CS246: Database Management Systems Lab

Lab # 08 (1 Questions, 82 Marks)
Lab session: AL1
Held on: 19-Feb-2024 (Sat)
Lab Timings: 14:00 to 17:00 Hours Pages: 4
Submission time: 16:45 Hrs, 19-Feb-2024
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1. Some of the tasks are so designed to emit errors when SQL statements are invoked. You should make an informed effort to find the cause of the errors. **You do not need to resolve the errors.**
2. You must perform insertion as individual statements. That is write several insert statements. **Any attempt to import all the data into tables leads to ZERO marks.**
3. Write all the SQL statements in a file named with `your_roll_number`.sql file name & extension and upload. Note replace the text `your_roll_number` with appropriate roll number. If you have several files, appropriately name them by prepending your roll number.
4. You must submit every file that is used to implement the following lab problem.
5. This lab theme is centered around sections 3.7 of the text book *Database System Concepts* Abraham Silberschatz, Henry F Korth & S. Sudarshan and SELECT statement involving more than one table.
6. Refer to table creation statement manual document
7. Refer to insert statement manual document
8. Refer to select statement manual document
9. Refer to join statement manual document

Question 1: (82 points)

Write `MySQL` statements for the following tasks:

Task 01 (1 mark) Create a database named `week08`. Within this database, create the following tables.

Task 02 (37 marks) **Create tables**

1. (10 marks) Create a table `student` with the following description and data population method
   (a) (2 marks) 1^{st} column `roll_number` is of integer data type. This is the primary key of the table.

(b) (2 marks) 2^{nd} column `name` is of variable length character data whose size is 20 characters. Place a constraint that this should not take NULL values

(c) (2 marks) 3^{rd} column `program` is of variable length character data whose size is 20 characters. This column take values from the set {'Certificate', 'Diploma', 'Degree', 'Honors'}.

(d) (4 marks) Insert the data given in file `student.csv` into table `student`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task02_student.sql` file. At the SQL prompt execute `source task02_student.sql`.

2. (6 marks) Create a table `course` with the following description and data population

(a) (1 mark) 1^{st} column `cid` is of fixed length character data whose size is 5.

(b) (1 mark) 2^{nd} column `cname` is of variable length character data whose size is 100.

(c) (4 marks) Insert the data given in file `course.csv` into table `course`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task02_course.sql` file. At the SQL prompt execute `source task02_course.sql`.

3. (9 marks) Create a table `concept` with the following description and data population

(a) (1 mark) 1^{st} column `cid` is of fixed length character data whose size is 5.

(b) (1 mark) 2^{nd} column `qn` is of fixed length character data whose size is 5.

(c) (1 mark) 3^{nd} column `description` is of variable length character data whose size is 100.

(d) (1 mark) `cid` and `qn` together is the primary key.

(e) (1 mark) `cid` is a foreign key references `course(cid)`.

(f) (4 marks) Insert the data given in file `concept.csv` into table `concept`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task02_concept.sql` file. At the SQL prompt execute `source task02_concept.sql`.

4. (12 marks) Create a table `marks` with the following specification and data population

(a) (1 mark) 1^{st} column `roll_number` is of integer data type.

(b) (1 mark) 2^{nd} column `cid` is of fixed length character data whose size is 5.

(c) (1 mark) 3^{rd} column `set1` is of fixed length character data whose size is 5.

(d) (1 mark) 4^{th} column `set1_marks` is of integer data.

(e) (1 mark) 5^{th} column `set2` is of fixed length character data whose size is 5.

(f) (1 mark) 6^{th} column `set2_marks` is of integer data.

(g) Place the following constraints on this table:

- (1 mark) `roll_number, cid, set1` to be primary key.
- (1 mark) `roll_number` a foreign key references the table `student(roll_number)`

- (1 mark) `cid` a foreign key references the table `course(cid)`

(h) (4 marks) Insert the data given in file `marks.csv` into table `marks`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task02_marks.sql` file. At the SQL prompt execute `source task02_marks.sql`.

Task 03 (44 marks) **Select involving more than two table and aggregation functions**

1. (1 mark) List the student name, `cid, set1, set1_marks, set2, set2_marks`.
2. (1 mark) List the `roll_number`, course name, `set1, set1_marks, set2, set2_marks`.
3. (1 mark) List the student name, course name, `set1, set1_marks, set2, set2_marks`.
4. (1 mark) List the student name, `cid, set1`, `set1 concept description, set1_marks`, `set2`, `set2 concept description, set2_marks`.
5. (1 mark) List the `roll_number`, course name, `set1`, `set1 concept description, set1_marks`, `set2`, `set2 concept description, set2_marks`.
6. (2 marks) List names of the students who are in both "Introduction to Data Science" and "Computer System Tools" (You should not use `cid` for this query).
7. (2 marks) List names of the students who are in "Introduction to Data Science" but not in "Python Programming" (You should not use `cid` for this query).
8. (2 marks) List `roll_number`'s of students who are in "Linear Algebra", "Python Programming", and "Computer System Tools" (You should not use `cid` for this query).
9. (2 marks) List `roll_number`'s of students who are in "Linear Algebra" but not in "Python Programming", and "Computer System Tools" (You should not use `cid` for this query).
10. (4 marks) List `roll_number`'s of students who have credited all the four courses.
11. (4 marks) List `roll_number`'s of students who have NOT credited all four courses.
12. (1 mark) What is the average obtained in DA105 in `q01s1`?
13. (1 mark) What is the average obtained in DA106 in `q01s2`?
14. (1 mark) What is the average obtained in DA107 in `q01s1`?
15. (1 mark) What is the average obtained in DA108 in `q01s2`?
16. (1 mark) Count the number of students who got marks between 0 and 5 in `q01s1` in `DA107`
17. (1 mark) Name the student(s) who got maximum marks in `DA107` for `q07s1`
18. (1 mark) List the `roll_number`'s of students who got maximum marks in `DA107` and registered for 'Diploma' in set `q02s2`
19. (1 mark) List the `roll_number`'s of students who got maximum marks in `DA107` and registered for 'Honors'
20. (1 mark) List the `roll_number`'s of students who got maximum marks in `DA107`, registered for 'Honors' in the concept 'OS'

21. (2 marks) List the `roll_number, name, cid, cname` and total marks obtained in set1, total marks obtained in set2 by the student.
22. (2 marks) List the `roll_number, name, cid, cname` and total marks obtained in set1, total marks obtained in set2 by the student who registered for 'Degree'.
23. (2 marks) For each course, count how many students are registered for {'Certificate', 'Diploma', 'Degree', 'Honors'}.
24. (2 marks) What is the average obtained in DA105 in `q01s1` for students registered for Certificate?
25. (2 marks) What is the average obtained in DA108 in `q12s1` for students registered for Diploma?
26. (1 mark) Compute the total marks obtained by `roll_number` 270101636 in `DA105` in `set1_marks` and `set2_marks`
27. (1 mark) Compute the total marks obtained by `roll_number` 270101636 in `DA106` in `set1_marks` and `set2_marks`
28. (1 mark) Compute the total marks obtained by `roll_number` 270101636 in `DA107` in `set1_marks` and `set2_marks`
29. (1 mark) Compute the total marks obtained by `roll_number` 270101636 in `DA108` in `set1_marks` and `set2_marks`