LAB SESSION 12

1. Write a class Circle with a private member radius. Write a friend function to calculate the area of the circle.

Code:

```cpp
#include <iostream>
using namespace std;

int startlab12()
{
    cout << "Name: Saad Ali Khan(SE-23083)" << endl;
    cout << "Start of Lab 12" << endl;
    return 0;
}

class Circle
{
private:
    double radius;

public:
    Circle(double r) : radius(r) {}

    friend double calculateArea(const Circle &c);
};

double calculateArea(const Circle &c)
{
    return 3.14 * c.radius * c.radius;
}
int l12q1()
{
    Circle circle(5.0);
    cout << "Area of the circle: " << calculateArea(circle) << endl;
    return 0;
}
int main()
{
    startlab12();
    l12q1();
    return 0;
}
```

Output:

```
Name: Saad Ali Khan(SE-23083)
Start of Lab 12
Area of the circle: 78.5
PS D:\SE\oops_labs>
```

2. Implement a class Rectangle with private members length and width. Write a friend function to calculate the perimeter of the rectangle.

Code:

```
#include <iostream>
using namespace std;

int startlab12()
{
    cout << "Name: Saad Ali Khan(SE-23083)" << endl;
    cout << "Lab 12" << endl;
    return 0;
}
class Rectangle
{
private:
    double length;
    double width;

public:
    Rectangle(double l, double w) : length(l), width(w) {}

    friend double calculatePerimeter(const Rectangle &r);
};

double calculatePerimeter(const Rectangle &r)
{
    return 2 * (r.length + r.width);
}
int l12q2()
{
    Rectangle rectangle(10.0, 5.0);
    cout << "Perimeter of the rectangle: " << calculatePerimeter(rectangle) <<
endl;
```

```
    return 0;
}

int main()
{
    startlab12();
    l12q2();
    return 0;
}
```

Output:

```
Name: Saad Ali Khan(SE-23083)
Lab 12
Perimeter of the rectangle: 30
PS D:\SE\oops_labs>
```