PD2 2023

HW4

CSIE@NCKU 2023

Homework Description:

Same as HW3, given a simple csv file (file name will be given by the input argument) in which each line contains the employee sign-in and sign-out information, and each line contains “employee_id”, “signing type”, and “signing time”.

Please answer the question that

Which employees work with longest continuous workdays without personal leave? Please answer the top three employees with their ID and number of longest continuous workdays.

Please use ‘cout’ to send all result to console.

In the output, each line should contain

‘employee_id, #longest_continuous_workdays, from_day, end_day’

And, lines are printed according to #longest_continuous_workdays in the descending order (if two employees have the same #longest_continuous_workdays, print out their order according to their employee ids in the ascending order).

Same as HW3, employees may forget to sign-in or sign-out, and so that we count them a workday if they have either sign-in log or sign-out log within a day.

Same as HW3, the sign-in and sign-out time format is ‘year-month-date-hour-minute’, where year is 4-digits, month is 2-digits, date is 2-digits, hour is 2-digits and minute is 2-digits. For example, 201301050859 represents 2013-01-05, 8:59.

The operations of the company start from 2012/1/1, and Don’t care the signing date after 2023/4/26. In addition, from_day and end_day should be as the form of ‘20200101’ (hour and minute are ignored).

Deadline:

2023/4/26 23:59 (Wed.).

HW4 should be submitted before the deadline. No excuse to submit your code after the deadline. TA will copy your code at 2023/4/27 00:01. If your code is not in the hw4 Folder, you will get score '0'.

Environment:

1. uname -a
   Linux version 5.15.0-67-generic (buildd@lcy02-amd64-116) (gcc (Ubuntu 11.3.0-1ubuntu1~22.04) 11.3.0, GNU ld (GNU Binutils for Ubuntu) 2.38) #74-Ubuntu SMP Wed Feb 22 14:14:39 UTC 2023
2. IP: 140.116.246.230
3. Please remember you should connect to the server with a NCKU IP. Make sure you use NCKU VPN or connect to the server in our school.

Example:

An example csv file, named test.csv, may be as the form:

```
1023,sign-in,202303110819
1025,sign-out,202303111650
1053,sign-out,202303101505
1023,sign-out,202303112000
1053,sign-in,202303100811
1023,sign-out,202303101700
```

Input:

```
test.csv
```

Output:

```
1023,2,20230310,20230311
1025,1,20230311,20230311
1053,1,20230310,20230310
```

Note:

1. It is encouraged that you can "use chatGPT".
2. You could consider to use array operations because the array size of working days won't be more than 5000 or 10000.

3. This is a simple extension from HW3 and remember you may process a big file.
4. (Important)The context in the file is “not sorted”, meaning that in some cases you will see sign-out before sign-in for an employee in a specific day.
5. The maximum number of employees is smaller than 10,000.
6. Normally, each day should have two signs (one is ‘sign-in’, one is ‘sign-out’). We won’t give the case that two sign-in or two sign-out within a day.
7. You don’t need to consider the case of less than 3 employees.
8. If an employee have 2 or 3 #continuous_workdays being listed as top three #continuous_workdays, use the longest one. You should print out three different employees.
9. For some cases, employees may forget to sign-in or sign-out. But each day is counted individually, they won’t work overnight.
10. Remember the strict output ordering policy. We will examine your correctness by our shell script without any excuse.
11. Please list the result to console. We will use the shell operator “>” to copy all your homework output to a created file named “result”.
12. You need to declare the executable file named “**hw4**” which will be generated by using your makefile with “make all”.
13. The csv file name will be given as the input argument without any exception of file handle error.
14. For the convenience of checking your homework, **output** must not contain any blank characters or other characters, otherwise your score will be deducted.
15. It is okay if you know how to use the STL library.
16. We count the result correction as the base of scoring (100%).
17. The execution efficiency will also be counting. Top 10% submissions will get the bonus of 20% score.
18. Note that you should process ‘time’ as string or ‘long long’, it is out of scope of ‘int’.
19. If you know how to use scp (you may use Windows-based PowerShell), you could try scp in powershell like:

```
scp hw4.cpp ktchuang@140.116.246.230:~/hw4
```

How to Submit:

Please pay attention to the following instructions when submitting homework:

1. Under your account folder, create the folder named "**hw4**".
   (*Please note that you must pay attention to the correct capitalization. If we cannot correctly copy the foler hw4, you will get score '0'.)

2. Put every necessary files under the folder, including :
   i. Your **main program**, such as main.cpp, hw4.cpp, main.h, program.h, etc.
   ii. **makefile** (*Name your executable file as "hw4")
3. Make sure it works normally under the folder and all files are in the correct path.

Examples of files in your folder:

```
netdb@2023pd2:/home/vs6112030/hw4$ pwd
/home/vs6112030/hw4
netdb@2023pd2:/home/vs6112030/hw4$ ls
hw4  main.cpp  makefile
```

How we execute:

```
netdb@2023pd2:/home/vs6112030/hw4$ make all
netdb@2023pd2:/home/vs6112030/hw4$ ./hw4 test.csv > result
```

Supplement:

You may try to learn the way of using 'vector', 'csv read', 'time string formatting' from google or ChatGPT.