1 .Define an integer set class named CSet with some memeber functions as follows:

1.1 Multiple elements of the same type can be put in a set.

1.2 IsExist():   To judge if an integer is a member of a set or not;

1.3 IsEqual():   To judge if two sets are equal or not;

1.4 Intersection():   To get intersection with another set; (交集）

1.5 Union():   To get union with another set. （并集）

1.6 RemoveItem():   To delete an integer from the set;

1.7 AddItem():   To add an integer to a set.In this function adds an integer successfully when this integer is NOT in the set and there are enough space to save it in the set;

1.8 GetItem():   To get an integer according to specified position.

NOTES:

(1) To complement CSet class, you may define other member functions with appropriate arguments as well as member variables if you need.

(2) Templates in STL(Standard Template Library) of C++ are FORBIDDEN.

2. Define a class of CSmart which can print how many objects of CSmart there are in the program, and explain the results of the procedure.

NOTE: Don't modify any codes EXCEPT CSmart class.

```
class CSmart
{
    //   Here is your definition ...
};
void DoSomething()
{
    CSmart s;
}

CSmart s1;

int main()   {
    CSmart s2;
    DoSomething();
    CSmart *s3 = new CSmart;
    delete s3;
    s2.~CSmart();
    return 0;
}
```

The outputs of main are as below:

```
1 object
2 objects
3 objects
2 objects
3 objects
2 objects
1 object
0 object
```

3. Create a class, CIntChar, to archieve an integer to save a string which length is no more than 4.

   Suppose that a character length is 1 byte.

   For example: "Love". It's binary form associated with an integer is：
                0100 1100 0110 1111 0111 0110 0110 0101
   (1) If the string's length is less than 4 characters, the remaining part is made up by zero.   For example, "Hi" is: 0100 1000 0110 1001 0000 0000 0000 0000
   (2) If the string's length is more than 4 characters, only the first 4 characters are saved in CIntChar.

   NOTES:
   (1) You MUST define an integer int class to store a string and other appropriate members;
   (2) The string you entered is prohitated from storing in the CIntChar;
   (3) In the main, cllient may call member functions in the following way.

   ```
   void main()
   {
       CIntChar    IC("Love");
       IC.ASC_Print();            // Print the content with string format:   Love
       IC.Binary_Print();         // Print the content with binary format:
                                  // 0100 1100 0110 1111 0111 0110 0110 0101
       IC.Int_Print();            // Print the content with integer format: 1282373221
       cout << IC.At(3) << endl;   // Get the fourth chararacter in the integer:   'v'
       cout << IC.str( ) <<endl;     // Get the string:   "Love"
   }
   ```

4. In C09: Cpptime.h of chapter 9，There is an example, Time, which used C library.

4.1 Define CDateTime to encapusulate funcitons: localtime and struct tm in C library;

4.2 In the main, the class can be used in te following way:

```
int main()
{
        CDateTime dt = CDateTime::Now();


        // 以 am 或 pm 形式显示当前时间，例如下午：3:30:12 pm
          dt.ShowTime12();


        // 以 24 小时形式显示当前时间，例如下午：22:11:12 pm
          dt.ShowTime24();


        // 显示当前日期和星期，例如：2025 年 3 月 19 日，星期三
        dt.ShowDate();


        return 0;
}
```

4.3   [optional] Furthermore, display current time dynamically.

[optional]   Define a class of CLoopSet which holds data with linear structure and connects the last node to the first node, and reimplement all of the member functions in the CSet above.

Note:

(1) You may define compatible parameters as well as   other members you need.

(2) Templates in STL(Standard Template Library) of C++ are FORBIDDEN.