CS246: Database Management Systems Lab

Lab # 03 (1 Questions, 50 Points)
Timings: 14:00 to 17:00 Hours Pages: 4

IIT Guwahati

21 Jan 2020 (Tue)

Question 1: (50 points)

Implement the following problem in C or 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

Disclaimer The grades data is randomly generated and has no bearing with the actual data.

Problem Statement Your task is to:

Read These three files

Sort Sort each record of the grades01.csv file on the following fields using (i) Quick sort and (ii) Merge sort

Step 1 Student's name (using students roll number) in *ascending order*. After this step all the rows should be sorted by students name. That is logically the following is the result.

```
...
RAHUL KRISHNA,Machine Learning,BB
RAHUL KRISHNA,Students Activity Course-2,DD
RAHUL KRISHNA,Departmental Elective Lab 6.3,DD
RAHUL KRISHNA,Minor-1,CD
...
RAHUL KUMAR,Software Engineering Lab,AB
RAHUL KUMAR,Physics Lab/ME110 Workshop,DD
RAHUL KUMAR,Departmental Elective 6.1,BC
RAHUL KUMAR,Minor-4,AA
...
RAHUL MALA,Students Activity Course-1,AA
RAHUL MALA,Implementation of Programming Languages Lab,AA
RAHUL MALA,Minor 5,AB
RAHUL MALA,Departmental Elective 6.2,AB
...
```

Step 2 Followed by course name in *descending order*. That is within the above sorting, sort by course name in descending order. You will re-order when student name is same but credited several courses, and these courses names should be in the descending order for a given student name. In other words, input to this step is output of step 1. Through this step, student name AND course name should be in sorted order.

```
...
RAHUL KRISHNA,Workshop/PH110 Physics Lab,CD
RAHUL KRISHNA,System Software Lab,DD
RAHUL KRISHNA,Students Activity Course-4,CD
RAHUL KRISHNA,Students Activity Course-3,BB
...
RAHUL KUMAR,Workshop/PH110 Physics Lab,CC
RAHUL KUMAR,System Software Lab,AA
RAHUL KUMAR,Students Activity Course-4,CC
RAHUL KUMAR,Students Activity Course-3,AA
...
RAHUL MALA,Workshop/PH110 Physics Lab,BC
RAHUL MALA,System Software Lab,DD
RAHUL MALA,Students Activity Course-4,BC
RAHUL MALA,Students Activity Course-3,AA
...
```

Step 3 Followed by sort the grade obtained in ascending order. That is by keeping the student name in ascending order AND course name in descending order you have to sort the grade obtained in ascending order. You will re-order when for the same student name and same course name you have two different grades obtained and they have to be in sorted order. In other words, input to this step is output of step 2. Through this step, student

name AND course name AND grade obtained should be in the sorted order.

```
...
RAHUL KRISHNA,Workshop/PH110 Physics Lab,CD
RAHUL KRISHNA,System Software Lab,DD
RAHUL KRISHNA,Students Activity Course-4,CD
RAHUL KRISHNA,Students Activity Course-3,BB
...
RAHUL KUMAR,Workshop/PH110 Physics Lab,CC
RAHUL KUMAR,System Software Lab,AA
RAHUL KUMAR,Students Activity Course-4,CC
RAHUL KUMAR,Students Activity Course-3,AA
...
RAHUL MALA,Workshop/PH110 Physics Lab,BC
RAHUL MALA,System Software Lab,DD
RAHUL MALA,Students Activity Course-4,BC
RAHUL MALA,Students Activity Course-3,AA
...
```

Write Output at the end of step 3 should be written in a new file with the following format:

- Student full name
- Separated by comma
- Course name
- 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-M.csv`

Instructions Adhere to the following

File naming Prepend C/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 17:00 hours, TAs will come and evaluate your program. Leave the lab once your evaluation is completed.

Marking Scheme The evaluation criteria is as follows:

- **10 Marks** For reading three input files
- **10 Marks** For sorting each student semester-wise grades in ascending order
- **10 Marks** Followed by sorting by course name in descending order
- **10 Marks** Followed by sorting by grades in ascending order
- **10 Marks** Correct output