

## Lab Exercise 6

**IT1050 – Object Oriented Concepts**

**Semester 1, 2024**

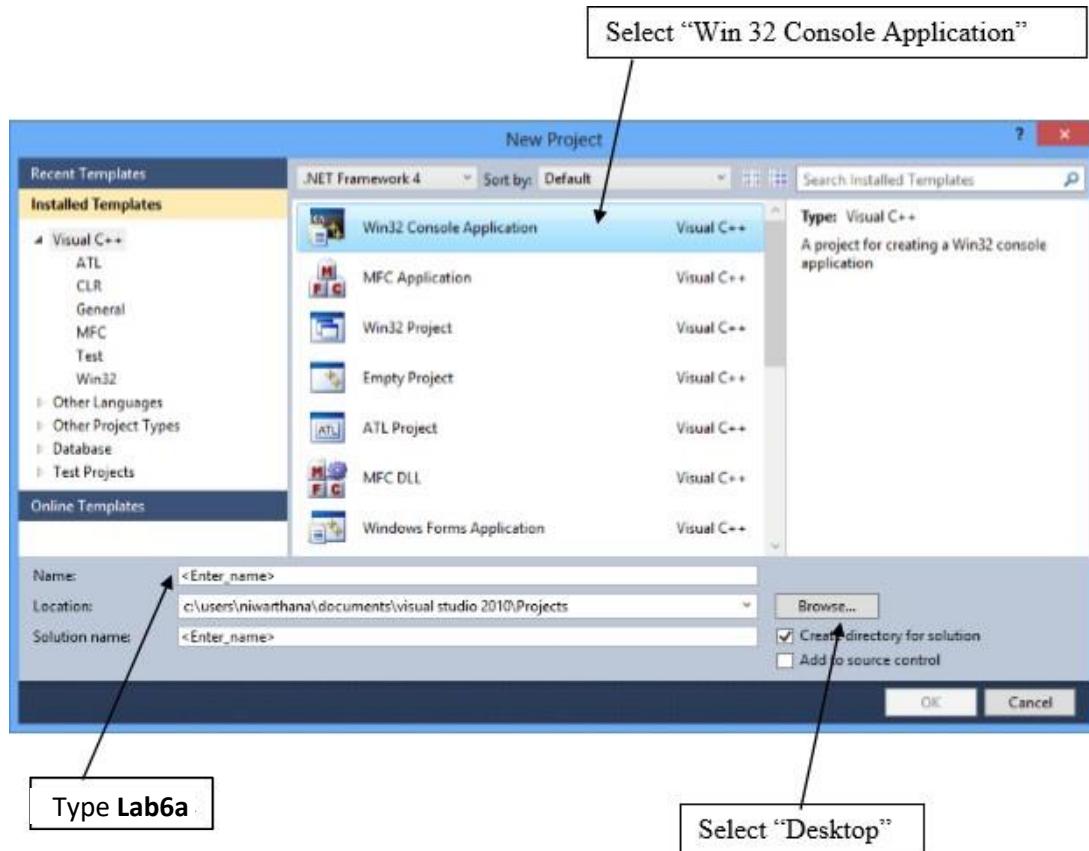
Objectives:

- Creation of classes and method calling in Object Oriented Programming concepts.

### Exercise 1:

In Exercise 1 we will implement the *Circle* class that can be helpful to calculate the area of a garden.

- (a) In Visual C++, create a new Win32 Console Application project. Save the project in your Desktop. We will name the project as **Lab6a**

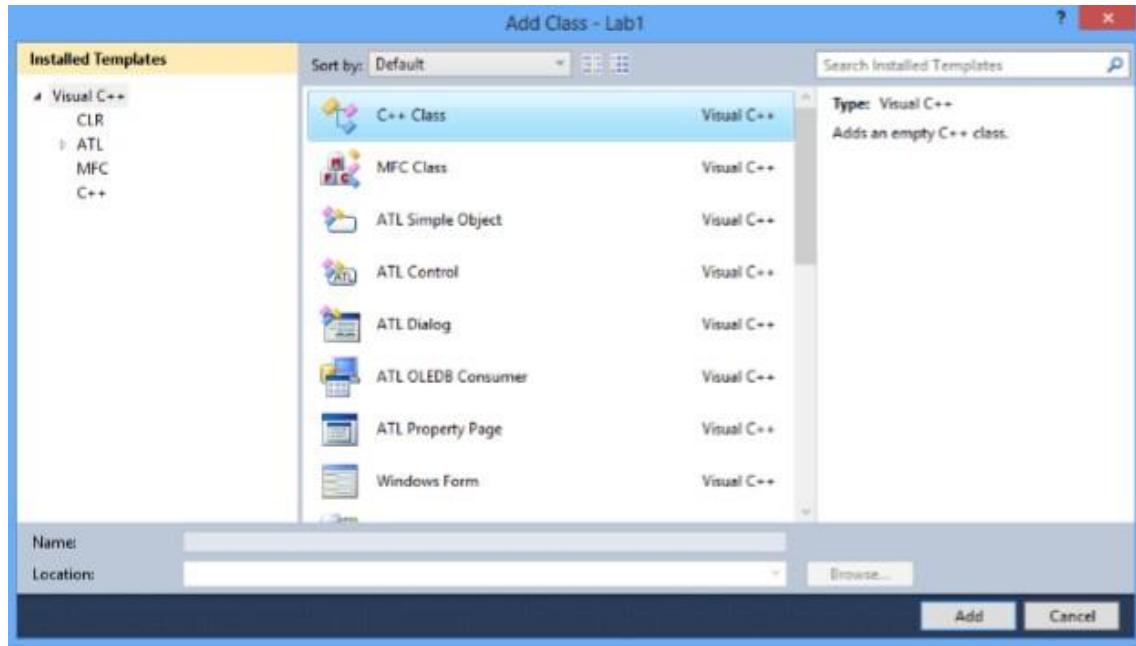


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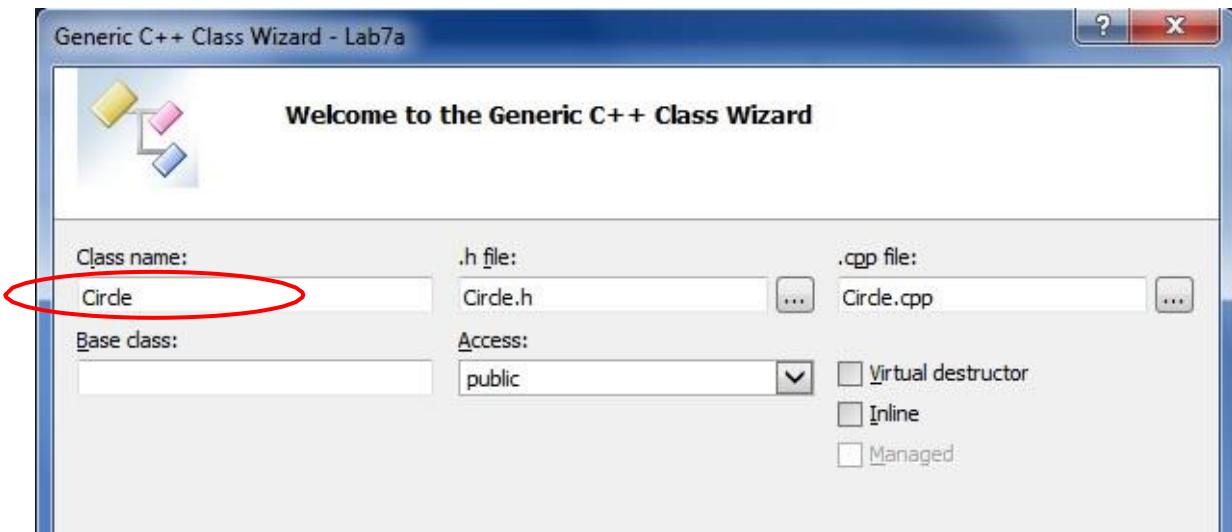
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- b)** Add a new Class to the project from the main menu select **Project -> Add Class**



Select the C++ Class Template.

- (b) We will create a Class called Circle. When you specify the Class Name the Wizard creates the header file and the .cpp file.



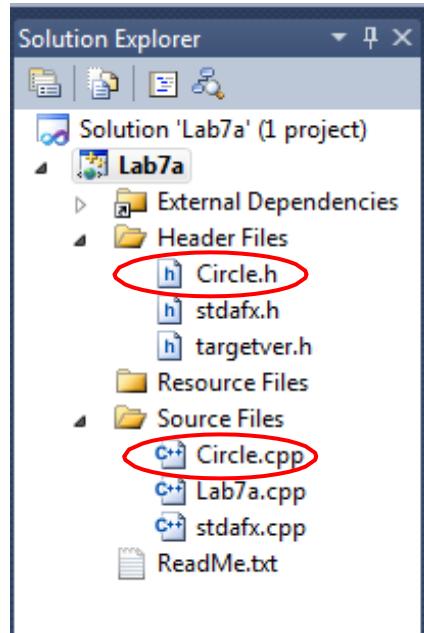
Click the “Finish” button at the bottom of the “C++ Class Wizard”

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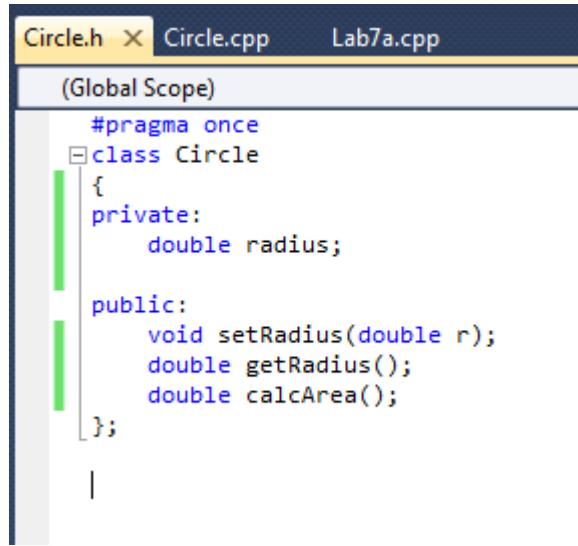
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Then you can see the **Circle.h** and the **Circle.cpp** files in the “Solution Explorer”



c) Write the definition of the Circle class in **Circle.h** header file. (Double click **Circle.h** from the Solution Explorer).



```

Circle.h X Circle.cpp     Lab7a.cpp
(Global Scope)


```

#pragma once
class Circle
{
private:
    double radius;

public:
    void setRadius(double r);
    double getRadius();
    double calcArea();
};

|

```

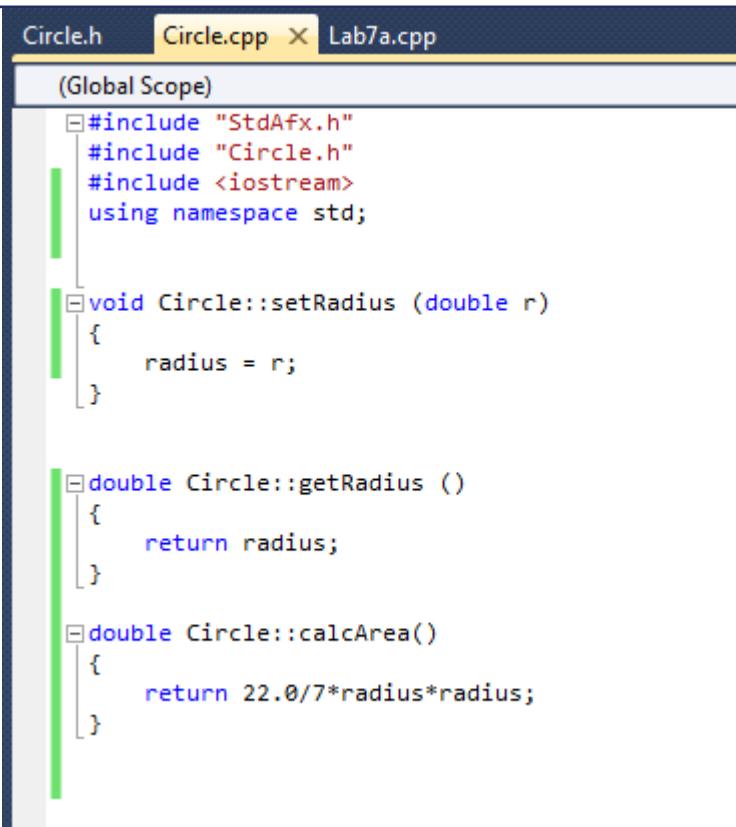

```

d) Implement Circle class in **Circle.cpp** (Double click on **Circle.cpp** from the Solution Explorer)

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```

Circle.h          Circle.cpp X Lab7a.cpp
(Global Scope)
#include "StdAfx.h"
#include "Circle.h"
#include <iostream>
using namespace std;

void Circle::setRadius (double r)
{
    radius = r;
}

double Circle::getRadius ()
{
    return radius;
}

double Circle::calcArea()
{
    return 22.0/7*radius*radius;
}

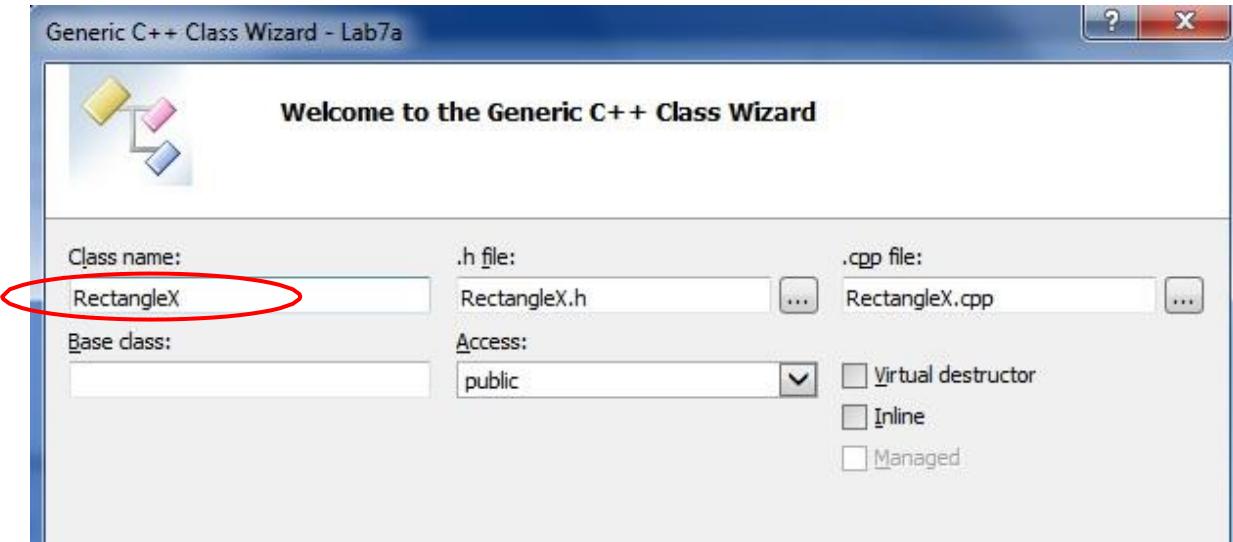
```

### Exercise 2:

In Exercise 2 we will implement the **RectangleX** class that can be helpful to calculate the area of a garden.

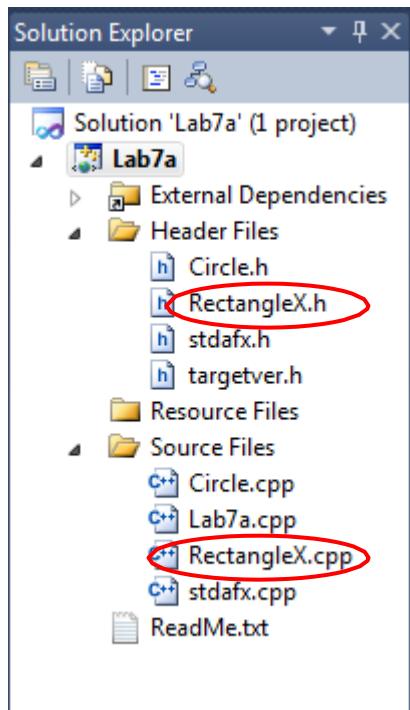
- Add another Class to the project from the main menu select **Project -> Add Class**. Select the C++ Class Template.
- We will create a Class called **RectangleX**. When you specify the Class Name the Wizard creates the header file and the .cpp file.

Note: Rectangle is a reserved word in C++. We can't use Rectangle as a class name instead of that use **RectangleX** as the class name

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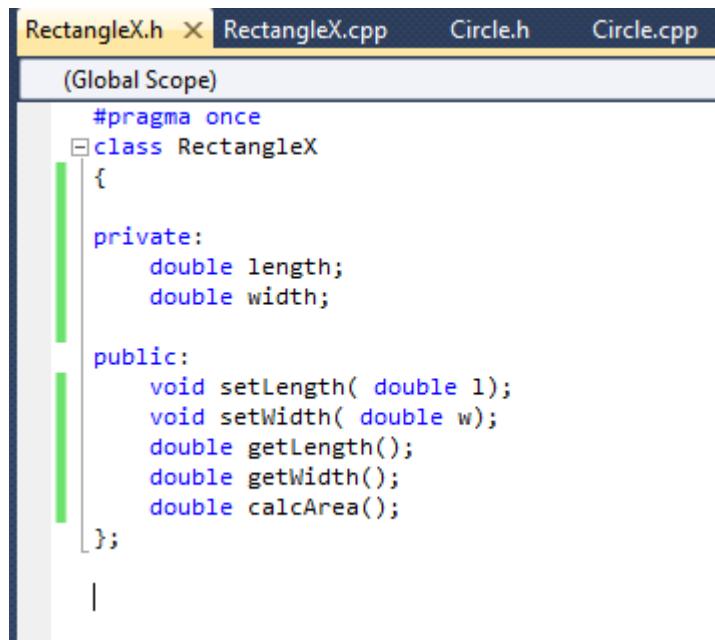
Click the “Finish” button at the bottom of the “C++ Class Wizard”

Then you can see the **RectangleX.h** and the **RectangleX.cpp** files in the “Solution Explorer”



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- c) Write the definition of the **RectangleX** class in **RectangleX.h** header file. (Double click **RectangleX.h** from the Solution Explorer).



```
#pragma once
class RectangleX
{
private:
    double length;
    double width;

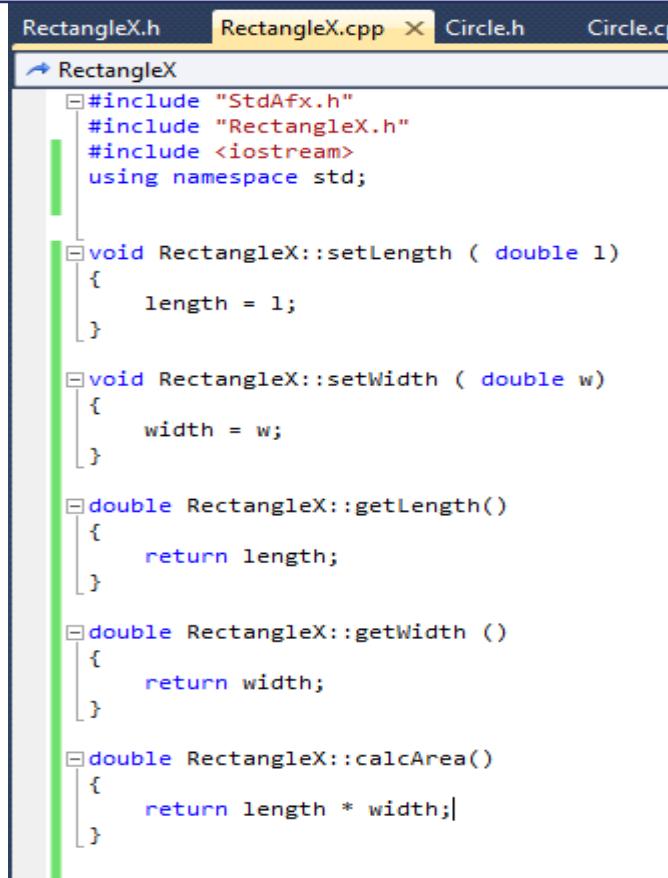
public:
    void setLength( double l );
    void setWidth( double w );
    double getLength();
    double getWidth();
    double calcArea();
};
```

- d) Implement **RectangleX** class in **RectangleX.cpp** (Double click on RectangleX.cpp from the Solution Explorer)

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```

RectangleX.h      RectangleX.cpp <--> Circle.h      Circle.cpp
File RectangleX
Class RectangleX
Method void RectangleX::setLength ( double l )
Method void RectangleX::setWidth ( double w )
Method double RectangleX::getLength()
Method double RectangleX::getWidth()
Method double RectangleX::calcArea()

```

```

#include "StdAfx.h"
#include "RectangleX.h"
#include <iostream>
using namespace std;

void RectangleX::setLength ( double l )
{
    length = l;
}

void RectangleX::setWidth ( double w )
{
    width = w;
}

double RectangleX::getLength()
{
    return length;
}

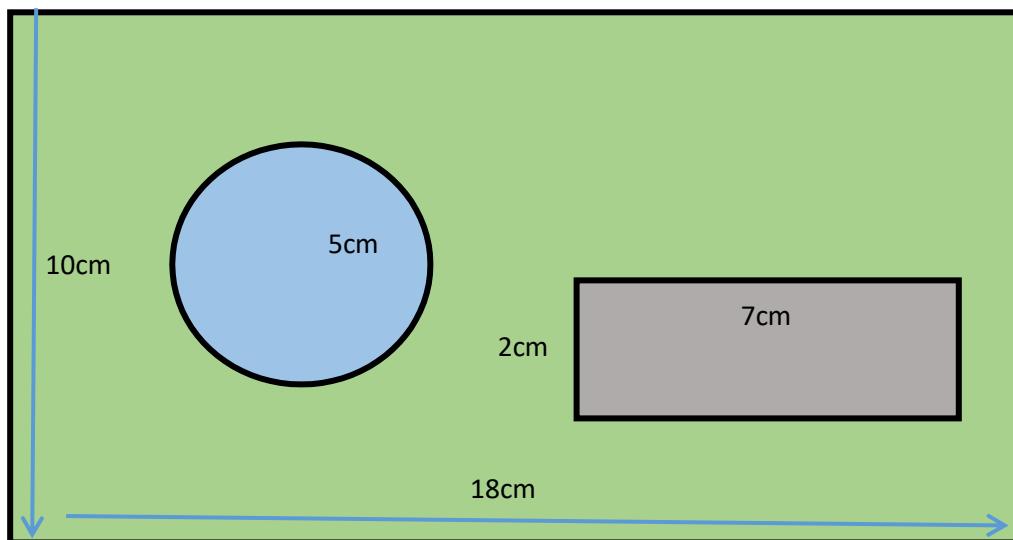
double RectangleX::getWidth()
{
    return width;
}

double RectangleX::calcArea()
{
    return length * width;
}

```

#### Exercise 3:

Write the client program ( main ) in Lab06a.cpp to find the garden area (green colour) as shown in the diagram below.



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- a) Implement a *Square* class that can be helpful to calculate the area of a square.

Follow the same steps as in Exercise 1 and Exercise 2 to implement the Square class accordingly. You may have to use,

$$\text{Area of a square} = \text{length} * \text{length}$$

- b) Modify the client program in Lab7a.cpp to add a square to the diagram as shown below and find the area shown in green.

