Programming in C++
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Lecture - 22
Access Specifiers (Contd.)

Welcome to part 2 of module 12 of Programming in C++. We have discussed in this module the different access specified so the visibility options of member of a class. We have learnt that there are public and private access specifiers which can be used to control who can access which part of the class. Public specifiers means that anyone that is any global function or any other class can access the member which is specified as public, but if some member data member or method is specified as private then that data member or method can be accessed only from within the definition of the class or more precisely from other methods of the same class, but it cannot be access by anyone else.

Based on this we have outline the principle of information highly where we have prescribed that we should always have the attributes or data members as private and the methods as public giving us the basic hiding of the state from the behavior of the object. And we have seen example of that using a stack showing that if you expose the implementation if you put the data members in public then what kind of difficulties and risk that one would run, instead if the data members are private and only the methods of the stack type or stack class, push, pop, top and empty are public then an application would be able to seamlessly use a stack without being concerned about how the stack is actually implemented without running any risk of tampering the stack in the process of writing the application. Finally, we have shown how typically a code object oriented C++ code should be organized for hiding information in terms of the header and implementation facts.

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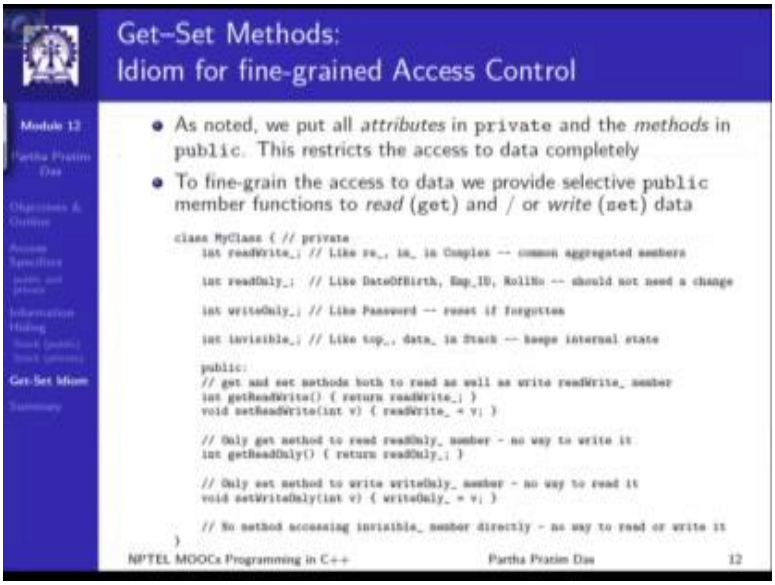

We will next talk about Idiom, which is a commonly known as the Get-Set Idiom which is used for fine grained access control in different members of a class or an object. We know that we will put all attributes in private and we will put methods in public and this restricts access to data completely which is, what one extreme that you can have is. Now typically we would like to fine grained this access and we would like to provide selective public member functions or read functions or get methods or write functions or set methods on the data that we have protected by making them private.

So I just illustrate the whole idea in terms of an example, here is a class which I just call it as a class my class which is not very important. There are four data members assumed and I have not used any access specifier after the beginning of the class definition here which means that by default these data members are private there in, and these data members are intended in a way that the first data members read write is a data member which, as I being a data member it is private so nobody can directly come and change its value, but in terms of its use I would like to read and write its value. For example, this is a member like a r e components of a complex number i m component of a complex number or so, I would need to read and set the value of this component if I am reading a complex number. If I am writing the current value of a complex number I will need to read the r e i n component and then so on. A large number of data member aggregate

members turned out to be read write. So I need to provide some mechanism by which I should be able to do that and the simple way to do this is to provide a spear of get set functions.

What is the get set function do? A get function say on the read write on this variable say has a name get read write, it is simply takes this data member and returns it. This method is kept in the public space, so any external function or any other member functions of any other class can call the get read write functions shamelessly because it is available in the public space. And this in turn will access the private member and returned its value. So in about a way we are selectively making this the value of this known to the external world with the control that whenever somebody has to do that somebody has to go through this particular (Refer Time: 05:46). For example, one what is the basic difference between providing this get and let us say similarly I have a set which can take a value v and actually a science is valued to the data members read write. So basically, if I have get and set both then I can read as well as write the value of this variable read write.

Now you will wonder an (Refer Time: 06:14) question has to why do you want to make this private and then put a pair of public methods which can get and set this, will could have just made this public and anybody could have change that. But yes, in terms of read write this is similar, but that is a major difference because if I put it in public then the object will never get to known, when it is being this particular data member is being read or when it is being read. But if it is done through a function is a method then when it is being read I can also do some computation here. When is being written I can also do some computation before or after this value is written it to. So the object will always be aware that the value of read write has been changed or the value of read write has been read by somebody. So it is not exactly seems as to putting this data member as a public access.

Now, coming to the other data members if we look into the next one we want to just make it read only. So there is a lot of in terms of any model different real world data types in encapsulations we will find that there are lot of data which is read only like date of birth. Date of birth of a person cannot keep on changing so it should be set to something when I create the object for that person and after that it should not be possible

to change it the best way to control that would be to make this a with the private access and then allow just a get function on it. So which will allow somebody to to read the date of birth and possibly compute age of that person or read the employee Id and check out, read the roll number of the student, and find the grade of the student and so on. All these get function will allow us to get that data, but will not be able to change that data. so which means that this particular if I just provide the get function and the responding data becomes read only data.

Once you get this then obviously rest becomes very straight forward it is just completing the all possible combinations I can have a right only variable if you just have a set method on that variable but there is no get method do not what variables can be write only there are several variables which can be write only. One very common example is password, because password is so sensitive that normally you would not like to allow any mechanism at all to read a password all that you might want, might allow will have to allow is the is a mechanism to change the password when needed. So password is something which you just write you never read that values. You can just have only set and not no get functions which makes it a write only.

Similarly, in the final group you may have invisible members like the top of the stack or the data array of the stack you just do not want to know how the stack operates all that you want to know is push, pop, top and empty you should work. So there should be no method at all either to read the value of top or data or to change set the value of top or data, and therefore there should be no set-get methods on that. So, with this set-get idiom as you can see that we can create a very fine grain control on the accessibility of the data members and similar accessibility of different methods can also be done, but certainly get-set is a is a typical idiom that works for data members to allow you to do more finite things.

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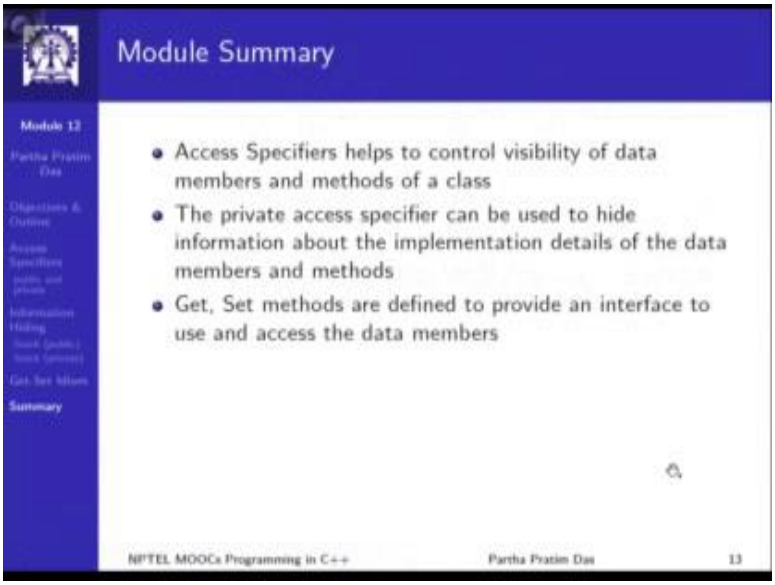

With this we will close on this module. In this module we have understood access specifiers how they help to control visibility of the class members, the public, and the private. They can be used as we have seen to hide information about the implementation of a class while exposing the behavior through the interface and we have specifically seen that get-set methods a specific idiom is often used in C++ to provide very fine grain control on the interface in terms of what access to the data members you want to provide in your design.