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 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 codes...
};
 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.

(2) If the string's length is more than 4 characters, only the first 4 characters are saved in CIntChar.

NOTES:

(1) You can 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 main, programmer can 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;    // Print the fourth chararacter in the integer:    v
    cout << IC.str( ) <<endl;    // Print the string in CIntChar:    Love
}
```

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

Demands:

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

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

```
int main()
{
        CDateTime dt = CDateTime::Now();
        dt.ShowTime12();     // 以 am  或 pm 形式显示当前时间，例如下午：3:30:12 pm
        dt.ShowTime24();     // 以 24 小时形式显示当前时间，例如下午：22:11:12 pm
        dt.ShowDate();       // 显示当前日期和星期，例如：2023 年 3 月 24 日，星期五

        return 0;
}
```

4.3 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 CSet.

Note: You may define compatible parameters as well as other members you need.