



## Lesson 27 Classes (OOP)

An object is a user-defined datatype like an integer or a string. Unlike those simple data types, though, an object can have much richer functionality. It typically collects some data ("member data") and some functionality ("methods"). For example, we might create a class to handle a matrix, or a tensor, or a student's record in a class, etc.

### Declaring and Defining a Class:

Before we can use variables of a given class, we first have to specify the class. Analogous to functions, we can declare the class by specifying any member data it contains and providing a list of its available functions (along with what arguments those functions take and their return types).

### Example: The Student Class

Suppose we want to keep track of students taking a course. Each student will have a name, a midterm grade, a final grade, and a course project grade. These grades will be used to compute a final course grade.

```
#include <iostream>
#include <string>
using namespace std;
class Student
{
private:
```



*/\* here we declare private attributes of the class\*/*

string Name;

double MidtermGrade;

double FinalGrade;

double ProjectGrade;

**public:**

*/\* Here we declare public methods and functions \*/*

void SetName(string theName)

{

Name = theName;

}

void SetMidtermGrade(double grade)

{

MidtermGrade = grade;

}

void SetFinalGrade(double grade)

{

FinalGrade = grade;

}

void SetProjectGrade(double grade)

{

ProjectGrade = grade;

}



```
double ComputeCourseGrade(void)
{
    double courseGrade = (MidtermGrade + FinalGrade +
    ProjectGrade) / 3.0;
    return(courseGrade);
}

string GetName(void)
{
    return(Name);
}

}; //Done declaring the class
```

Ok, here's some code in **main()** that allows us to use the class :

```
int main()
{
    Student Student1;
    Student1.SetName("John Smith");
    // change the name of the student1
    Student1.SetMidtermGrade(80.0);
    cout << "Student " << Student1.GetName() << " has course
    grade ";
    cout << Student1.ComputeCourseGrade() << "\n";
}
```

Program output:

Student John Smith has course grade 26.6667