# CS246: Database Management Systems Lab

**Lab # 07 (1 Questions, 78 Points)**
**Held on 20-Feb-2023**
**Lab Timings: 14:00 to 18:00 Hours Pages: 5**
**Submission: 18:00 Hrs, 20-Feb-2023**
**Instructors Dr. V. Vijaya saradhi & Prof. Jatindra Kumar Deka**
**Head TAs Adithya Moorthy & Laxita Agrawal**
**Department of CSE, IIT Guwahati**

a. This lab assignment is based on the concepts covered in chapter 4 **intermediate SQL** in the CS245 theory class.

b. **Some of the questions are so designed to yield errors.**

c. You can refer to the text book for SQL syntax.

**Question 1:** (78 points)

Using `MySQL` perform the following tasks:

**Task 01 - 1 mark** Create a database named *week07*

**Task 02** (3 marks) **Create tables**

a. (1 mark) A table `student18a` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `name` | string of characters of fixed size 100 |
| $2^{nd}$ column | `roll_number` | string of characters of fixed size 10 |

with `roll_number` as primary key.

b. (1 mark) A table `course18a` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `semester` | integer |
| $2^{nd}$ column | `cid` | string of characters of fixed size 7 |
| $3^{rd}$ column | `name` | string of characters of fixed size 100 |
| $4^{th}$ column | `l` | integer |
| $5^{th}$ column | `t` | integer |
| $6^{th}$ column | `p` | integer |
| $7^{th}$ column | `c` | integer |

with `cid` as primary key.

c. (1 mark) A table `grade18a` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `roll_number` | string of characters of fixed size 10 |
| $2^{nd}$ column | `cid` | string of characters of fixed size 7 |
| $3^{rd}$ column | `letter_grade` | string of characters of fixed size 2 |

with `roll_number` and `cid` together form primary key

**Task 03** (3 marks) **Populate data**

- (1 mark) populate data from the file `student18.csv` into table `student18a`
- (1 mark) populate data from the file `course18.csv` into table `course18a`

- (1 mark) populate data from the file `grade18.csv` into table `grade18a`

Use any one of the following methods to populate the data

- Using several insert statements, each insert statement corresponding to one line of the data file into a table. These insert statements are generated using a C program
- Using MySQL `load` statement

**Task 04** (13 marks) **Views**

a. **view involving row selection**
   i. (3 marks) Create a view containing three columns `roll_number, cid, letter_grade` with students who have taken minor course.
   ii. (1 mark) Insert a record `180101000, CS 101, AB` into `grade18a` table.
   iii. (1 mark) Query the view for the `roll_number = 180101000`. Is the view created above `materialized`?

b. **view involving distinct clause**
   i. (3 marks) Create a view containing `cid, letter_grade` columns having distinct values from the `grade18a` table.
   ii. (1 mark) Insert a record `CS101, PM` into the created view.
   iii. Is the view updatable/not updatable? Why?

c. **view involving group by**
   i. (3 marks) Create a view containing `cid, letter_grade`, number of students obtained within the given `letter_grade`
   ii. (1 mark) Insert a record `CS 101, NP, 17` into the created view.
   iii. Why Is the view updatable/not updatable?

**Task 05** (14 marks) **The check clause**

a. (1 mark) Create `course18b` table whose specification is given in Task 02 (b). At the time of table creation specify the following constraints:
   i. (3 marks) `semester` should take values from the set of integers {1, 2, 3, 4, 5, 6, 7, 8}
   ii. (1 mark) Insert a row `(10, 'CS 777', 'Introduction to Chat GPT', 3, 0, 0, 6)` into `course18b`. Is the above constrained honored?

b. (1 mark) Create `allowable_letter_grade` with the following details:

| | | |
|---|---|---|
| $1^{st}$ column | `grade` | string of characters of fixed size 2 |
| $2^{nd}$ column | `value` | integer |

and having rows:

| allowable_letter_grade | |
|---|---|
| grade | value |
| AS | 10 |
| AA | 10 |
| AB | 9 |
| BB | 8 |
| BC | 7 |
| CC | 6 |
| CD | 5 |
| DD | 4 |
| FP | 0 |
| FA | 0 |
| NP | 0 |
| PP | 0 |
| I | 0 |
| X | 0 |

Do not use `load` statement to populate this data.

c. (1 mark) Create `grade18b` whose specification is given in Task 02 (c). At the time of table creation specify the constraint:

i. (3 marks) The column `grade18b.letter_grade` must take one of the values as given in `allowable_letter_grade.grade`.

ii. (1 mark) populate data from the file `grade18.csv` into table `grade18b`

iii. (1 mark) Update grades of students in the `grades18b` who registered for minor course XX102M and obtained 'DD', to convert to grade 'MP'.

iv. (2 marks) Is the update statement above honored the constraint **Task 05** (c.i)? Why?

**Task 06** (10 marks) **Naming constraints**

a. (3 marks) create `student18c` table whose column specifications are as given in **Task 02** (a). Make `roll_number` primary key. Name this primary key constraint.

b. (4 marks) create a `grade18c` table whose column specifications are as given in `Task 02` (c). Make `roll_number, cid` a primary key. Provide a name this primary key constraint. Make `roll_number` foreign key pointing to `student18c` table. Give a name to this foreign key constraint.

c. (3 marks) Remove the foreign key constraint created above (**Task 06** (b)).

**Task 07** (8 marks) **Type conversion**

a. (1 mark) Create a table `student18d` whose description is identical to specification given in `Task 01` (a).

b. (1 mark) Populate data from the file `student18.csv` into `student18d`

c. (3 marks) Find the sum of `roll_numbers`, minimum, maximum and average of `roll_numbers` from the table `student18d` by converting `roll_number` data type to `unsigned int`.

d. (3 marks) List the `roll_number` by converting it into `datetime` data type from the `student18d` table.

**Task 08** (6 marks) **Table extensions**

a. (3 marks) Using table extensions, create `course18e` table with similar description as that given in `course18a` of **Task 02** (b)

b. (3 marks) Populate the data from `course18a` table into `course18e` table

c. Hint: Use `insert` statement along with subquery `select`

**Task 09** (20 marks) **Join variants**

a. Create the following three tables:

i. (1 mark) A table `student18f` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `roll_number` | string of characters of fixed size 10 |
| $2^{nd}$ column | `name` | string of characters of fixed size 100 |
| $3^{rd}$ column | `redundant01` | integer |

with following constraints:

- `roll_number` as primary key
- `redundant01`'s default value is 10

ii. (1 mark) A table `course18f` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `semester` | integer |
| $2^{nd}$ column | `cid` | string of characters of fixed size 7 |
| $3^{rd}$ column | `name` | string of characters of fixed size 100 |
| $4^{th}$ column | `l` | integer |
| $5^{th}$ column | `t` | integer |
| $6^{th}$ column | `p` | integer |
| $7^{th}$ column | `c` | integer |
| $8^{th}$ column | `redundant01` | integer |

with following constraints:

- `cid` as primary key
- `redundant01`'s default value is 10

iii. (1 mark) A table `grade18f` containing the following

| | | |
|---|---|---|
| $1^{st}$ column | `roll_number` | string of characters of fixed size 10 |
| $2^{nd}$ column | `cid` | string of characters of fixed size 7 |
| $3^{rd}$ column | `letter_grade` | string of characters of fixed size 2 |
| $4^{th}$ column | `redundant01` | integer |

with following constraints:

- `roll_number, cid` as primary key
- `redundant01`'s default value is 10

b. **popluate data**

i. (3 marks) populate data from the file `student18.csv` into table `student18f` such that default constraint is honored

ii. (3 marks) populate data from the file `course18.csv` into table `course18f` such that default constraint is honored

iii. (3 marks) populate data from the file `grade18.csv` into table `grade18f` such that default constraint is honored

c. (3 marks) `join ... using` Using tables above, list student `roll_number`, `name` and `letter_grade` obtained with course having credit structure `3-1-0-8`

d. (1 mark) delete all record from `grade18f`

e. (1 mark) populate data from the file `cs570.csv` into table `grade18f` such that default constraint is honored

f. (3 marks) List all the students' `roll_number`s, `name`s, and corresponding `letter_grade` obtained from the tables `student18f` and `grade18f`.

**Instructions** Adhere to the following

**SQL statements** Write the SQL statements corresponding to each task in a text.

**File naming** text file name should be [Your roll number].sql

**Independent efforts** You should make an honest and independent effort in obtaining the solution to the above problem.

**Mobile phones** are not allowed inside the lab

**Submission Procedure** You should upload all the SQL files and C program files in MS assignments site.

**Marking Scheme** Mentioned against each task/sub task