CS246: Database Management Systems Lab

Lab # 07 (1 Questions, 60 Marks)
Lab session: AL1
Held on: 17-Feb-2024 (Sat)
Lab Timings: 14:00 to 17:00 Hours Pages: 4
Submission time: 16:45 Hrs, 17-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 3.3, section 3.4 and section 3.5 of the text book *Database System Concepts* Abraham Silberschatz, Henry F Korth & S. Sudarshan. Additional hints are embedded within the problem set.
6. Refer to table creation statement document
7. Refer to insert statement document
8. Refer to select statement document

Question 1: (60 points)

Write `MySQL` statements for the following tasks:

Task 01 (1 mark) Create a database named `week07`. Within this database, create the following tables.

Task 02 (8 marks) Create a table `T01` with columns named `a, b, c, d` which are of integer data type. Column `e` is of character data type of size 20. Place the following constraints on the columns

1. (1 mark) Column `a` as primary key
2. (1 mark) Column `b` is unique and not null
3. (1 mark) Column `c` is unique and not null

4. (1 mark) Column `d` is unique and not null
5. (1 mark) Column `e` is unique and not null

(3 marks) Insert the data given in file `t01.csv` into table `T01`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task02.sql` file. At the SQL prompt execute `source task02.sql`.

Task 03 (8 marks) Create a table `T02` with the following columns named `c1, c3` of integer data type. Column `c2` is of character data type of size 20. Place the following constraints on the columns

1. (1 mark) Column `c1` is primary key
2. (1 mark) Column `c3` is not null
3. (1 mark) Column `c2` is not null

(5 marks) Insert the data given in file `t02.csv` into table `T02`. Note you should write several individual insert statements. Develop a C program to generate them. Save the output in a say `task03.sql` file. At the SQL prompt execute `source task03.sql`.

Task 04 (9 marks) Write SQL queries to retrieve data using above tables

1. (1 mark) Retrieve all the rows of table `T01` by listing columns `a, b, c, d` and `e`.
2. (1 mark) Retrieve all the rows of table `T01` by listing first 4 columns.
3. (1 mark) Retrieve all the rows of table `T01` by listing last 3 columns.
4. (1 mark) Retrieve all the rows of table `T01` by listing columns `a, c` and `e`.
5. (1 mark) Retrieve all the rows of table `T01` by listing all the columns in reverse order.
6. (1 mark) Retrieve all the rows of table `T01` by performing following arithmetic operation on columns
   (a) Add 10 to column `a`. List column `a` before addition and after addition.
   (b) Subtract 20 from column `b`. List column `b` before subtraction and after subtraction.
   (c) Multiply 30 to column `c`. List column `c` before multiplication and after multiplication.
   (d) Divide column `d` by 40. List column `d` before division and after division.
   (e) You have to list the columns strictly in the order given above. Any deviation leads to ZERO marks.
7. (1 mark) Retrieve all the rows of table `T01` by listing all the columns without naming them.
8. (1 mark) Retrieve all the rows of table `T01` by listing all the columns and sorting the column `e` in ascending order.
9. (1 mark) Retrieve all the rows of table `T01` by listing all the columns and sorting the column `e` in descending order.

Task 05 (11 marks) Write SQL queries to retrieve data using above tables

1. (1 mark) Retrieve the rows and all columns of table `T01` such that column `a` is **equal** to 82941.
2. (1 mark) Retrieve the rows of table `T01` such that column `a` is **not equal** to 82941 and list first 4 columns.
3. (1 mark) Retrieve the rows of table `T01` whose column `a` is **greater than** 84921 and listing columns last 3 columns.
4. (1 mark) Retrieve the rows of table `T01` whose column `a` is **greater than or equal to** 84921 and listing columns `a, c` and `e`.
5. (1 mark) Retrieve the rows of table `T01` whose columns `a` is **less than** 84921 and listing columns in reverse order.
6. (1 mark) Retrieve the rows of table `T01` whose columns `a` is **less than or equal** to 84921 and listing columns in reverse order.
7. (1 mark) Retrieve the rows of table `T01` whose columns `a` is **between** 80000 and 84921 and listing columns in reverse order.
8. (1 mark) Retrieve the rows of table `T01` which meet the following condition
   - `a` is between 80000 and 84921
   - `b` not equal to 84921
   - `c` greater than 40000
   - `d` less than 65000

   by performing following arithmetic operation on columns and listing them
   - Add 10 to column `a`. List column `a` before addition and after addition.
   - Subtract 20 from column `b`. List column `b` before subtraction and after subtraction
   - Multiply 30 to column `c`. List column `c` before multiplication and after multiplication
   - Divide column `d` by 40. List column `d` before divison and after divison
   - You have to list the columns strictly in the order given above. Any deviation leads to ZERO marks.
9. (1 mark) Retrieve the rows of table `T01` whose `a` value is between 0 and 50000 and `b` value is greater than 50000 and listing all the columns without naming them.
10. (1 mark) Retrieve the rows of table `T01` whose `a` value is between 0 and 50000 and `b` value is greater than 50000 and sorting the column `e` in ascending order.
11. (1 mark) Retrieve the rows of table `T01` whose `a` value is between 0 and 50000 and `b` value is greater than 50000 and sorting the column `e` in ascending order and column `b` in descending order.

Task 06 (11 marks) Write SQL queries to retrieve data using above tables. You should use only the concepts presented in section section 3.3, 3.4, and 3.5 to solve the following. Any alternate solutions involving advanced content will receive ZERO marks.

1. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` starts with `lo`.
2. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` ends with `ing`.
3. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` contains exactly four characters.
4. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` contains exactly four characters of which third character is `i`.
5. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` contains exactly four characters of which second character is `i` and fourth character is `h` or `l`.
6. (5 marks) Retrieve the rows and column `e` of table `T01` such that column `e` contains four characters of which third character is not `i` (You may think of multiple SQL statements to achieve this task. You may create temporary tables and store the result and operate on the temporary tables).
7. (1 mark) Retrieve the rows and column `e` of table `T01` such that column `e` is more than six characters. Use of length computation function leads to ZERO marks.

Task 07 (12 marks) Write SQL queries using set operators to retrieve data using above tables. You must use set operators. Use of logical operators to obtain solution leads to ZERO marks.

1. (2 marks) Retrieve all the rows of `T01(a, b)` and `T02(c1, c3)` such that `a` is greater than 50000 OR `c2` starts with `e`.
2. (5 marks) Retrieve all the common rows in `T02` and `T01(a, e, c)`. The `intersect` operator is not present in `MySQL` you must obtain solution for this using the discussion present in section 3.8.1 namely set membership testing.
3. (5 marks) Retrieve all the rows present in `T02` but not in `T01(a, e, c)`. The `except` operator is not present in `MySQL` you must obtain solution for this using the discussion present in section 3.8.1 namely set membership testing.