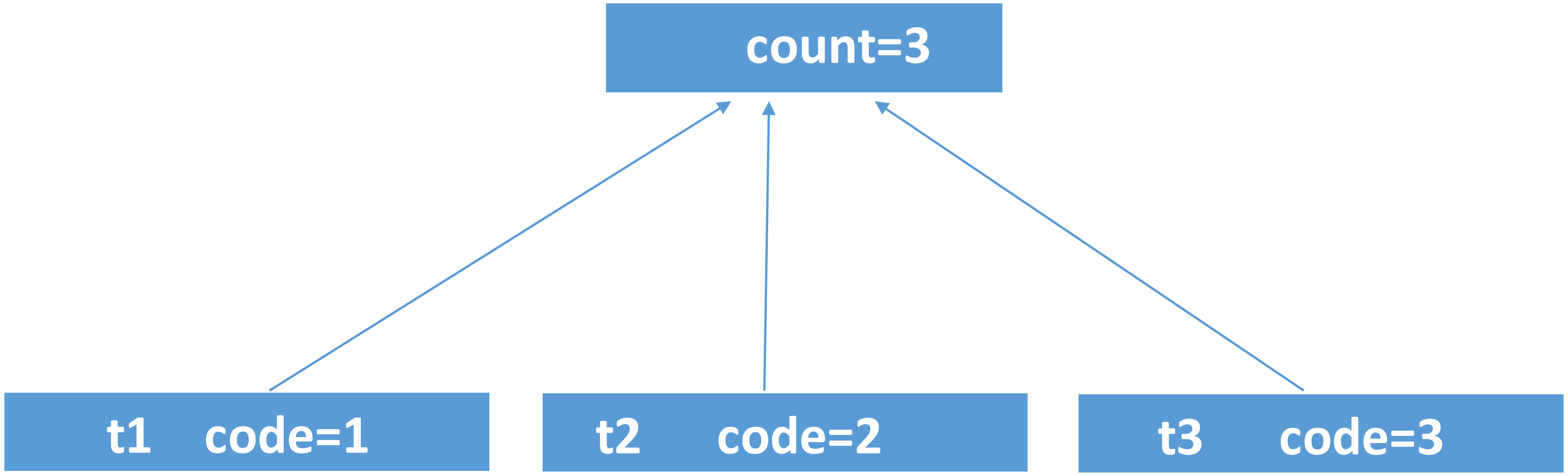
code= ++count;

is executed whenever setCode() function is invoked and current value of count is assigned to code.

Since each object has its own copy of code, the value contained in code represents a unique number of its object.

Output of the program:

```
count=2
count=3
object number=1
object number=2
object number=3
```



count=3

t1 code=1

t2 code=2

t3 code=3

Practice:

Q1. Write a program to count number of students using data member and display the result using static member function. Use appropriate data members and member functions.