CS246: Database Management Systems Lab

Lab # 03 (1 Questions, 100 Marks)
Lab session: AL1
Held on: 23-Jan-2023 (Mon)
Lab Timings: 14:00 to 17:00 Hours Pages: 4
Submission time: 18:00 Hrs, 23-Jan-2023
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Question 1: (100 points)

Records sorting by set of keys. Implement the following problem in C programming language. Use of any other programming language is not allowed and will lead to awarding 0 marks.

Input Data You are given three input data files containing the following:

students01.csv Each line contains information about one student as described below:

- Student name
- Student roll number

courses01.csv Each line contains information about one course. The following attributes are given for each course

- Semester number in which the course is offered. Semester number is between 1 and 8 (both inclusive)
- Course number
- Course name
- Number of lecture hours per week
- Number of tutorial hours per week
- Number of practical hours per week
- Total number of credits

grades01.csv Every line contains the following information

- Student roll number
- Course number
- Grade the student obtained in this course

Problem Statement Your task is to:

Task 1 Read the three files

Task 2 Sort the loaded data on the following fields using (i) Quick sort and (ii) bubble sort

Task 2a Student's name in *ascending order*. The output of this task should be `student name`, `course name`, `credits`, `grade`. Example output is:

```
...
RAHUL KRISHNA,Introductory Biology,6,AA
RAHUL KRISHNA,Chemistry,8,BC
RAHUL KRISHNA,Chemistry Lab,3,AB
RAHUL KRISHNA,Introduction to Computing,6,CD
...
RAHUL KUMAR,Introductory Biology,6,DD
RAHUL KUMAR,Chemistry,8,BB
RAHUL KUMAR,Chemistry Lab,3,AA
RAHUL KUMAR,Introduction to Computing,6,AB
...
RAHUL MALA,Introductory Biology,6,BC
RAHUL MALA,Chemistry,8,CC
RAHUL MALA,Chemistry Lab,3,CD
RAHUL MALA,Introduction to Computing,6,DD
...
```

Task 2b followed by task 2a, sort `credits` in *descending order*. That is within the above sorting (task 2a), sort by `credits` in descending order. Through this task, `student name` should be sorted in ascending order (task 2a) AND `credits` should be sorted in descending order.

```
...
RAHUL KRISHNA,BTP Phase - 2,12,AB
RAHUL KRISHNA,BTP Phase - 1,12,DD
RAHUL KRISHNA,Probability Theory and Random Processes,8,AB,
RAHUL KRISHNA,Mathematics-2,8,BB,
...
RAHUL KUMAR,BTP Phase - 2,12,CD
RAHUL KUMAR,BTP Phase - 1,12,CD
RAHUL KUMAR,Engineering Mechanics,8,AB
RAHUL KUMAR,Basic Electronics,8,AB
...
RAHUL MALA,BTP Phase - 1,12,BB
RAHUL MALA,BTP Phase - 2,12,BC
RAHUL MALA,Mathematics-1,8,BB
RAHUL MALA,Engineering Mechanics,8,CC
...
```

Task 2c followed by task 2b, sort the `grade` obtained in ascending order. That is, sort `student name` in ascending order AND `credits` in descending order AND `grade` in ascending order.
Note: grade is a two characters string. While sorting grades, do not interpret their value. Sort grade as two character string.

```
...
RAHUL KRISHNA,BTP Phase - 2,12,AB
```

```
RAHUL KRISHNA,BTP Phase - 1,12,DD
RAHUL KRISHNA,Mathematics-1,8,AA
RAHUL KRISHNA,Probability Theory and Random Processes,8,AB
...
RAHUL KUMAR,BTP Phase - 2,12,CD
RAHUL KUMAR,BTP Phase - 1,12,CD
RAHUL KUMAR,Engineering Mechanics,8,AB
RAHUL KUMAR,Basic Electronics,8,AB
...
RAHUL MALA,BTP Phase - 1,12,BB
RAHUL MALA,BTP Phase - 2,12,BC
RAHUL MALA,Basic Electronics,8,AB
RAHUL MALA,Mathematics-1,8,BB
...
```

Task 3 Output at the end of `Task 2c` should be written in a new file with the following format:

- Student full name
- Separated by comma
- Course name
- Separated by comma
- Credits
- Separated by comma
- Grade

Mandatory It is mandatory to perform the above three sorting steps.
Write the above into two new files named `grades-sorted-Q.csv` and `grades-sorted-B.csv`

Instructions Adhere to the following

File naming Prepend C program file names with your roll number. Adhere to the input and output file naming convention as given in the problem description.

Independent efforts You should make an honest and independent effort in obtaining the solution to the above problem. You are also encouraged to bring one data structures and algorithms text book and one programming language text book of your choice.

Discussions with fellow students are not allowed.

Internet Use of internet during lab hours is not allowed.

Mobile phones Use of mobile phones in the lab hours is not allowed.

Evaluation At the end of 18:00 hours, TAs will come and evaluate your program. Leave the lab once your evaluation is completed.

Marking Scheme The evaluation criteria is as follows:

Task 1 (10 Marks) for reading three input files

Task 2a (20 Marks) for sorting each `student name` in ascending order

Task 2b (25 Marks) followed by sorting by `credits` in descending order

Task 2c (25 Marks) followed by sorting by `grade`s in ascending order

Task 3 (20 Marks) Correct output