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FACULTY OF ENGINEERING & TECHNOLOGY

CSPS103: Object Oriented Programming

Lecture-15

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OBJECTIVES

In this lecture, you will learn to:

- ❖Friend function
- ❖Declaration of friend function in C++
- ❖Characteristics of a Friend function
- ❖Examples

FRIEND FUNCTION

- In general, only other members of a class have access to the private members of the class.
- However, it is possible to allow a nonmember function access to the private members of a class by declaring it as a friend of the class.
- To make a function a friend of a class, you include its prototype in the class declaration and precede it with the friend keyword.
- The function is declared with friend keyword.
- But while defining friend function, it does not use either keyword friend or :: operator.
- A function can be a friend of more than one class.
- Member function of one class can be friend functions of another class.
- In such cases they are defined using the scope resolution operator.

DECLARATION OF FRIEND FUNCTION IN C++

```
class class_name
{
    friend data_type function_name(argument/s);          // syntax of friend function.
};
```

CHARACTERISTICS OF A FRIEND FUNCTION

- It is not in the scope of the class to which it has been declared as friend.
- A friend function cannot be called using the object of that class. If can be invoked like a normal function without help of any object.
- It cannot access the member variables directly & has to use an object name dot membership operator with member name.
- It can be declared either in the public or the private part of a class without affecting its meaning.
- Usually, it has the object as arguments.

EXAMPLE FRIEND FUNCTION

Program to illustrate use of friend function

```
#include<iostream.h>
#include<conio.h>
class A{
 int x, y;
public:
 friend void display(A &obj);
 void getdata() {
 cin>>x>>y;
 }
};
void display(A &obj){
cout<<obj.x<<obj.y;
}
int main(){
A a;
a.getdata();
display(a);
getch();
return 0;
}
```

EXAMPLE WHEN THE FUNCTION IS FRIENDLY TO TWO CLASSES

```
#include <iostream.h>
class B;          // forward declarartion.
class A
{
    int x;
    public:
    void setdata(int i)
    {
        x=i;
    }
    friend void min(A,B);         // friend function.
};
class B
{
    int y;
    public:
    void setdata(int i)
    {
        y=i;
    }
    friend void min(A,B);                  // friend function
};
```

EXAMPLE WHEN THE FUNCTION IS FRIENDLY TO TWO CLASSES (Contd.)

```
void min(A a,B b)
{
    if(a.x<=b.y)
    std::cout << a.x << std::endl;
    else
    std::cout << b.y << std::endl;
}
   int main()
{
   A a;
   B b;
   a.setdata(10);
   b.setdata(20);
   min(a,b);
    return 0;
 }
```

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Multiple Choice Question:

Q1. Which rule will not affect the friend function?

a) private and protected members of a class cannot be accessed from outside

b) private and protected member can be accessed anywhere

c) protected member can be accessed anywhere

d) private member can be accessed anywhere

Multiple Choice Question:

Q2. Which keyword is used to declare the friend function?

a) firend

b) friend

c) classfriend

d) myfriend

Multiple Choice Question:

Q3. What is the syntax of friend function?

a) friend class1 Class2;

b) friend class;

c) friend class

d) friend class()

Multiple Choice Question:

Q4. What is a friend function in C++?

a) A function which can access all the private, protected and public members of a class

b) A function which is not allowed to access any member of any class

c) A function which is allowed to access public and protected members of a class

d) A function which is allowed to access only public members of a class

Multiple Choice Question:

Q5. Pick the correct statement.

a) Friend functions are in the scope of a class

b) Friend functions can be called using class objects

c) Friend functions can be invoked as a normal function

d) Friend functions can access only protected members not the private members

Summary

In this lecture, you learned that:

- If a function is defined as a friend function in C++, then the protected and private data of a class can be accessed using the function.
- By using the keyword friend compiler knows the given function is a friend function.