

## Lab Assignment 5

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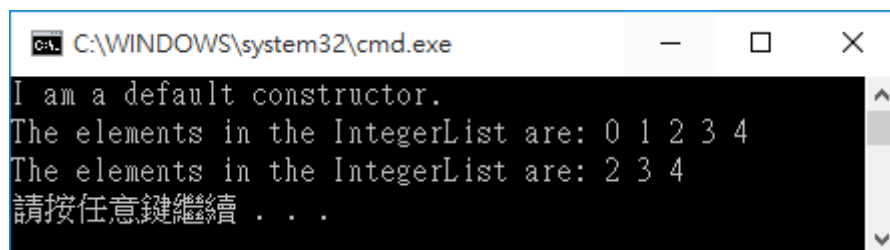
**Exercise 1 (40%)** (a) Write an `IntegerList` class for an array of integers. In the class, use `std::list` as your internal data representation and provide the following constructors:

- `IntegerList()` // print a message said "I am a default constructor."
- `IntegerList(unsigned nelems)` // creates an `IntegerList` with the integers `0...nelems-1`
- `IntegerList(unsigned start, unsigned end)` // creates an `IntegerList` with the range `[start, end)`

In addition, provide a non-member `print` function. Test your program with the client code listed below:

```
#include <iostream>
#include "IntegerList.h"
using namespace std;

int main()
{
    IntegerList a;
    IntegerList b(5);
    print(cout, b) << endl;
    IntegerList c(2, 5);
    print(cout, c) << endl;
}
```



The screenshot shows a Windows command prompt window titled "C:\WINDOWS\system32\cmd.exe". The output of the program is as follows:

```
I am a default constructor.
The elements in the IntegerList are: 0 1 2 3 4
The elements in the IntegerList are: 2 3 4
請按任意鍵繼續 . . .
```

(b) Add an `intersection` member function that prints out the elements common to two arrays. Allow a sequential operation. Test your program with the client code listed below:

```
| #include <iostream>
```

```
#include "IntegerList.h"
using namespace std;

int main()
{
    IntegerList a(3);
    IntegerList b(5);
    IntegerList c(2, 6);
    print(cout, c.intersection(b).intersection(a)) << endl;
}
```

Your output looks like:

```
C:\WINDOWS\system32\cmd.exe
Intersection elements are: 2 3 4
Intersection elements are: 2
The elements in the IntegerList are: 2
請按任意鍵繼續 . . .
```

**Exercise 2 (40%):** Write a program that allows users to continue input an integer and print them with commas if they have more than three digits. For example, -2036 and 123456789123456 would be printed as -2,036 and 123,456,789,123,456, respectively. Use ! to terminate the input. (**hint:** you might want to use `insert` member function in STL `std::string` to ease your life)

```
Enter an integer (<! to quit>): -2345
The integer with comma is: -2,345
Enter an integer (<! to quit>): -123
The integer with comma is: -123
Enter an integer (<! to quit>): 567
The integer with comma is: 567
Enter an integer (<! to quit>): 12345678901234567890
The integer with comma is: 12,345,678,901,234,567,890
Enter an integer (<! to quit>): 23456
The integer with comma is: 23,456
Enter an integer (<! to quit>): !
Press any key to continue . . .
```