C++ Programming

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Class

- Building block that binds together data & code.
- Program is divided into different classes
- Class is collection of data member and member function.
- Class represents set/group of such objects which is having common structure and common behavior.
- Class is logical entity.
- Class has
  - Variables (data members)
  - Functions (member functions or methods)
- By default class members are private(not accessible outside class scope)
- Classes are stand-alone components & can be distributed in form of libraries
- Class is blue-print of an object

Data Members and Member Functions

Data Members

- Data members of the class are generally made as private to provide the data security.
- The private members cannot be accessed outside the class.
- So these members are always accessed by the member functions.

Member Functions

- Member functions are generally declared as public members of class.
- Constructor : Initialize Object
- Destructor : De-initialize Object
- Mutators : Modifies state of the object
- Inspectors : Don’t Modify state of object
- Facilitator : Provide facility like IO

Object

- Object is an instance of class.
- Entity that has physical existence, can store data, send and receive message to communicate with other objects.
- An entity, which get space inside memory is called object.
- Object is used to access data members and member function of the class
- Process of creating object from a class is called instantiation
- **Object has**
  - Data members (***state*** of object)
    - Value stored inside object is called state of the object.
    - Value of data member represent state of the object.
  - Member function (***behavior*** of object)
    - Set of operation that we perform on object is called behaviour of an object.
    - Member function of class represent behaviour of the object.
    - is how object acts & reacts, when its state is changed & operations are done
    - Operations performed are also known as messages
  - Unique address(***identity*** of object)

Few Points to note

- Member function do not get space inside object.
- If we create object of the class then only data members get space inside object. Hence size of object is depends on size of all the data members declared inside class.
- Data members get space once per object according to the order of data member declaration.
- Structure of the object is depends on data members declared inside class.
- Member function do not get space per object rather it gets space on code segment and all the objects of same class share single copy of it.
- Member function's of the class defines behaviour of the object.

Access Specifier

- - If we want to control visibility of members of structure/class then we should use access Specifier.
- Defines the accessibility of data member and member functions

- **Access specifiers in C++**
  1. private(-)
  2. protected(#)
  3. public(+)

- 1. Private - Can access inside the same struct/class in which it is declared Generally data members should declared as private. (data security)
- 2. public - Can access inside the same struct/class in which it is declared as well as inside out side function(like main()). Generally member functions should declared as public.

Scope Resolution Operator (: :)

- :: operator is used to bind a member with some class or namespace.
- It can be used to define members outside class.
- Also used to resolve ambiguity.
- It can also be used to access global members.
  - Example :- ::a =10; access global var.
- Scope resolution Operator is used to :
  - to call global functions
  - to define member functions of class outside the class
  - to access members of namespaces

Example Scope Resolution

```
class complex {
   int real, imag;
public: complex();
   void show();
};
complex::complex() {
   real = imag = 0;
}
void complex::show() {
   cout<<real<<imag;
}
complex obj;
obj.show();
```

Program Demo

- Declare one **class complex within namespace** , having real,imag as data members,declare functions accept() and display(). Define these outside the class using (::). Call accept() and display() from main.

Thank You