Lab7. Map(STL)

For this lab section, we hope all of you learn what Map is and how to implement your own Map by std::vector and use std::sort(). In addition, you have to understand how to write a file.

We will upload our new test case on 4/29, you must download it on lab7 assignment. After you complete all the methods of the class, you should ask the TA for the DEMO.

We will provide you a file (Lab7_template.cpp) and a test case (test.txt), and you need to do all TODO parts in the file.

Class member:

vector<pair<string, info>> people

Class Methods:

readFile() {}
sortByName(){}
sortByInfo(const char* type){}
find(string name){}
erase(string name){}
write(fstream& file) {}
writeFile(){}

The detail of Class:

1. people:

String is a person's name, and info is a struct, person's height and weight included.

2. readFile():

Read the file to get the command number, and the commands. The command table is listed below.

a { name } { height } { weight }	If a person's name exists in the vector, you need to replace the person's info with new info. Otherwise, just add the element to the vector
f { name }	If a person's name exists in the vector, you need to show the person's info. Otherwise, print ("name" is not found!)
e { name }	If a person's name exists in the vector, you need to erase the person's element in the vector. Otherwise, print ("name" is not found!)

3.add(string name, info& _info):

Add a new element to the vector. If a person's name exists in the vector, override his or her info with new info and show the changes.

4. find(string name):

Search the element in the vector. If a person's name exists in the vector, you need to show the person's info. Otherwise, print ("name" is not found!).

5.erase(string name):

Erase the element in the vector. If a person's name exists in the vector, you need to erase the person's element in the vector. Otherwise, print ("name" is not found!).

6. sortByName():
Sort the element in the vector by name in ascending order.
7. sortByInfo(const char* type):
Sort the element in the vector by the specific way in ascending order. The type table is listed below. You need to do three comparison functions.

"H"	Compare elements by height
"W"	Compare elements by weight
"HW"	Compare elements by height and weight. If two people's height are same, and then sort two people by weight

8. write(fstream& file):
You should write the sorted vector to the file.
9. writeFile():
Write the results of the sorted vector by methods. Don't modify this function.

Note:

1. When you insert an element to a map(STL), the map will sort all elements by key automatically. But you don't do this in this lab, that is, you just add an element to the vector or modify element in the vector.
2. You must use an iterator and don't use std::map.

Hint:

Map:
1. https://www.cplusplus.com/reference/map/map/
2. Teacher's slide "10_Template_STL_voice_Eng.pptx" p.42 ~ p.46

Write File:
1. Teacher's slide "10_Streams_FILE_I_O_voice_Eng.pptx"

Sort:
1. http://www.cplusplus.com/reference/algorithm/sort/
2. Teacher's slide "10_Template_STL_voice_Eng.pptx" p.3 ~ p.4

Sample Input: Sample Output:

```
15
a Abby 150 50
a Benny 167 59
a Lucas 200 100
a Adam 167 66
a Ryan 167 90
a Aurora 156 48
a Levi 150 44
a Sarah 170 60
a Joseph 177 70
a Zoey 144 45
a Abby 170 50
f Joseph
f Gary
e Joseph
e Gary
```

```
Abby's h:150 and w:50 is changed to h:170 and w:50
Joseph is found! h:177 and w:70
Gary is not found!
Joseph is erased!
Gary is not found!
File lab7.txt saved!
```

File Output:

You have to print your output and file same as the format that we ask.

```
Sort By Name
Abby:   170, 50
Adam:   167, 66
Aurora: 156, 48
Benny:  167, 59
Levi:   150, 44
Lucas:  200, 100
Ryan:   167, 90
Sarah:  170, 60
Zoey:   144, 45

Sort By Height
Zoey:   144, 45
Levi:   150, 44
Aurora: 156, 48
Adam:   167, 66
Benny:  167, 59
Ryan:   167, 90
Abby:   170, 50
Sarah:  170, 60
Sort By Weight
Levi:   150, 44
Zoey:   144, 45
Aurora: 156, 48
Abby:   170, 50
Benny:  167, 59
Sarah:  170, 60
Adam:   167, 66
Ryan:   167, 90
Lucas:  200, 100

Sort By Height&Weight
Zoey:   144, 45
Levi:   150, 44
Aurora: 156, 48
Benny:  167, 59
Adam:   167, 66
Ryan:   167, 90
Abby:   170, 50
Sarah:  170, 60
Lucas:  200, 100
```