C++ Programming

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Constant in C++

- We can declare a constant variable that cannot be modified in the app.
- If we do not want to modify value of the variable then const keyword is used.
- constant variable is also called as read only variable.
- The value of such variable should be known at compile time.
- In C++ , Initializing constant variable is mandatory
- const int i=3; //VALID
- Const int val; //Not ok in c++
- Generally const keyword is used with the argument of function to ensure that the variable cannot be modified within that function.

Constant data member

- Once initialized, if we do not want to modify state of the data member inside any member function of the class including constructor body then we should declare data member constant.
- If we declare data member constant then it is mandatory to initialize it using constructors member initializer list.

```
class Test
{
private:
        const int num1;
public:
        Test( void ) :
num1( 10 ) //OK
        {
        //this->num1 = 10; //Not
OK
        }
};
```

Const member function

- The member function can declared as const. In that case object invoking the function cannot be modified within that member function.
- We can not declare global function constant but we can declare member function constant.
- If we do not want to modify state of current object inside member function then we should declare member function as constant.
- void display() const;
- Even though normal members cannot be modified in const function, but *mutable* data members are allowed to modify.
- In constant member function, if we want to modify state of non constant data member then we should use **mutable keyword.**
- We can not declare following function constant:
  1. Global Function
  2. Static Member Function
  3. Constructor
  4. Destructor

Const object

- If we dont want to modify state of the object then instead of declaring data member constant, we should declare object constant.
- On non constant object, we can call constant as well as non constant member function.
- On Constant object, we can call only constant member functions
- It is C language feature which is used to create alias for existing data type.
- Using typedef, we can not define new data type rather we can give short name / meaningful name to the existing data type.

Reference

- Reference is derived data type.
- It alias or another name given to the exisiting memory location / object.
  - Example : int a=10;   int &r = a;
  - In above example a is referent variable and r is reference variable.
  - It is mandatory to initialize reference.
- Reference is alias to a variable and cannot be reinitialized to other variable
- When ‘&’ operator is used with reference, it gives address of variable to which it refers.
- Reference can be used as data member of any class
- **Using typedef we can create alias for class whereas using reference we can create alias for object.**

Reference

- We can not create reference to constant value.
  - int &num2 = 10; //can not create reference to constant value
- Reference is internally considered as constant pointer hence referent of reference must be variable/object.

```
int main( void )
{
        int num1 = 10;
        int &num2 = num1;
        //int *const num2 = &num1;
        cout<<"Num2 : "<<num2<<endl;
        //cout<<"Num2 : "<<*num2<<endl;
        return 0;
}
```

pass arguments to function, by value, by address or by reference.

- **In C++, we can pass argument to the function using 3 ways:**

1. By Value
2. By Address
3. By Reference

- If variable is passed by reference, then any change made in variable within function is reflected in caller function.
- Reference can be argument or return type of any function

Static Variable

- All the static and global variables get space only once during program loading / before starting execution of main function
- Static variable is also called as shared variable.
- Unintialized static and global variable get space on BSS segment.
- Intialized static and global variable get space on Data segment.
- Default value of static and global variable is zero.
- Static variables are same as global variables but it is having limited scope.

Static Member Functions

- Except main function, we can declare global function as well as member function static.
- To access non static members of the class, we should declare member function non static and to access
- static members of the class we should declare member function static.
- Member function of a class which is designed to call on object is called instance method. In short non static member function is also called as instance method.
- To access instance method either we should use object, pointer or reference to object.
- static member function is also called as class level method.
- To access class level method we should use classname and ::(scope resolution) operator.

Thank You