面向对象程序设计 C++ 第 5 次实验

要求：

i) 提供编程思路、关键代码、程序运行结果（截图、输出结果等）；

ii) 可以以附录形式给出完整的源代码，同时需要将源代码文件（.h 文件、.cpp 文件等），和作业报告一起打包提交，压缩包命名为"学号_姓名"；

iii) 以 .docx 或 .pdf 格式撰写与提交作业，作业以"学号_姓名"命名。非编程题直接写在 word 文档里，编程题需建立子文件夹存放代码文件，子文件夹命名为"hwx_y"，表示为第 x 次作业第 y 题。

iv) 独立完成，严禁抄袭。

题目 1

Write a computer program that could be used to track, by lab, which user is logged into which computer:

Lab Number	Computer Station Numbers
1	1-5
2	1-6
3	1-4
4	1-3

➢ You run four computer labs. Each lab contains computer stations that are numbered as the above table.

➢ Each user has a unique ID number. The ID starting with three characters (for example, SWE or DMT), and followed by three digits (like, 001).

➢ Whenever a user logs in, the user's ID, lab number, and the computer station number are transmitted to your system. For example, if user SWE001 logs into station 2 in lab 3, then your system receives (SWE001, 2, 3) as input data. Similarly, when a user SWE001 logs off a station, then your system receives the user id SWE001.

➢ If a user who is already logged into a computer attempts to log into a second computer, display "invalid login".

If a user attempts to log into a computer which is already occupied, display "invalid login".

If a user who is not included in the database attempts to log out, display "invalid logoff".

输入格式

If user SWE001 is logged into station 2 in lab 3 and user DMT001 is logged into station 1 of lab 4, use

+ for logging in,

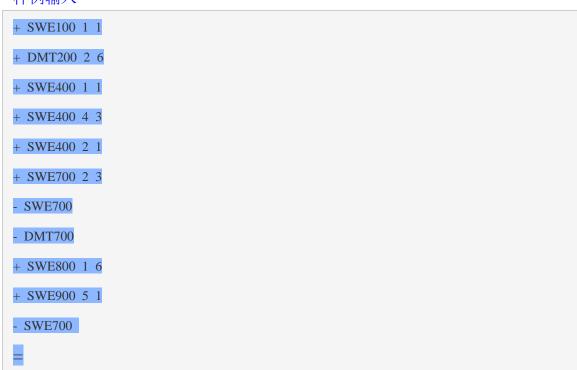- for logging off, and = for end of input:

+ SWE001 2 3

+ DMT001 1 4

- SWE001

=

输出格式

The status of all labs (who is logged into which computer). Otherwise, display invalid login or invalid logoff.

You need to display the status of all labs even when the input is invalid.

样例输入

```
+ SWE100 1 1
+ DMT200 2 6
+ SWE400 1 1
+ SWE400 4 3
+ SWE400 2 1
+ SWE700 2 3
- SWE700
- DMT700
+ SWE800 1 6
+ SWE900 5 1
- SWE700
=
```

样例输出

```
1 1: SWE100 2: empty 3: empty 4: empty 5: empty
2 1: empty 2: empty 3: empty 4: empty 5: empty 6: empty
3 1: empty 2: empty 3: empty 4: empty
4 1: empty 2: empty 3: empty


1 1: SWE100 2: empty 3: empty 4: empty 5: empty
2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200
3 1: empty 2: empty 3: empty 4: empty
4 1: empty 2: empty 3: empty
```

invalid login

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: empty

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

invalid login

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: SWE700 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

invalid logoff

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

invalid login

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

invalid login

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

invalid logoff

1 1: SWE100 2: empty 3: empty 4: empty 5: empty

2 1: empty 2: empty 3: empty 4: empty 5: empty 6: DMT200

3 1: empty 2: empty 3: empty 4: empty

4 1: empty 2: empty 3: SWE400

题目 2

➕ 把题目 1 的 **Computer Labs** 程序修改为面向对象程序，包含以下内容：

➢ ComputerLab 类

➢ User 类

➢ main 函数（除此之外，程序中没有其他的全局函数）