

CSCI204/MCS9204/CSCI804

Object and Generic Programming in C++

Laboratory Exercise 7 (Week 9)

Task: A template class - Bag (1.0)

Define a template class **Bag** in a file **Bag.h**. A **Bag** is a collection of zero or more elements, in no particular order that may have duplicates. The public interface consists of methods to:

- Create a template class **Bag**.
- A function **add()** which can add an element to a **Bag**.
- A function **remove()** which can remove a given element from a **Bag**. If the element is duplicated, only remove the first one.
- Implement the union of two **Bag** objects in an overloaded **+** operator. The union of two **Bag** objects, b1 and b2, should be a **Bag** object containing elements that belong to b1 or b2. Remember that duplication is fine.
- An insertion operator (<<) that print all the elements in the **Bag**.

Implement member functions and insertion operator for the **Bag** in a file **Bag.cpp**.

Download the file **testBag.cpp** in which instantiates and initialize two **integer Bag** objects and two **double Bag** objects to test your **Bag** class.

Compile the program like

`g++ testBag.cpp`

Run the program like.

`./a.out`

Number of integers for an integer bag 1: 5

Input an integer: 1

Input an integer: 3

Input an integer: 4

Input an integer: 6

Input an integer: 9

The first integer bag contains: 1 3 4 6 9

Number of integers for an integer bag 2: 3

Input an integer: 1

Input an integer: 6

Input an integer: 8

The second integer bag contains: 1 6 8

Combine two integer bags: 1 3 4 6 9 1 6 8

Input the element that needs to be removed: 1

After the element 1 has been removed, the bag contains 3 4 6 9 1 6 8

Input the element that needs to be removed: 6

After the element 6 has been removed, the bag contains 3 4 9 1 6 8

Number of doubles for a double bag 1: 6

Input a double: 1.5

Input a double: 2.2

Input a double: 3.2
Input a double: 1.5
Input a double: 2.4
Input a double: 2.2
The first double bag contains: 1.5 2.2 3.2 1.5 2.4 2.2

Number of doubles for a double bag 2: 4
Input a double: 2.2
Input a double: 3.3
Input a double: 4.1
Input a double: 3.2
The second double bag contains: 2.2 3.3 4.1 3.2

Combine two double bags: 1.5 2.2 3.2 1.5 2.4 2.2 2.2 3.3 4.1 3.2

Input the element that needs to be removed: 1.5
After the element 1.5 has been removed, the bag contains 2.2 3.2 1.5 2.4 2.2 2.2 3.3 4.1 3.2

Input the element that needs to be removed: 4.1
After the element 4.1 has been removed, the bag contains 2.2 3.2 1.5 2.4 2.2 2.2 3.3 3.2

You can download **input_bag.txt** to test your program by
./a.out < input_bag.txt

Submission:

You should submit the files of tasks to the server by **11:59 PM on Friday, 6 May 2016** via command:

```
submit -u your-user-name -c CSCI204 -a L7 Bag.h Bag.cpp
```

and input your password.

Make sure that you use the correct file names. The UNIX system is case sensitive. You must submit all files in one *submit* command line.

After submit your assignment successfully, please check your email of confirmation. You should keep this email for the reference.

You would receive ZERO of the marks if your program codes could not be compiled correctly.

Later submission will not be accepted. Submission via e-mail is NOT acceptable.

End of Specification