

# CSC2111 Computer Science I Lab

## Lab 05

# Objectives

1. Classes and Data Abstraction
2. User-defined classes

# Example

- Write a program to define the class circle and implement the basic properties of a circle in a single C++ source file

# Solution

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

class circle
{
public:
    void setRadius(double r); //Function to set the radius.
    double getRadius(); //Function to return the radius.
    double area(); //Function to return the area of a circle.

    circle(); //Constructor with a default parameter .The default value of the radius is 0.0;
    circle(double r); //parameterized Constructor. Create a circle with user defined radius.
    bool equal(circle& otherCircle) const; // compare this circle with another circle.
    void printCircle(); //Print a circle information.

private:
    double radius; //private variable
};
```

```
//Implementation for the class circle
void circle::setRadius(double r)
{
    if (r >= 0)
        radius = r;
    else
        radius = 0;
}

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

double circle::area()
{
    return 3.1416 * radius * radius;
}
circle::circle()
{
    radius = 0;
}
circle::circle(double r)
{
    radius = r;
}
bool circle::equal(circle& otherCircle) const
{
    return(radius==otherCircle.radius);
}
void circle::printCircle()
{
    cout << "The radius of circle is " << radius << endl;
}
.....
```

```

//The user program that uses the class circle
int main()
{
    circle circle1(10);
    circle circle2;

    double radius;

    cout << fixed << showpoint << setprecision(2);

    cout << "circle1 - "
        << "radius: " << circle1.getRadius()
        << ", area: " << circle1.area()
        << endl;

    cout << "circle2 information: ";
    circle2.printCircle();

    cout << "Enter the radius of a circle: ";
    cin >> radius;
    cout << endl;

    circle2.setRadius(radius);

    cout << "After setting the radius." << endl;
    cout << "circle2 - "
        << "radius: " << circle2.getRadius()
        << ", area: " << circle2.area()
        << endl;
    if (circle1.equal(circle2))
        cout << "circle1 and circle2 are equal! \n";
    else
        cout << "circle1 and circle2 are unequal! \n";
    return 0;
} //end main

```

# Output

C:\WINDOWS\system32\cmd.exe

```
circle1 - radius: 10.00, area: 314.16  
circle2 information: The radius of circle is 0.00  
Enter the radius of a circle: 10  
  
After setting the radius.  
circle2 - radius: 10.00, area: 314.16  
circle1 and circle2 are equal!  
Press any key to continue . . .
```