SLIIT

Discover Your Future

CSIT1050- Object Orientation

Lecture-05

Classes and Objects in C++

SLIIT
FACULTY OF COMPUTING

Learning Outcomes

At the end of the Lecture students should be able to;

- Implement a class and create objects using C++.

Recalling Steps in OOP

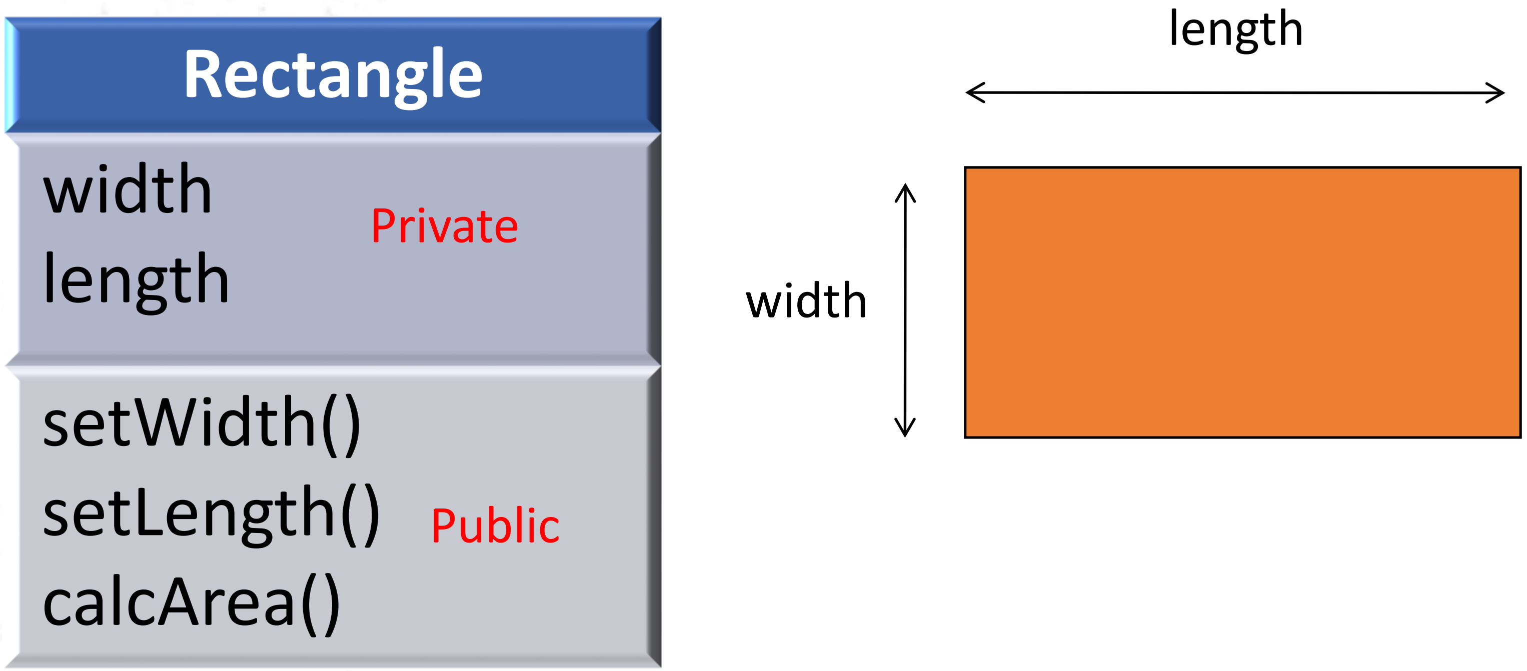
- Analyse the Problem
- Identify Objects
- Develop Classes
- Create Objects
- Build the Solution

OO Analysis and Design

OO Programming

How to write an Object Oriented Program ?

Example-1 - Rectangle Class



Rectangle

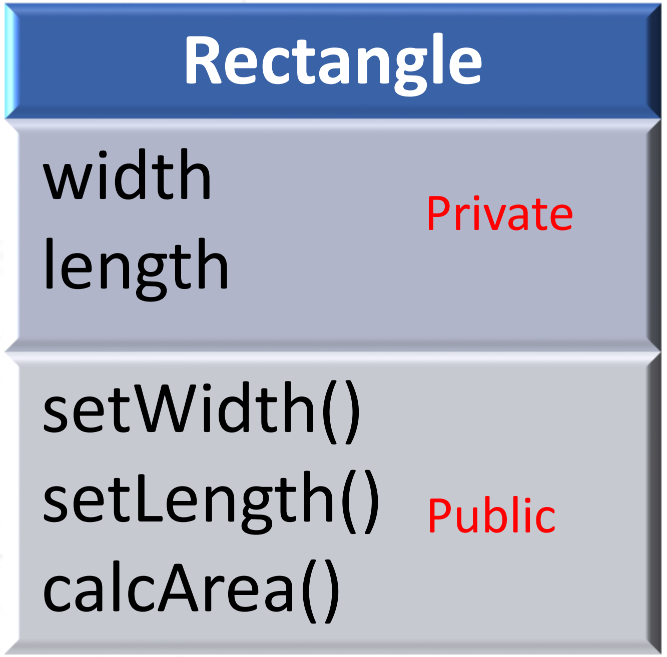
width
length

Private

setWidth()
setLength()
calcArea()

Public

Rectangle Class in C++



Rectangle

width
length

Private

setWidth()
setLength()
calcArea()

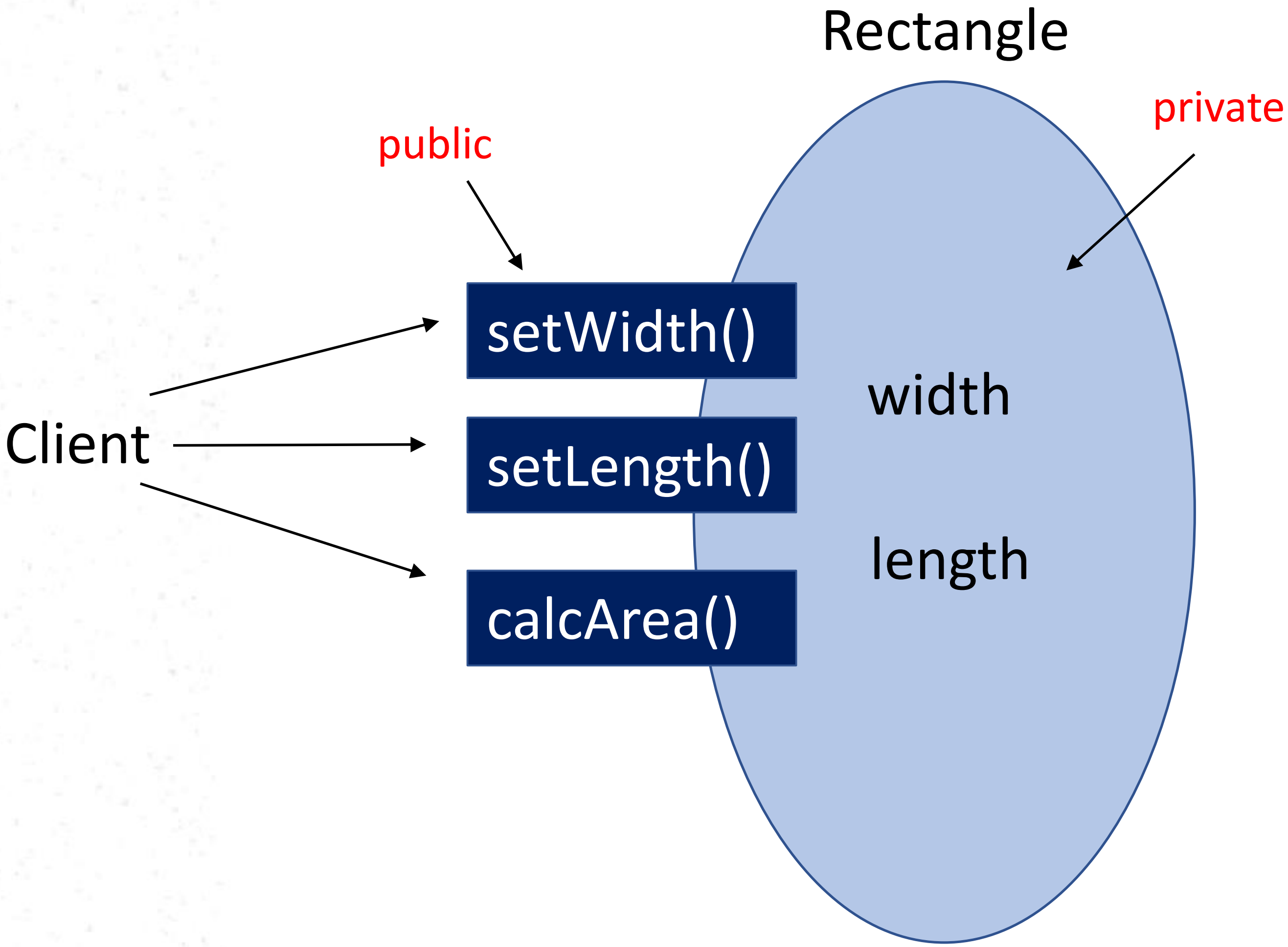
Public

```
//C++ coding for Rectangle class
class Rectangle {
   private:
          int width;
          int length;
    public:
          void setWidth(int no);
          void setLength(int no);
          int calcArea();
};
```

Private & Public

- The private part of the definition specifies the properties (data members) of a class.
- These are hidden from outside the class and can only be accessed through the methods (operations/functions) defined for the class.
- The public part of the definition specifies the methods as function prototypes.
- These methods as they are called, can be accessed by the main program.

Private & Public

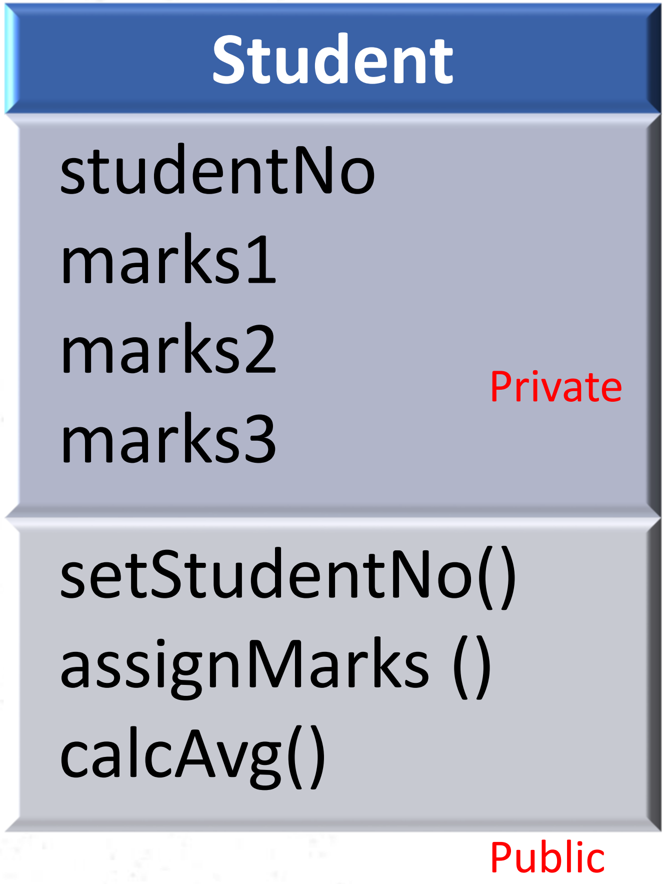


Rectangle Class in C++

```
//C++ coding for Rectangle
class Rectangle {
    private :
           int width;
           int length;
     public:
           void setWidth(int no);
           void setLength(int no);
           int calcArea();
};
```

```
void Rectangle::setWidth(int no) {
     width = no;
}

void Rectangle::setLength(int no) {
     length= no;
}
int Rectangle::calcArea() {
     int area = length * width;
     return area;
}
```

Student class – Activity 1



Student

studentNo

marks1

marks2

marks3

Private

setStudentNo()

assignMarks ()

calcAvg()

Public

Implement the Student class in C++.

Answer : Student Class in C++

```
//C++ coding for Student
class Student {
   private :
     int StudentNo;
     int marks1;
     int marks2;
     int marks3;
    public:
     void setStudentNo(int no);
     void assignMarks(int n1, int n2, int n3);
     float calcAvg();
};
```

```
void Student::setStudentNo(int no) {
      width = no;
}

void Student :: assignMarks(int n1, int n2, int n3);{
      marks1 = n1;
      marks2 = n2;
      marks3 = n3;
}
float Student ::calcAvg() {
      float average = (marks1+marks2+marks3)/3.0;
      return average;
}
```

Creating Objects

Class_name   Object_name;

e.g: Rectangle rect1;   // single object

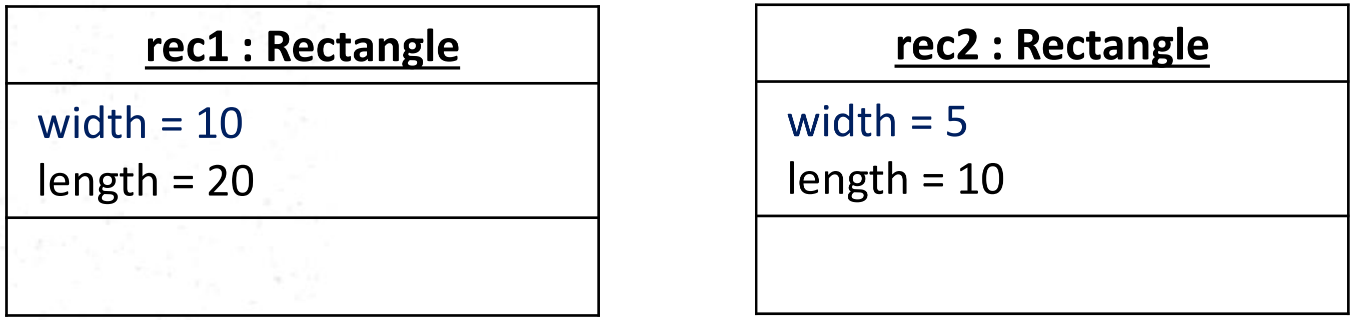
Rectangle rect1, rect2; // multiple objects

Rectangle rectangles[5];   // array of objects

Note :   Use C++ rules for identifiers when naming objects

Creating Objects

```
Rectangle rec1, rec2;
```



rec1 : Rectangle

width = 10
length = 20

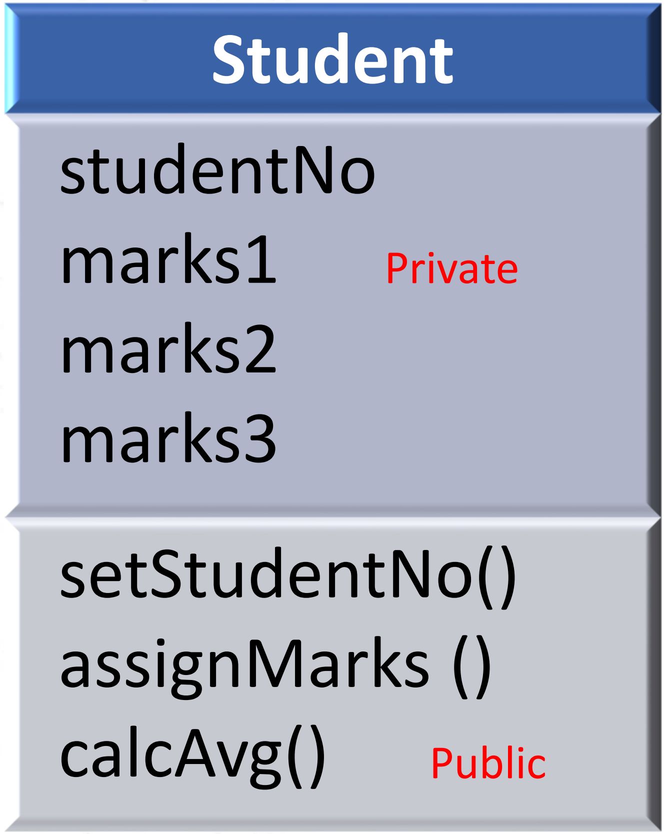
rec2 : Rectangle

width = 5
length = 10

Accessing Public Methods

```
#include <iostream>
using namespace std;
int main() {
     Rectangle rec1, rec2;

     rec1.setWidth(10);
     rec1.setLength(20);

     rec2.setWidth(5);
     rec2.setLength(10);

     cout << rec1.calcArea() << endl;
     cout << rec2.calcArea() << endl;
     return 0;
}
```

Student class – Activity 2



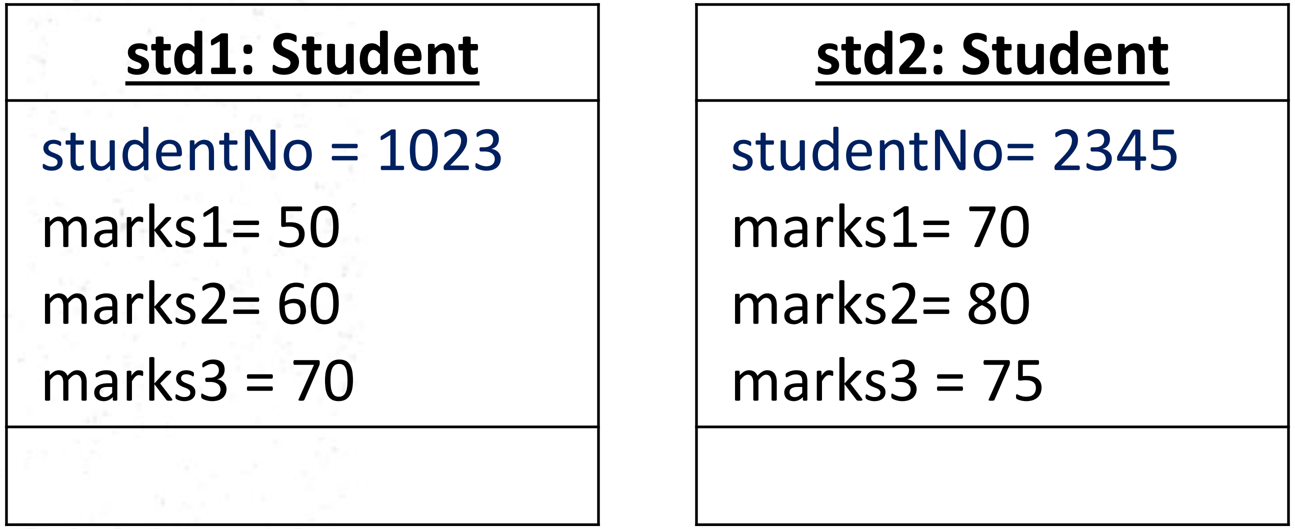
Student

studentNo
marks1 Private
marks2
marks3

setStudentNo()
assignMarks ()
calcAvg() Public

Create two Student Objects.
Calculate and
print their averages.

Student Objects



std1: Student

studentNo = 1023
marks1= 50
marks2= 60
marks3 = 70

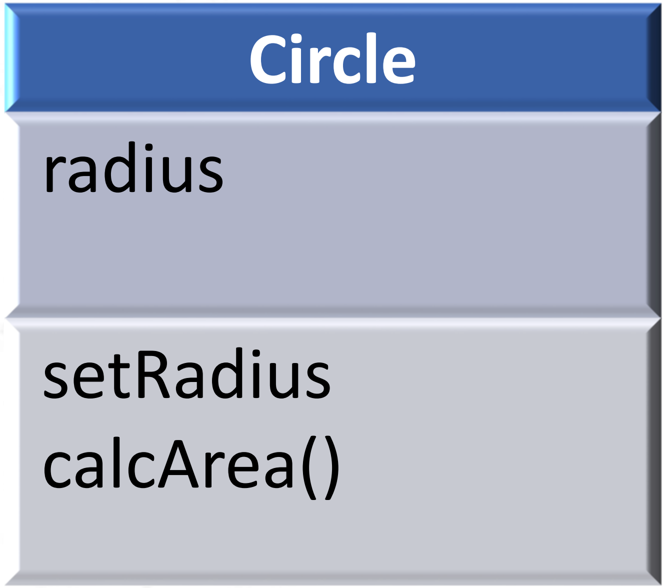
std2: Student

studentNo= 2345
marks1= 70
marks2= 80
marks3 = 75

```
#include <iostream>
using namespace std;
int main() {
     Student std1, std2;

     std1.setStudentNo(1023);
     std1.assignMarks(50,60,70);

     std2.setStudentNo(2345);
     std2.assignMarks(70,80,75);

     cout <<“Average of student1:”<< std1.calcAvg() << endl;
     cout <<“Average of student2:”<< std2.calcAvg() << endl;
     return 0;
}
```

Activity 3

Implement the Circle class and write a client (main) program to calculate and print the area of a circle.



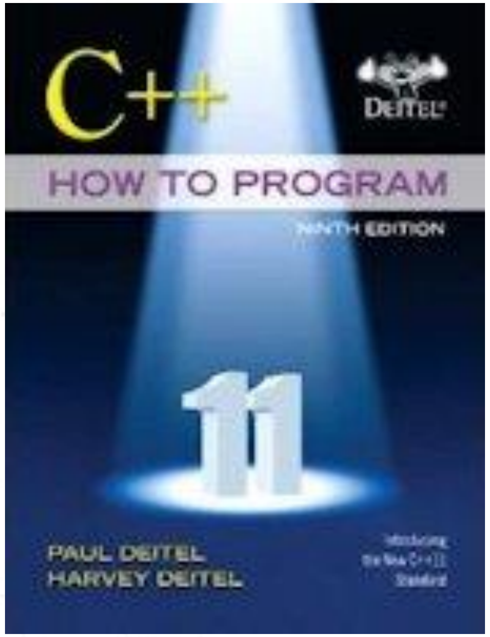
Circle

radius

setRadius

calcArea()

Reference



Chapter 03

Deitel & Deitel’s (2016), C++ How to Program,
9th Edition