

Heaven's Light is Our Guide



Rajshahi University of Engineering and Technology

Department of Computer Science and Engineering

Course No: CSE.1204

Course Title: Sessional based on CSE.1203 (Object Oriented Programming)

Lab Report No: 05

Lab Report On: Friend Function and Friend Class.

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Problem No: 01

Problem Statement: Implementation of **Friend Function** and **Friend Class**.

circle

float redious;
float area;
circle(float);
friend void print_c(circle&);
friend void print_ta(circle&,square&);
friend class square;

square

float side;
float area;
square(float);
friend void print_s(square&);
friend void print_ta(circle&,square&);
void trfc(circle&,square&);

Theory : A **Friend Function** is a function which is **not a member of a class** but can **access** the **private** and **protected** members of a class in which the function is declared as friend.

Similarly a **Friend Class** is a class which can **access** the **private** and **protected** members of **other class** in which it is declared as friend.

Following are some important points about friend functions and classes :

1. Friends should be used only for limited purpose. Too many functions or external classes are declared as friends of a class with protected or private data, it lessens the value of encapsulation of separate classes in object-oriented programming.
2. Friendship is not mutual. If class A is a friend of B, then B doesn't become a friend of A automatically.
3. As a matter of Object-Oriented Programming, the concept of friends is not there in Java.

Source Code:

1. main.cpp :

```
#include <iostream>
#include "circle.h"

using namespace std;

int main()
{
    circle A(5.0);
    print_c(A);
    square B(10.0);
    print_s(B);
    print_ta(A,B);
    B.trfc(A,B);
    print_c(A);
    print_s(B);
    print_ta(A,B);

    return 0;
}
```

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2. circle.h :

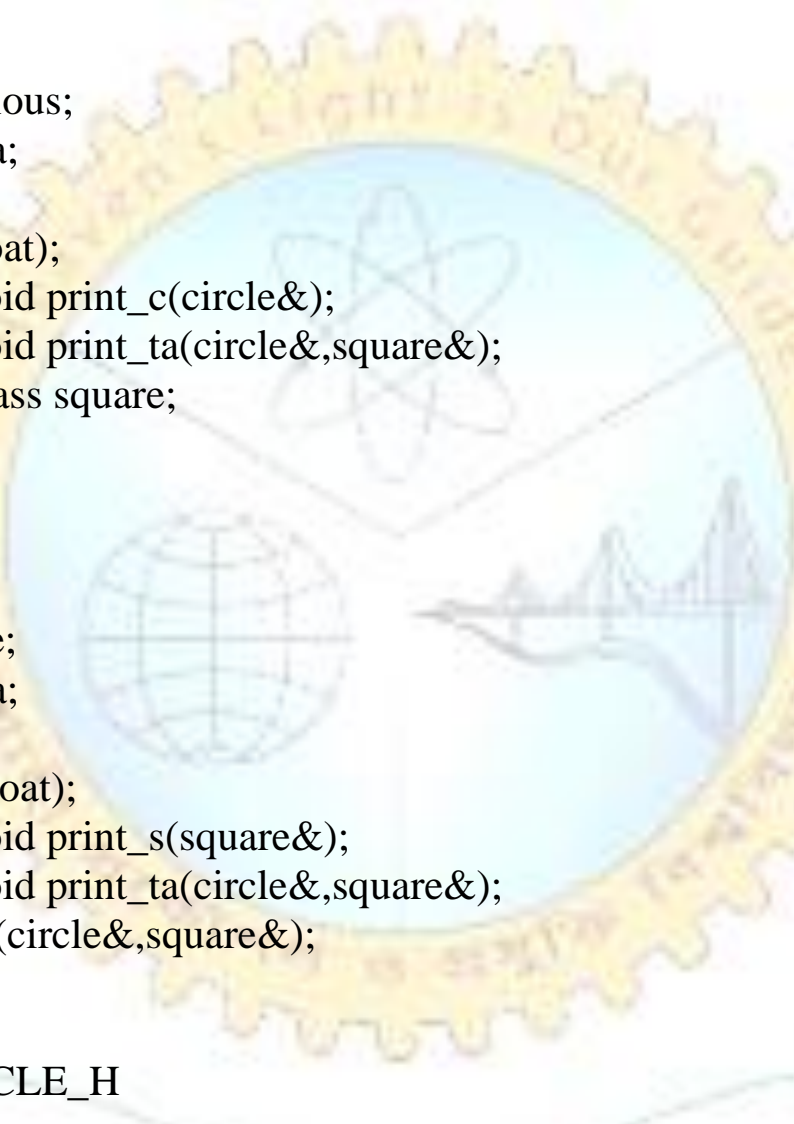
```
#ifndef CIRCLE_H
#define CIRCLE_H

class square;

class circle{
private:
    float radius;
    float area;
public:
    circle(float);
    friend void print_c(circle&);
    friend void print_ta(circle&,square&);
    friend class square;
};

class square{
private:
    float side;
    float area;
public:
    square(float);
    friend void print_s(square&);
    friend void print_ta(circle&,square&);
    void trfc(circle&,square&);
};

#endif // CIRCLE_H
```

The logo of Rajshahi University of Engineering and Technology (RUET) is visible in the background. It features a circular emblem with a gear-like outer border. Inside the circle, there is a globe on the left, a stylized atom in the center, and a bridge on the right. The text "Knowledge is Our Guide" is written along the top inner edge of the circle, and "RUET" is written at the bottom.

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3. circle.cpp :

```
#include <iostream>
#include "circle.h"

using namespace std;

circle::circle(float r){
    radius=r;
}

square::square(float s){
    side=s;
}

void square::trfc(circle& ob1,square& ob2){
    cout<<"\n\tTaking Radius from Circle\n"<<endl;
    ob2.side=ob2.side+ob1.radius;
    ob1.radius=0;
}

void print_c(circle& ob){
    ob.area=3.1416*ob.radius*ob.radius;
    cout<<"\t# CIRCLE #"<<endl;
    cout<<"Radius: "<<ob.radius<<endl;
    cout<<"Area: "<<ob.area<<"\n"<<endl;
}

void print_s(square& ob){
    ob.area=ob.side*ob.side;
    cout<<"\t# SQUARE #"<<endl;
    cout<<"Side: "<<ob.side<<endl;
    cout<<"Area: "<<ob.area<<"\n"<<endl;
}

void print_ta(circle& ob1,square& ob2){
    cout<<"\t# Total Area #"<<endl;
    cout<<"Area: "<<ob1.area+ob2.area<<"\n"<<endl;
}
```

Output :

```
"F:\2nd Semester\CSE\CSE.1204\Lab 5\FF\bin\Debug\FF.exe"

      # CIRCLE #
Radious: 5
Area: 78.54

      # SQUARE #
Side: 10
Area: 100

      # Total Area #
Area: 178.54

      Taking Radius from Circle

      # CIRCLE #
Radious: 0
Area: 0

      # SQUARE #
Side: 15
Area: 225

      # Total Area #
Area: 225

Process returned 0 (0x0)   execution time : 0.066 s
Press any key to continue.
_
```

Conclusion : By our Course Teachers help and my knowledge about C and C++, I completed the program.

The End