Department of Information and Communication Technology

Faculty of Technology

University of Ruhuna

Database Management Systems Practicum

ICT1222

Assignment 02 – Mini Project

Group Number 09

Submitted to: Mr.P.H.P. Nuwan Laksiri

Group Members: -

TG/2022/1357- K.H.S.V.Perera

TG/2022/1361- Sadeepa Dinakara

TG/2022/1359- Kavindu Dilshan

TG/2022/1360- Gihan Kaveesha

Table of Contents

Brief introduction about the problem/group project 3

Brief introduction to the solution 3

ER Diagram of Tecmis_fot 4

Relational Mapping of Tecmis_fot 5

Table queries and solutions 5

Tools and Techniques we have used for this project 10

Security measures that you have taken to protect your Database 10

Brief description about DB Accounts/Users and the reasons for creating such Accounts/Users. 11

Code snippets to support your work. 11

Problems that you faced during the development of the solution. 13

Solutions /How you have overcome the above the identified problems 18

New database techniques / trends you have used to develop the backend 18

If you are going to host your backend, where are you going to host it and reasons for the selection 19

If you are going to host your backend in a cloud environment what are the things/changes that you have to do in your backend 19

Individual contribution to the backend development 20

References 20

Brief introduction about the problem/group project

The implementation of a Management Information System (MIS) at the Faculty of Technology has greatly improved data management by effectively handling student marks, attendance, and results. This system enhances efficiency and organization in several ways:

- **Reduction of Duplicates**: The system effectively identifies and eliminates redundant data, ensuring high accuracy in the information managed.
- **Streamlined Data Entry**: The TECMIS minimizes the reliance on manual data entry and updates, significantly increasing operational efficiency.
- **Rapid Information Retrieval**: Emergency information can be accessed quickly and easily, by passing the need for time-consuming manual searches.
- **Improved Data Security**: The TECMIS incorporates robust security measures, including access controls, to safeguard sensitive information.
- **Space Efficiency**: The reduction in the need for physical storage has created additional space that was previously occupied by filing systems.

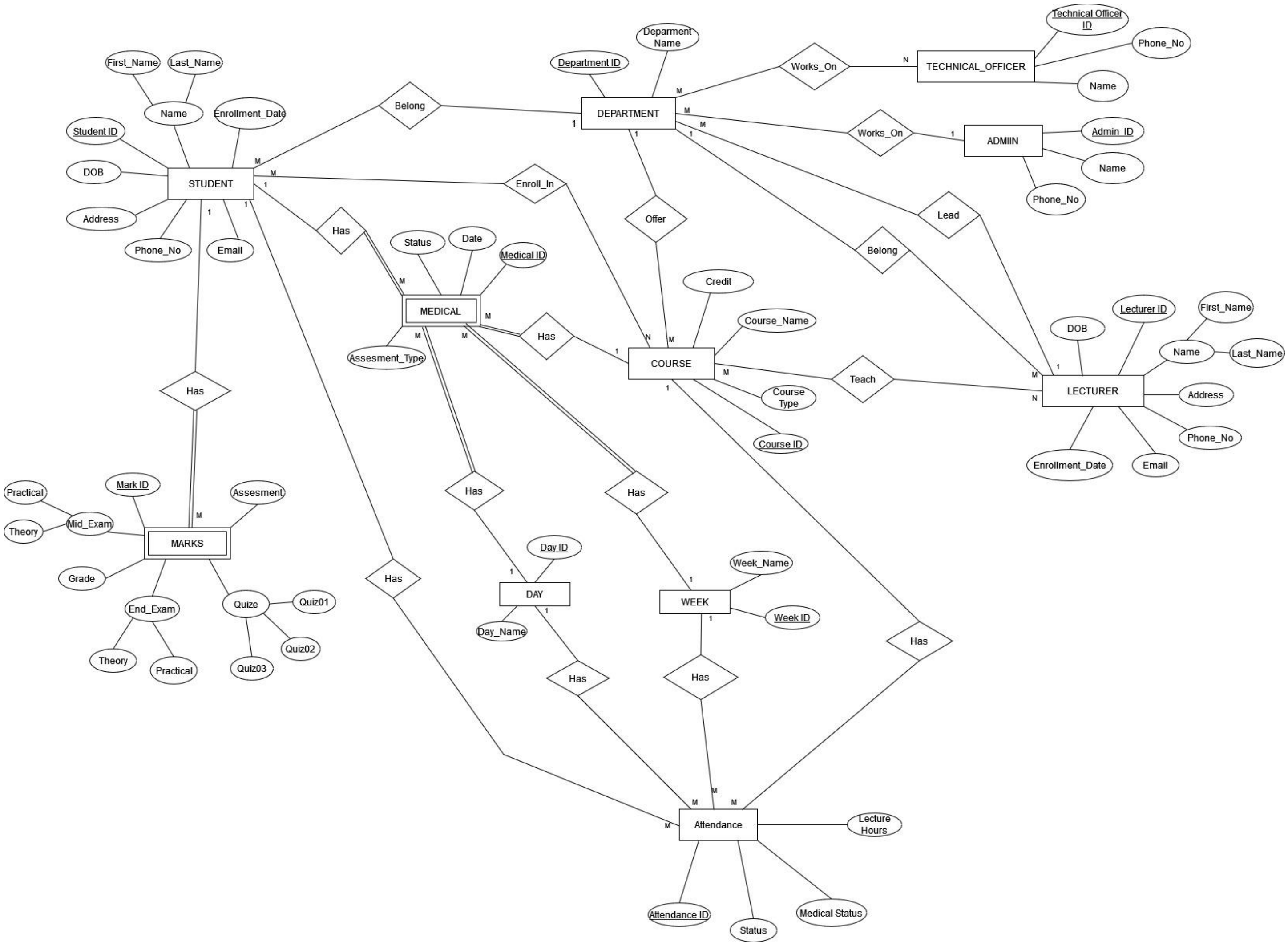
Brief introduction to the solution

To tackle these challenges, we developed an automated database management system that significantly simplifies data entry, updating, and retrieval compared to traditional methods. By utilizing primary keys, the system effectively prevents data redundancy, ensuring that duplicates are eliminated, and storage is optimized.

In emergency situations, users can swiftly search for information using keywords, eliminating lengthy wait times. The system only requires a computer with adequate storage, eliminating the need for physical space associated with manual processes. It also includes mechanisms to detect and prevent the entry of invalid or irrelevant data, enhancing overall accuracy.

Access is restricted to authorized personnel, improving security and reducing the risk of data loss. The user-friendly design of the system contributes to lower operating costs and decreased labor requirements.

Finalized ER Diagram .



Finalized Relational Mapping

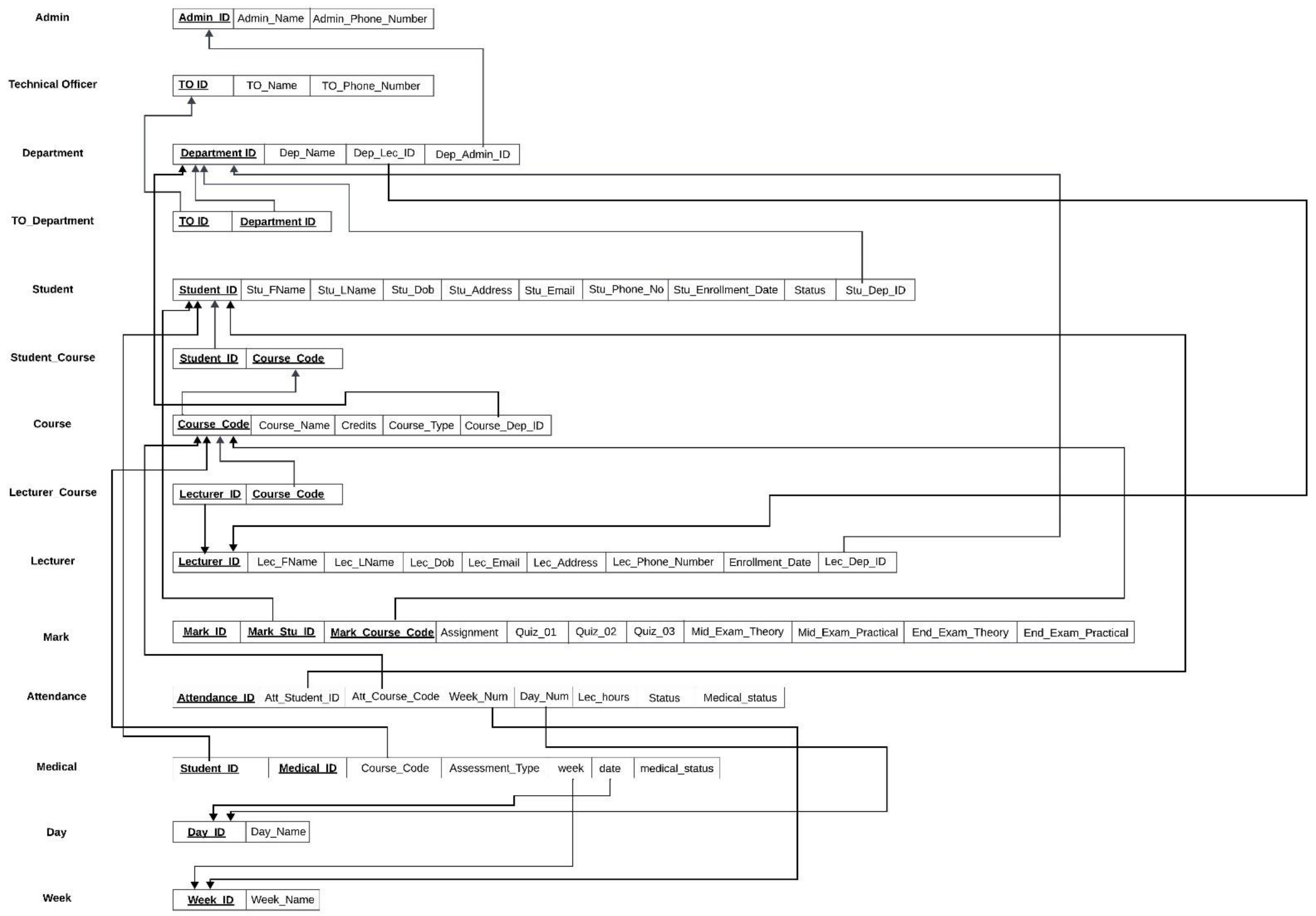
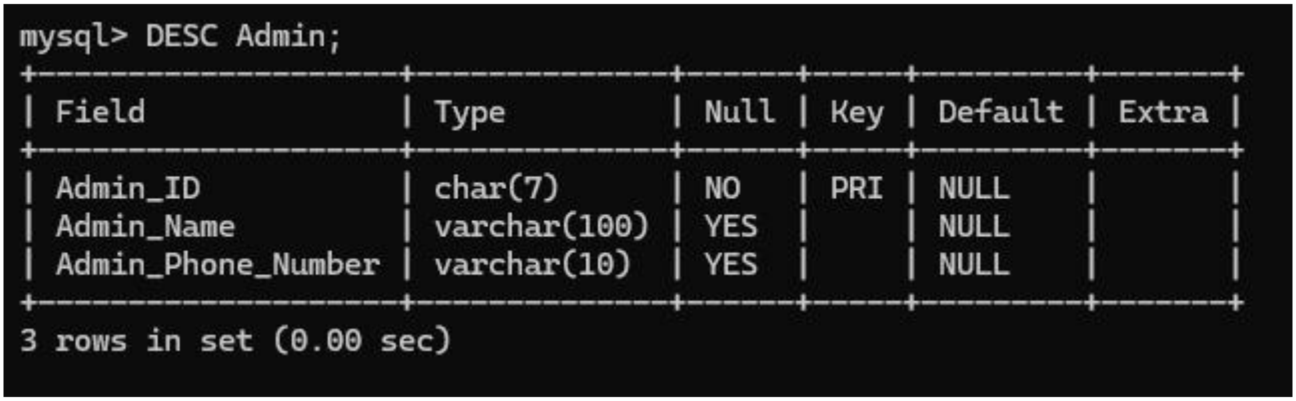

Admin
Admin_ID | Admin_Name | Admin_Phone_Number
Technical Officer
TO ID | TO_Name | TO_Phone_Number
Department
Department ID | Dep_Name | Dep_Lec_ID | Dep_Admin_ID
TO_Department
TO ID | Department ID
Student
Student_ID | Stu_FName | Stu_LName | Stu_Dob | Stu_Address | Stu_Email | Stu_Phone_No | Stu_Enrollment_Date | Status | Stu_Dep_ID
Student_Course
Student_ID | Course_Code
Course
Course_Code | Course_Name | Credits | Course_Type | Course_Dep_ID
Lecturer_Course
Lecturer_ID | Course_Code
Lecturer
Lecturer_ID | Lec_FName | Lec_LName | Lec_Dob | Lec_Email | Lec_Address | Lec_Phone_Number | Enrollment_Date | Lec_Dep_ID
Mark
Mark_ID | Mark_Stu_ID | Mark_Course_Code | Assignment | Quiz_01 | Quiz_02 | Quiz_03 | Mid_Exam_Theory | Mid_Exam_Practical | End_Exam_Theory | End_Exam_Practical
Attendance
Attendance_ID | Att_Student_ID | Att_Course_Code | Week_Num | Day_Num | Lec_hours | Status | Medical_status
Medical
Student_ID | Medical_ID | Course_Code | Assessment_Type | week | date | medical_status
Day
Day_ID | Day_Name
Week
Week_ID | Week_Name

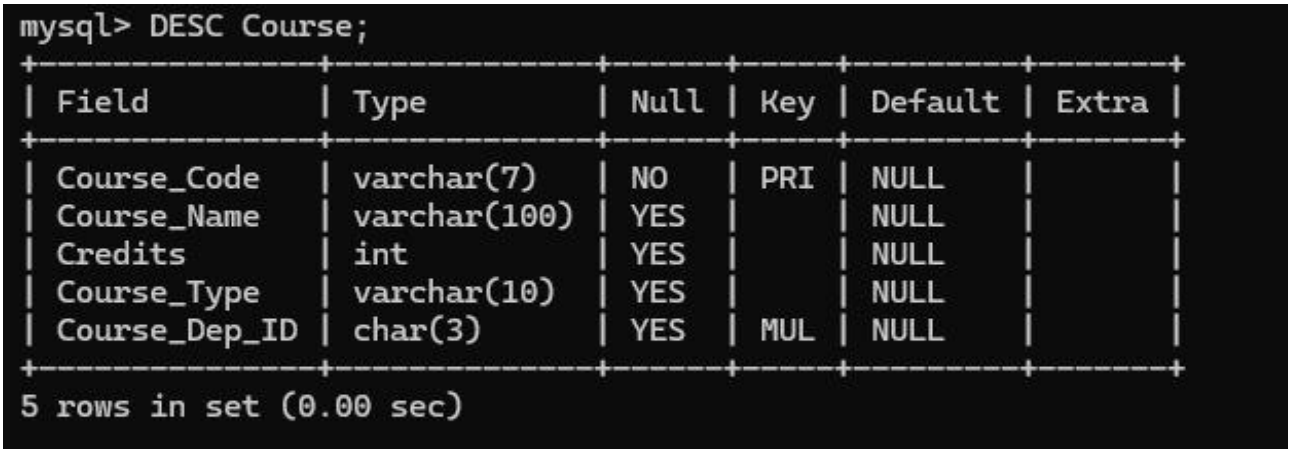
Table queries and solutions

Create admin table



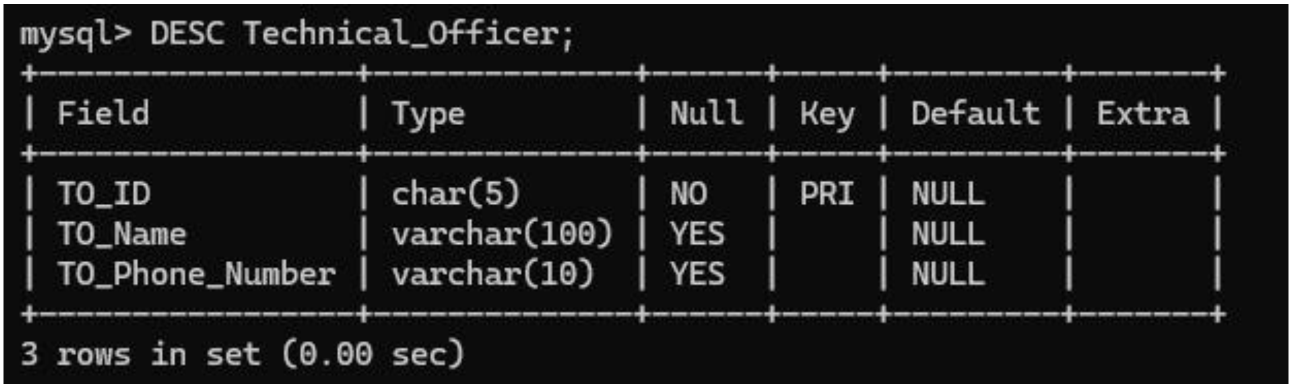
```
mysql> DESC Admin;
+--------------------+--------------+------+-----+---------+-------+
| Field              | Type         | Null | Key | Default | Extra |
+--------------------+--------------+------+-----+---------+-------+
| Admin_ID           | char(7)      | NO   | PRI | NULL    |       |
| Admin_Name         | varchar(100) | YES  |     | NULL    |       |
| Admin_Phone_Number | varchar(10)  | YES  |     | NULL    |       |
+--------------------+--------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

Create course table



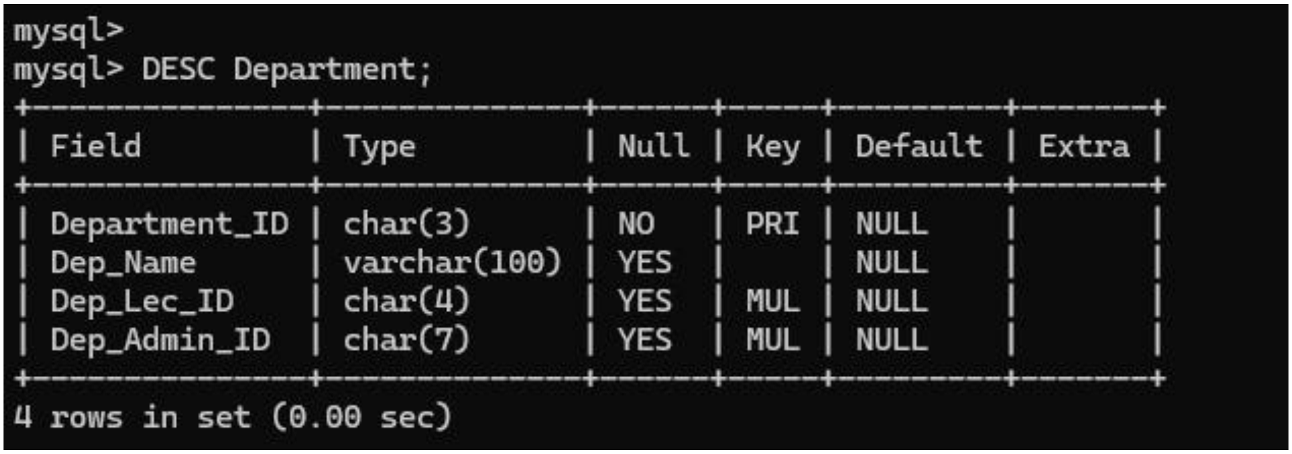
```
mysql> DESC Course;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| Course_Code   | varchar(7)   | NO   | PRI | NULL    |       |
| Course_Name   | varchar(100) | YES  |     | NULL    |       |
| Credits       | int          | YES  |     | NULL    |       |
| Course_Type   | varchar(10)  | YES  |     | NULL    |       |
| Course_Dep_ID | char(3)      | YES  | MUL | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Create technical_officer table



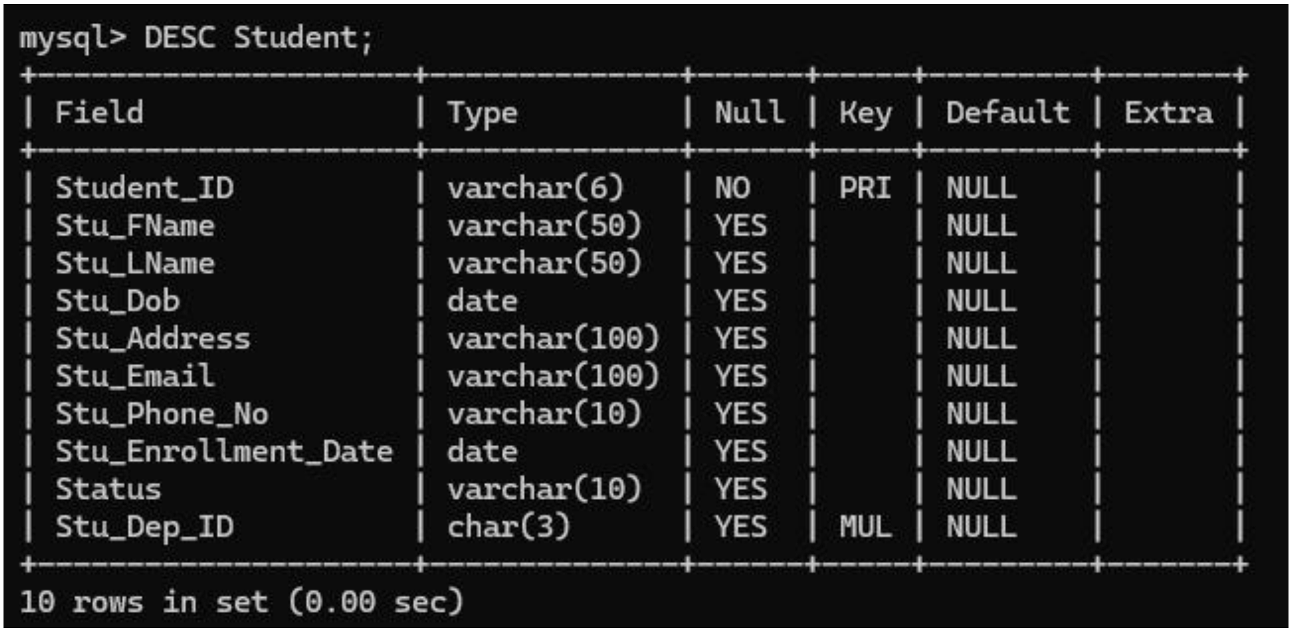
```
mysql> DESC Technical_Officer;
+-----------------+--------------+------+-----+---------+-------+
| Field           | Type         | Null | Key | Default | Extra |
+-----------------+--------------+------+-----+---------+-------+
| TO_ID           | char(5)      | NO   | PRI | NULL    |       |
| TO_Name         | varchar(100) | YES  |     | NULL    |       |
| TO_Phone_Number | varchar(10)  | YES  |     | NULL    |       |
+-----------------+--------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

Create department table



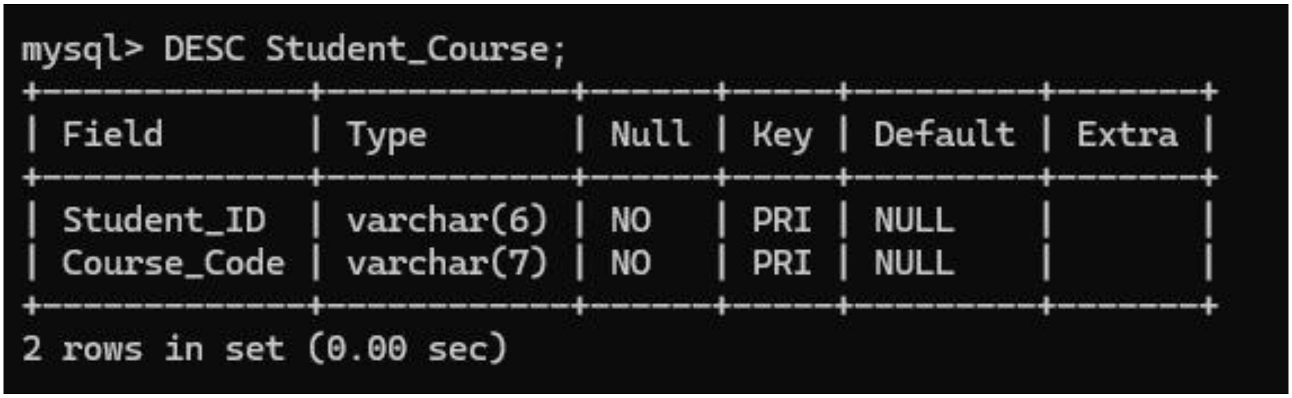
```
mysql>
mysql> DESC Department;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| Department_ID | char(3)      | NO   | PRI | NULL    |       |
| Dep_Name      | varchar(100) | YES  |     | NULL    |       |
| Dep_Lec_ID    | char(4)      | YES  | MUL | NULL    |       |
| Dep_Admin_ID  | char(7)      | YES  | MUL | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Create student table



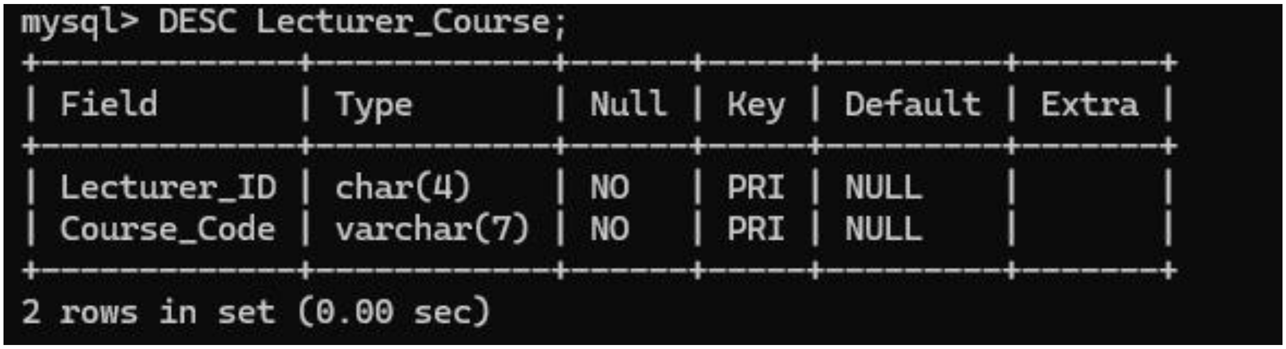
```
mysql> DESC Student;
+---------------------+--------------+------+-----+---------+-------+
| Field               | Type         | Null | Key | Default | Extra |
+---------------------+--------------+------+-----+---------+-------+
| Student_ID          | varchar(6)   | NO   | PRI | NULL    |       |
| Stu_FName           | varchar(50)  | YES  |     | NULL    |       |
| Stu_LName           | varchar(50)  | YES  |     | NULL    |       |
| Stu_Dob             | date         | YES  |     | NULL    |       |
| Stu_Address         | varchar(100) | YES  |     | NULL    |       |
| Stu_Email           | varchar(100) | YES  |     | NULL    |       |
| Stu_Phone_No        | varchar(10)  | YES  |     | NULL    |       |
| Stu_Enrollment_Date | date         | YES  |     | NULL    |       |
| Status              | varchar(10)  | YES  |     | NULL    |       |
| Stu_Dep_ID          | char(3)      | YES  | MUL | NULL    |       |
+---------------------+--------------+------+-----+---------+-------+
10 rows in set (0.00 sec)
```

Create student_course table



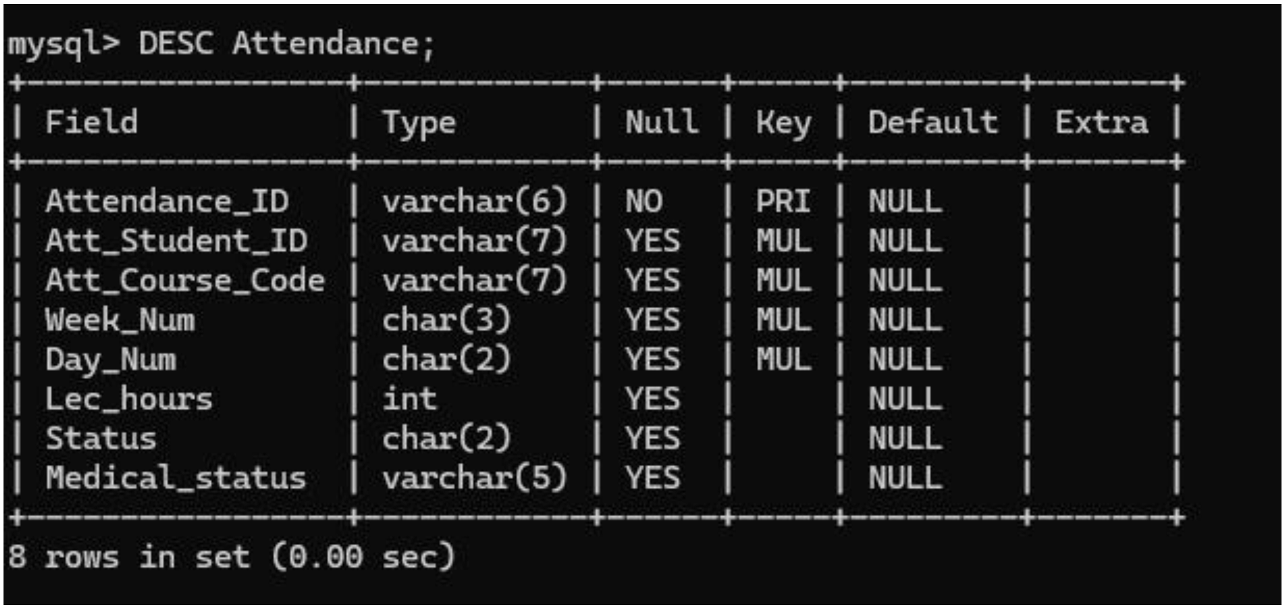
```
mysql> DESC Student_Course;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| Student_ID  | varchar(6) | NO   | PRI | NULL    |       |
| Course_Code | varchar(7) | NO   | PRI | NULL    |       |
+-------------+------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Create lecturer_course table



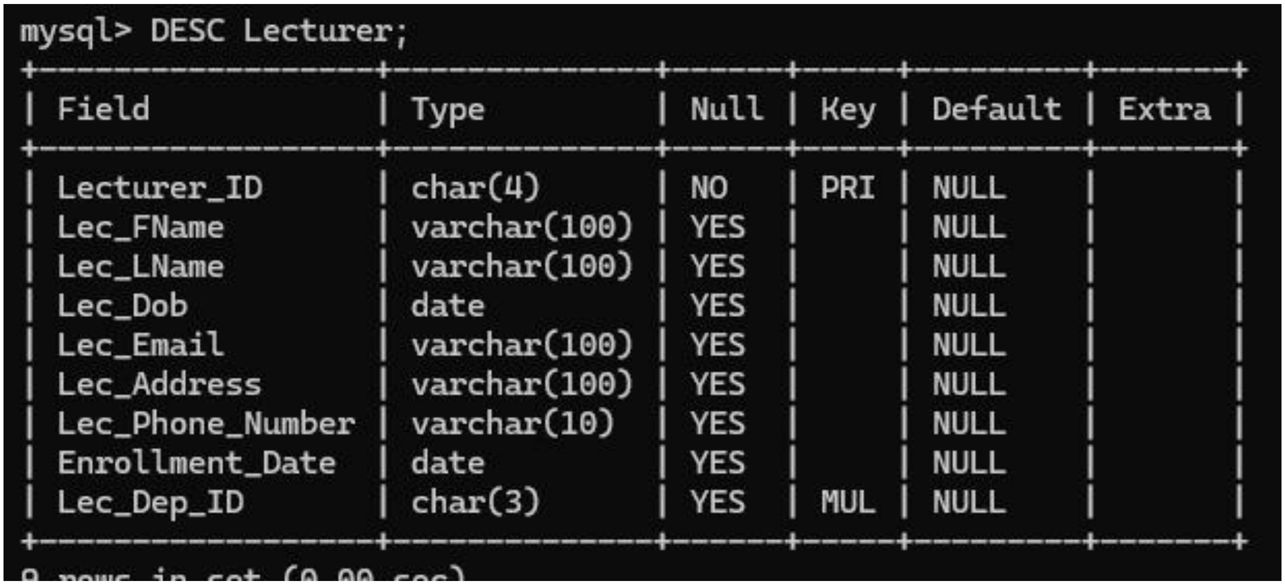
```
mysql> DESC Lecturer_Course;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| Lecturer_ID | char(4)    | NO   | PRI | NULL    |       |
| Course_Code | varchar(7) | NO   | PRI | NULL    |       |
+-------------+------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Create attendance table



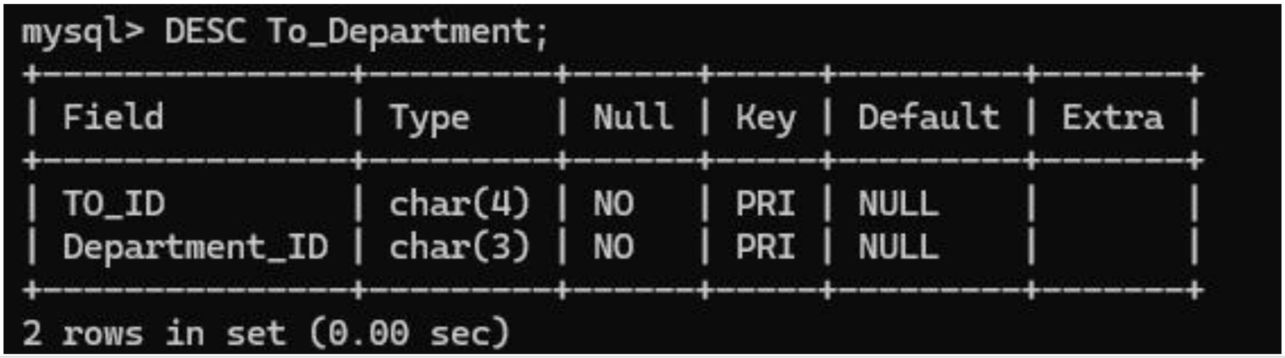
```
mysql> DESC Attendance;
+-------------------+-------------+------+-----+---------+-------+
| Field             | Type        | Null | Key | Default | Extra |
+-------------------+-------------+------+-----+---------+-------+
| Attendance_ID     | varchar(6)  | NO   | PRI | NULL    |       |
| Att_Student_ID    | varchar(7)  | YES  | MUL | NULL    |       |
| Att_Course_Code   | varchar(7)  | YES  | MUL | NULL    |       |
| Week_Num          | char(3)     | YES  | MUL | NULL    |       |
| Day_Num           | char(2)     | YES  | MUL | NULL    |       |
| Lec_hours         | int         | YES  |     | NULL    |       |
| Status            | char(2)     | YES  |     | NULL    |       |
| Medical_status    | varchar(5)  | YES  |     | NULL    |       |
+-------------------+-------------+------+-----+---------+-------+
8 rows in set (0.00 sec)
```

Create lecturer table



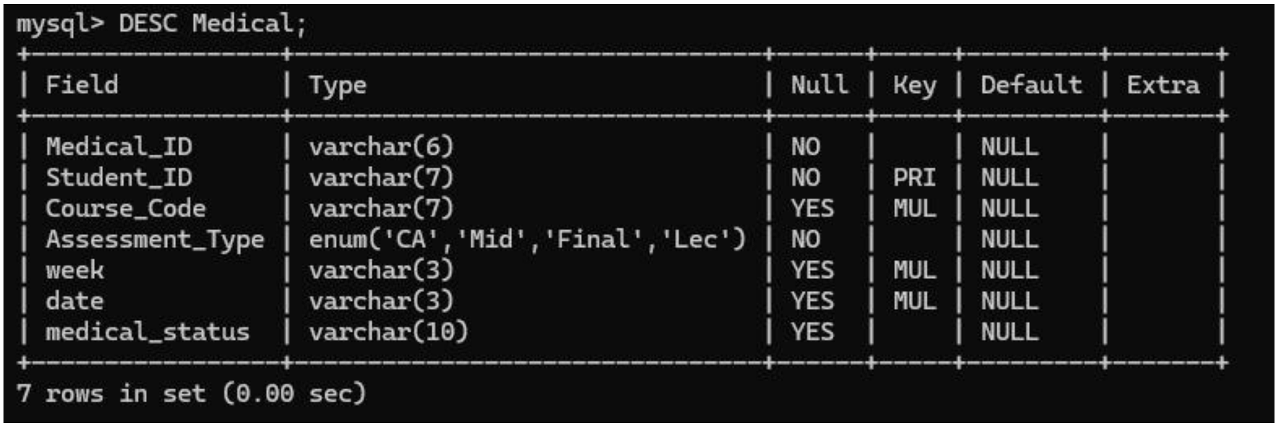
```
mysql> DESC Lecturer;
+-------------------+--------------+------+-----+---------+-------+
| Field             | Type         | Null | Key | Default | Extra |
+-------------------+--------------+------+-----+---------+-------+
| Lecturer_ID       | char(4)      | NO   | PRI | NULL    |       |
| Lec_FName         | varchar(100) | YES  |     | NULL    |       |
| Lec_LName         | varchar(100) | YES  |     | NULL    |       |
| Lec_Dob           | date         | YES  |     | NULL    |       |
| Lec_Email         | varchar(100) | YES  |     | NULL    |       |
| Lec_Address       | varchar(100) | YES  |     | NULL    |       |
| Lec_Phone_Number  | varchar(10)  | YES  |     | NULL    |       |
| Enrollment_Date   | date         | YES  |     | NULL    |       |
| Lec_Dep_ID        | char(3)      | YES  | MUL | NULL    |       |
+-------------------+--------------+------+-----+---------+-------+
9 rows in set (0.00 sec)
```

Create TO_department table



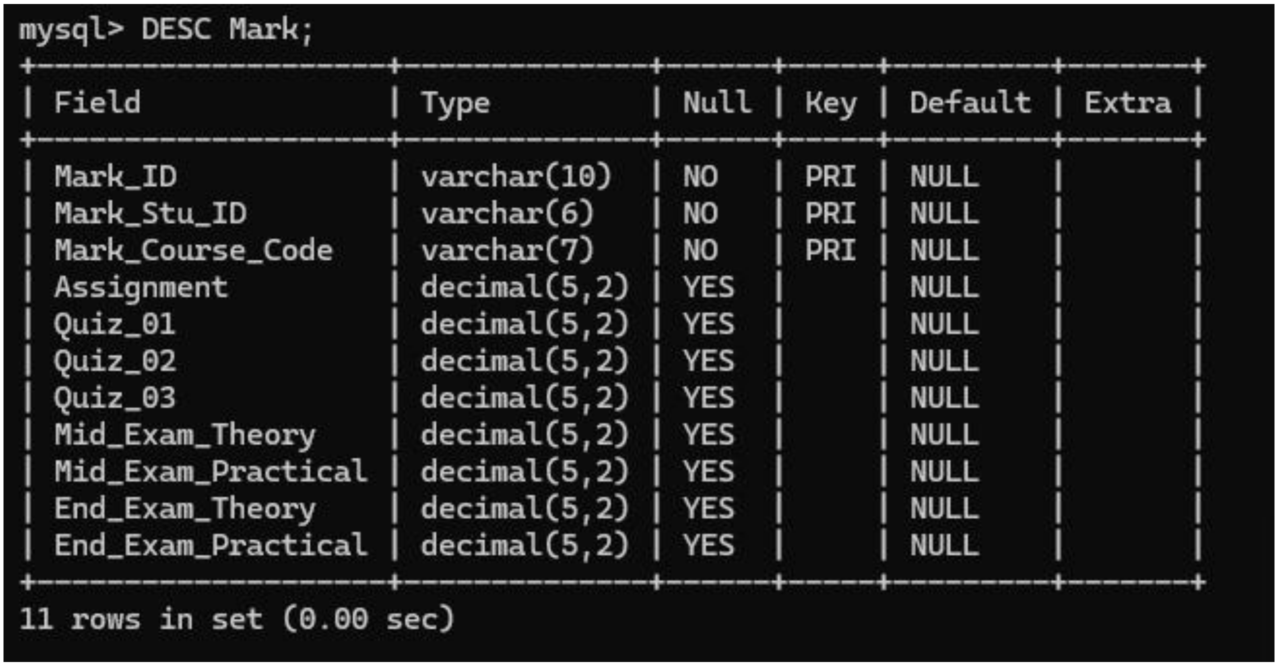
```
mysql> DESC To_Department;
+---------------+---------+------+-----+---------+-------+
| Field         | Type    | Null | Key | Default | Extra |
+---------------+---------+------+-----+---------+-------+
| TO_ID         | char(4) | NO   | PRI | NULL    |       |
| Department_ID | char(3) | NO   | PRI | NULL    |       |
+---------------+---------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Create medical table



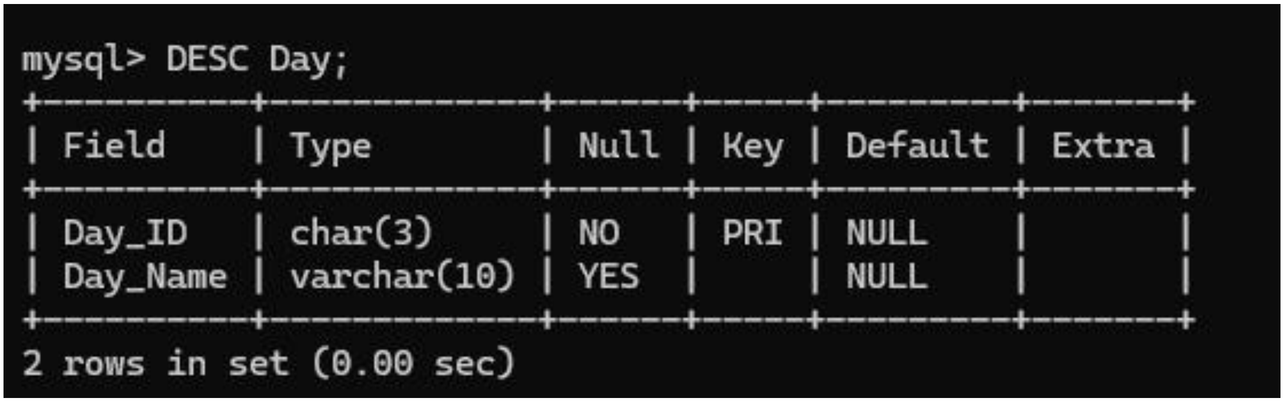
```
mysql> DESC Medical;
+-----------------+--------------------------------+------+-----+---------+-------+
| Field           | Type                           | Null | Key | Default | Extra |
+-----------------+--------------------------------+------+-----+---------+-------+
| Medical_ID      | varchar(6)                     | NO   |     | NULL    |       |
| Student_ID      | varchar(7)                     | NO   | PRI | NULL    |       |
| Course_Code     | varchar(7)                     | YES  | MUL | NULL    |       |
| Assessment_Type | enum('CA','Mid','Final','Lec') | NO   |     | NULL    |       |
| week            | varchar(3)                     | YES  | MUL | NULL    |       |
| date            | varchar(3)                     | YES  | MUL | NULL    |       |
| medical_status  | varchar(10)                    | YES  |     | NULL    |       |
+-----------------+--------------------------------+------+-----+---------+-------+
7 rows in set (0.00 sec)
```

Create mark table



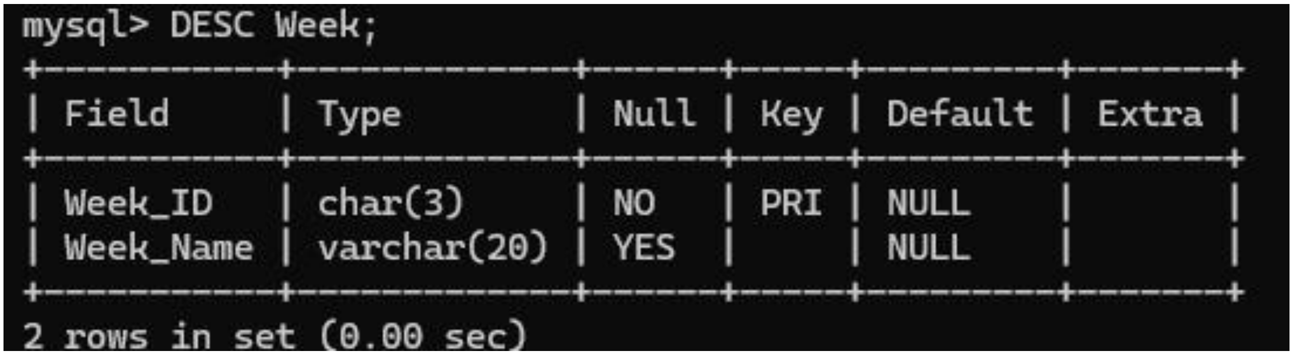
```
mysql> DESC Mark;
+--------------------+--------------+------+-----+---------+-------+
| Field              | Type         | Null | Key | Default | Extra |
+--------------------+--------------+------+-----+---------+-------+
| Mark_ID            | varchar(10)  | NO   | PRI | NULL    |       |
| Mark_Stu_ID        | varchar(6)   | NO   | PRI | NULL    |       |
| Mark_Course_Code   | varchar(7)   | NO   | PRI | NULL    |       |
| Assignment         | decimal(5,2) | YES  |     | NULL    |       |
| Quiz_01            | decimal(5,2) | YES  |     | NULL    |       |
| Quiz_02            | decimal(5,2) | YES  |     | NULL    |       |
| Quiz_03            | decimal(5,2) | YES  |     | NULL    |       |
| Mid_Exam_Theory    | decimal(5,2) | YES  |     | NULL    |       |
| Mid_Exam_Practical | decimal(5,2) | YES  |     | NULL    |       |
| End_Exam_Theory    | decimal(5,2) | YES  |     | NULL    |       |
| End_Exam_Practical | decimal(5,2) | YES  |     | NULL    |       |
+--------------------+--------------+------+-----+---------+-------+
11 rows in set (0.00 sec)
```

Create day table



```
mysql> DESC Day;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| Day_ID   | char(3)     | NO   | PRI | NULL    |       |
| Day_Name | varchar(10) | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Create Week table



```
mysql> DESC Week;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| Week_ID   | char(3)     | NO   | PRI | NULL    |       |
| Week_Name | varchar(20) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Tools and Techniques we have used for this project

- Draw.io

  Used to create the ER-diagram and Relational schema.

- MYSQL server, Notepad++

  To create and manage database efficiency.

  To create table structures and data insertion.

- GitHub and GitHub desktop

  To manage, collaborate on database and version control.

- Microsoft word

  To create Final report and SRS report.

Security measures that you have taken to protect your Database

- Admin - With All privileges with Grant Option for all the tables in the database
- Dean - With All privileges without Grant for all the tables in the database
- Lecturer – All privileges without Grant and user creation for all the tables in the database
- Technical Officer - Read, write, and update permissions for attendance related tables/views.
- Student - Read permission for final attendance and final marks/Grades tables/views.

Brief description about DB Accounts/Users and the reasons for creating such Accounts/Users.

Our database comprises several user roles, each with distinct permissions:

- **Administrator (Admin)**

  The Admin holds full access to the database, enabling the ability to create, delete, and insert data. This role is responsible for overall management and maintenance of the database.
- **Dean**

  The Dean has access to all database tables, with the authority to update both tables and data as needed.
- **Lecturer**

  Lecturers are permitted to modify the marks table and the course table, facilitating effective management of course-related data.
- **Technical Officer**

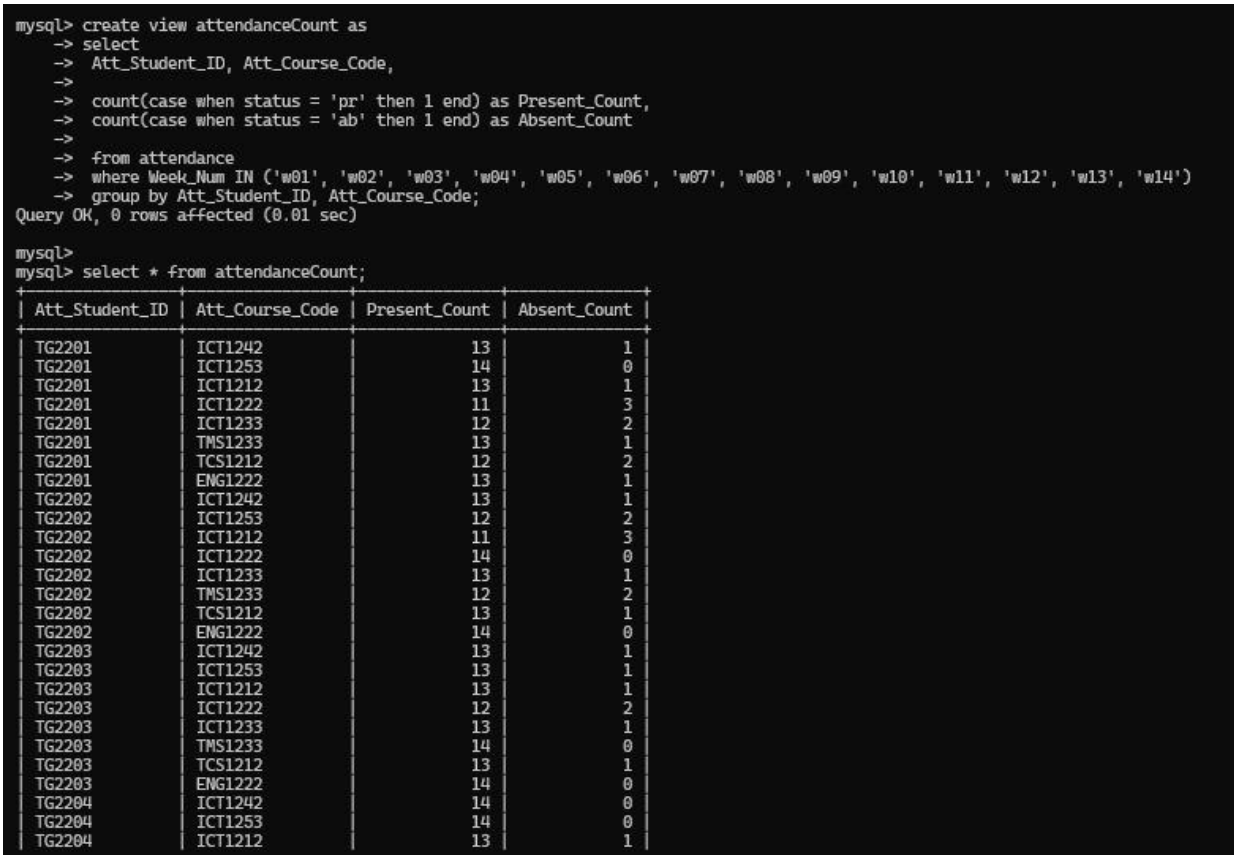
  The Technical Officer is tasked with managing, maintaining, and optimizing the database. This role has read, write, and update permissions specifically for attendance-related tables and views.
- **Student**

  Students can access course tables but are limited to viewing their marks only.

Code snippets to support your work.

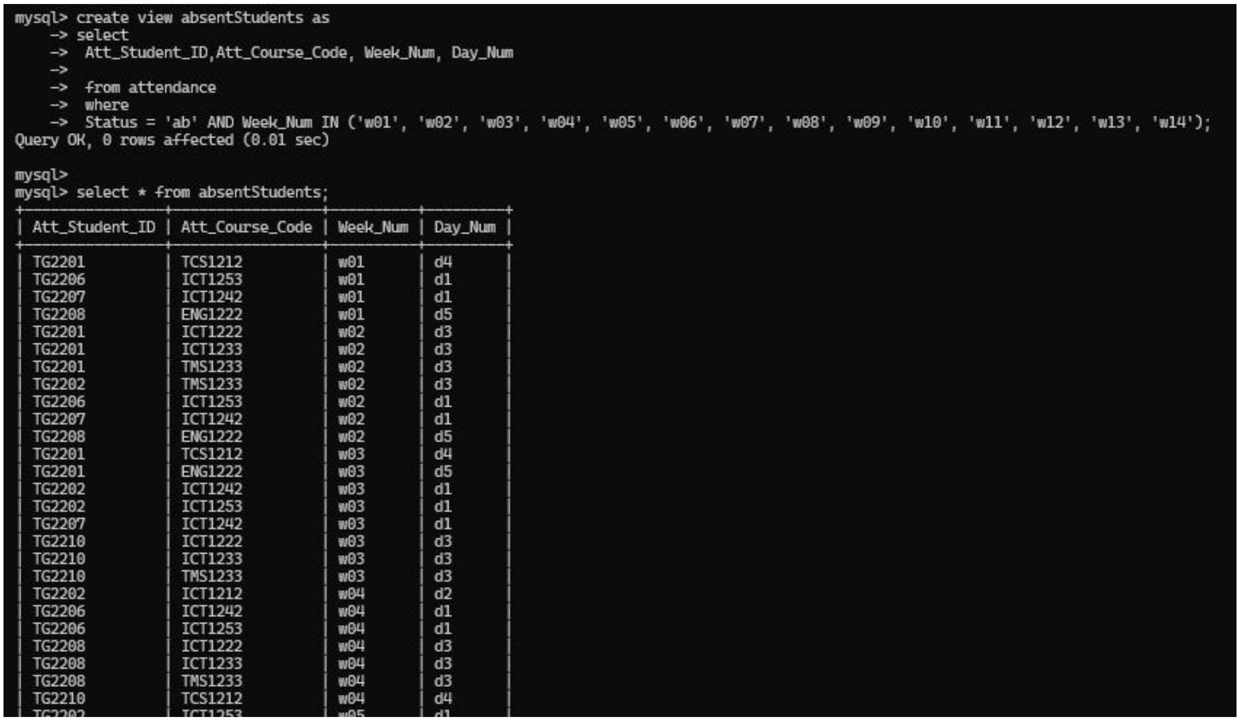
(views and procedures)

View for Attendance Count



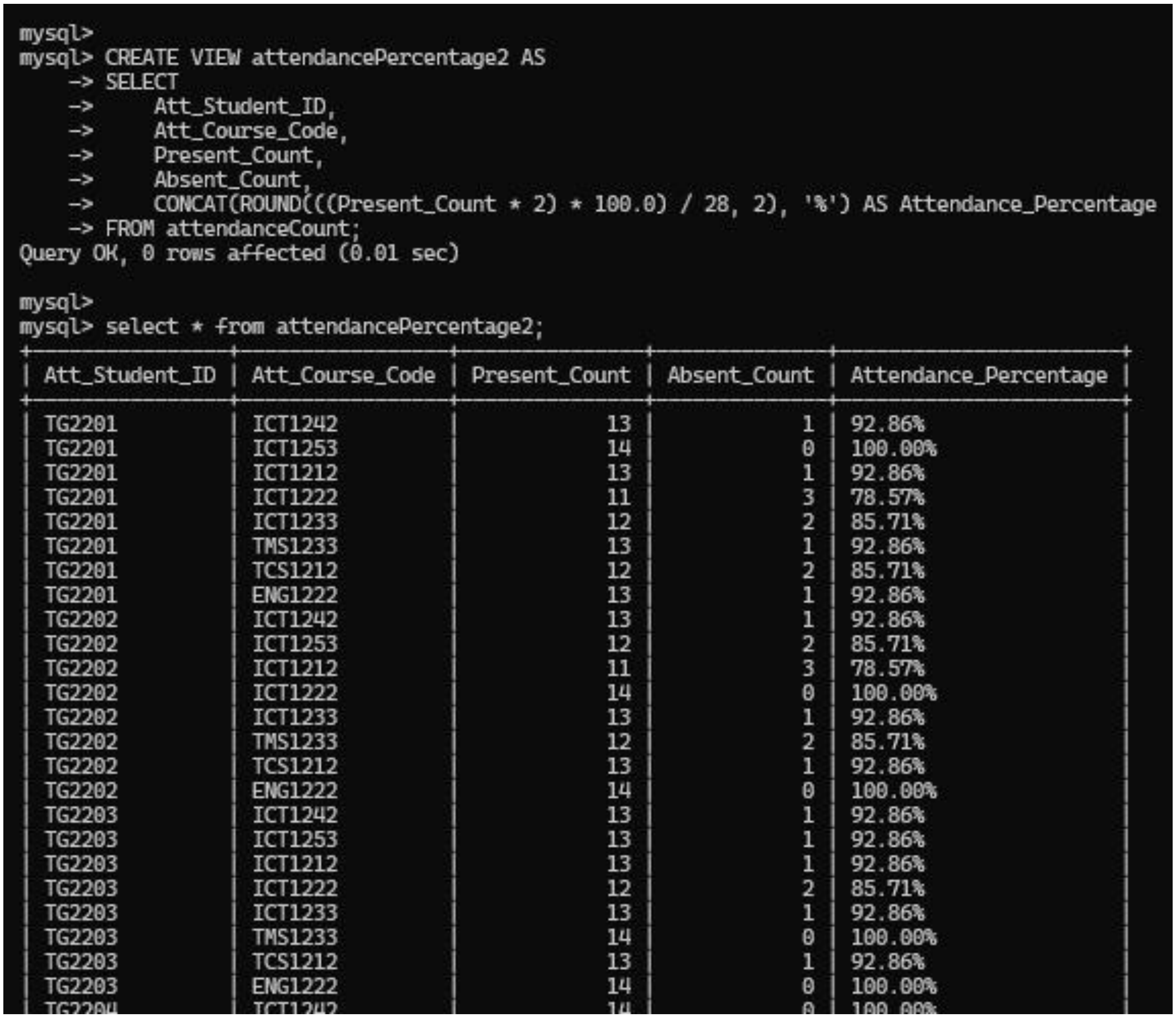
```
mysql> create view attendanceCount as
    -> select
    ->  Att_Student_ID, Att_Course_Code,
    ->
    ->  count(case when status = 'pr' then 1 end) as Present_Count,
    ->  count(case when status = 'ab' then 1 end) as Absent_Count
    ->
    ->  from attendance
    ->  where Week_Num IN ('w01', 'w02', 'w03', 'w04', 'w05', 'w06', 'w07', 'w08', 'w09', 'w10', 'w11', 'w12', 'w13', 'w14')
    ->  group by Att_Student_ID, Att_Course_Code;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from attendanceCount;
+----------------+-----------------+---------------+--------------+
| Att_Student_ID | Att_Course_Code | Present_Count | Absent_Count |
+----------------+-----------------+---------------+--------------+
| TG2201         | ICT1242         |            13 |            1 |
| TG2201         | ICT1253         |            14 |            0 |
| TG2201         | ICT1212         |            13 |            1 |
| TG2201         | ICT1222         |            11 |            3 |
| TG2201         | ICT1233         |            12 |            2 |
| TG2201         | TMS1233         |            13 |            1 |
| TG2201         | TCS1212         |            12 |            2 |
| TG2201         | ENG1222         |            13 |            1 |
| TG2202         | ICT1242         |            13 |            1 |
| TG2202         | ICT1253         |            12 |            2 |
| TG2202         | ICT1212         |            11 |            3 |
| TG2202         | ICT1222         |            14 |            0 |
| TG2202         | ICT1233         |            13 |            1 |
| TG2202         | TMS1233         |            12 |            2 |
| TG2202         | TCS1212         |            13 |            1 |
| TG2202         | ENG1222         |            14 |            0 |
| TG2203         | ICT1242         |            13 |            1 |
| TG2203         | ICT1253         |            13 |            1 |
| TG2203         | ICT1212         |            13 |            1 |
| TG2203         | ICT1222         |            12 |            2 |
| TG2203         | ICT1233         |            13 |            1 |
| TG2203         | TMS1233         |            14 |            0 |
| TG2203         | TCS1212         |            13 |            1 |
| TG2203         | ENG1222         |            14 |            0 |
| TG2204         | ICT1242         |            14 |            0 |
| TG2204         | ICT1253         |            14 |            0 |
| TG2204         | ICT1212         |            13 |            1 |
```

Get absent students



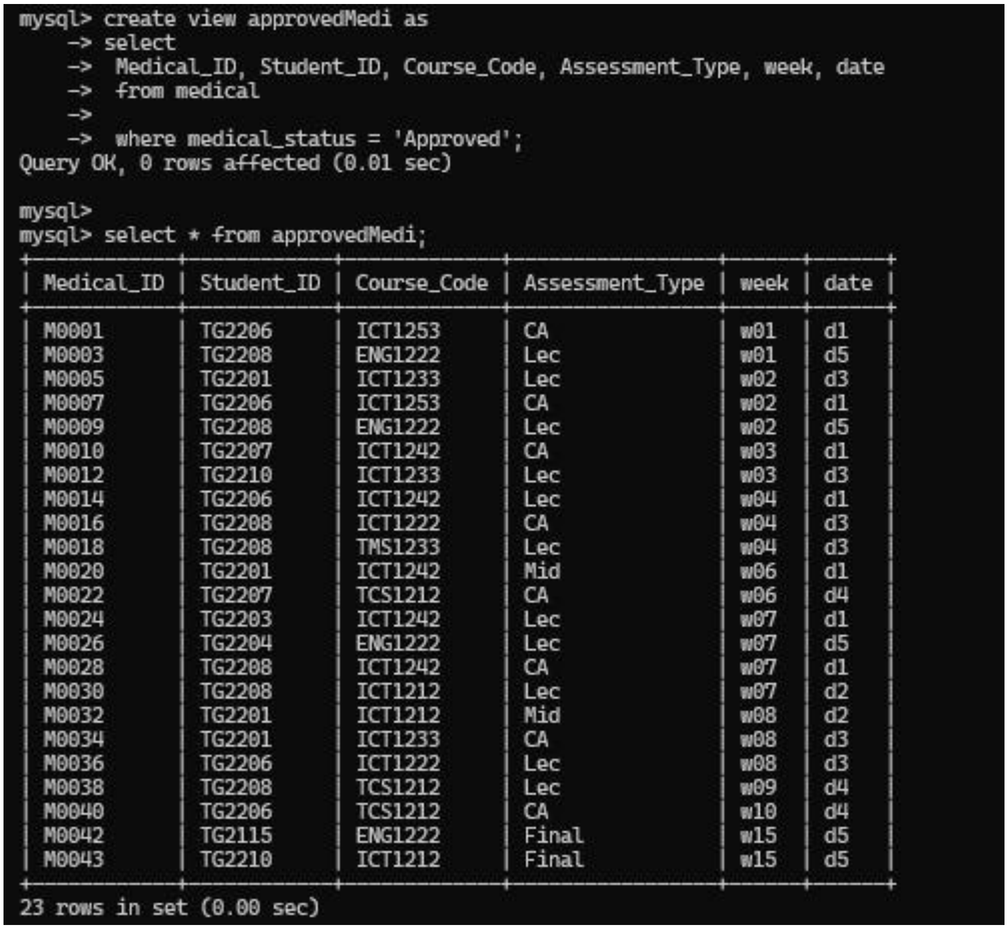
```
mysql> create view absentStudents as
    -> select
    ->  Att_Student_ID,Att_Course_Code, Week_Num, Day_Num
    ->
    ->  from attendance
    ->  where
    ->  Status = 'ab' AND Week_Num IN ('w01', 'w02', 'w03', 'w04', 'w05', 'w06', 'w07', 'w08', 'w09', 'w10', 'w11', 'w12', 'w13', 'w14');
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from absentStudents;
+----------------+-----------------+----------+---------+
| Att_Student_ID | Att_Course_Code | Week_Num | Day_Num |
+----------------+-----------------+----------+---------+
| TG2201         | TCS1212         | w01      | d4      |
| TG2206         | ICT1253         | w01      | d1      |
| TG2207         | ICT1242         | w01      | d1      |
| TG2208         | ENG1222         | w01      | d5      |
| TG2201         | ICT1222         | w02      | d3      |
| TG2201         | ICT1233         | w02      | d3      |
| TG2201         | TMS1233         | w02      | d3      |
| TG2202         | TMS1233         | w02      | d3      |
| TG2206         | ICT1253         | w02      | d1      |
| TG2207         | ICT1242         | w02      | d1      |
| TG2208         | ENG1222         | w02      | d5      |
| TG2201         | TCS1212         | w03      | d4      |
| TG2201         | ENG1222         | w03      | d5      |
| TG2202         | ICT1242         | w03      | d1      |
| TG2202         | ICT1253         | w03      | d1      |
| TG2207         | ICT1242         | w03      | d1      |
| TG2210         | ICT1222         | w03      | d3      |
| TG2210         | ICT1233         | w03      | d3      |
| TG2210         | TMS1233         | w03      | d3      |
| TG2202         | ICT1212         | w04      | d2      |
| TG2206         | ICT1242         | w04      | d1      |
| TG2206         | ICT1253         | w04      | d1      |
| TG2208         | ICT1222         | w04      | d3      |
| TG2208         | ICT1233         | w04      | d3      |
| TG2208         | TMS1233         | w04      | d3      |
| TG2210         | TCS1212         | w04      | d4      |
| TG2202         | ICT1253         | w05      | d1      |
```

Get attendance percentage

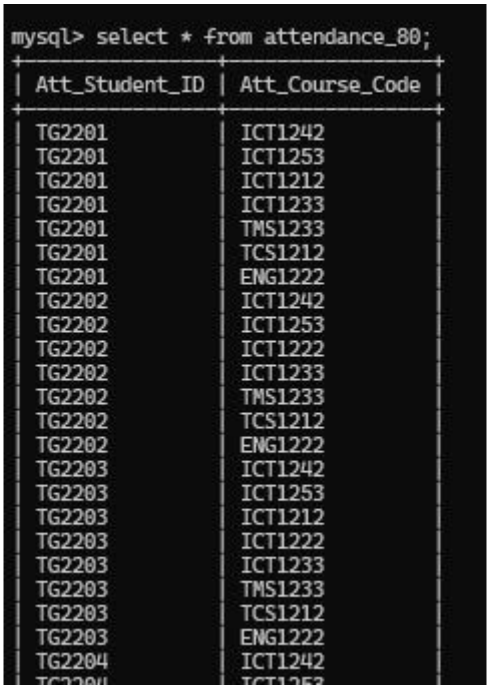


```
mysql>
mysql> CREATE VIEW attendancePercentage2 AS
    -> SELECT
    ->     Att_Student_ID,
    ->     Att_Course_Code,
    ->     Present_Count,
    ->     Absent_Count,
    ->     CONCAT(ROUND(((Present_Count * 2) * 100.0) / 28, 2), '%') AS Attendance_Percentage
    -> FROM attendanceCount;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from attendancePercentage2;
+----------------+-----------------+---------------+--------------+-----------------------+
| Att_Student_ID | Att_Course_Code | Present_Count | Absent_Count | Attendance_Percentage |
+----------------+-----------------+---------------+--------------+-----------------------+
| TG2201         | ICT1242         |            13 |            1 | 92.86%                |
| TG2201         | ICT1253         |            14 |            0 | 100.00%               |
| TG2201         | ICT1212         |            13 |            1 | 92.86%                |
| TG2201         | ICT1222         |            11 |            3 | 78.57%                |
| TG2201         | ICT1233         |            12 |            2 | 85.71%                |
| TG2201         | TMS1233         |            13 |            1 | 92.86%                |
| TG2201         | TCS1212         |            12 |            2 | 85.71%                |
| TG2201         | ENG1222         |            13 |            1 | 92.86%                |
| TG2202         | ICT1242         |            13 |            1 | 92.86%                |
| TG2202         | ICT1253         |            12 |            2 | 85.71%                |
| TG2202         | ICT1212         |            11 |            3 | 78.57%                |
| TG2202         | ICT1222         |            14 |            0 | 100.00%               |
| TG2202         | ICT1233         |            13 |            1 | 92.86%                |
| TG2202         | TMS1233         |            12 |            2 | 85.71%                |
| TG2202         | TCS1212         |            13 |            1 | 92.86%                |
| TG2202         | ENG1222         |            14 |            0 | 100.00%               |
| TG2203         | ICT1242         |            13 |            1 | 92.86%                |
| TG2203         | ICT1253         |            13 |            1 | 92.86%                |
| TG2203         | ICT1212         |            13 |            1 | 92.86%                |
| TG2203         | ICT1222         |            12 |            2 | 85.71%                |
| TG2203         | ICT1233         |            13 |            1 | 92.86%                |
| TG2203         | TMS1233         |            14 |            0 | 100.00%               |
| TG2203         | TCS1212         |            13 |            1 | 92.86%                |
| TG2203         | ENG1222         |            14 |            0 | 100.00%               |
| TG2204         | ICT1242         |            14 |            0 | 100.00%               |
```

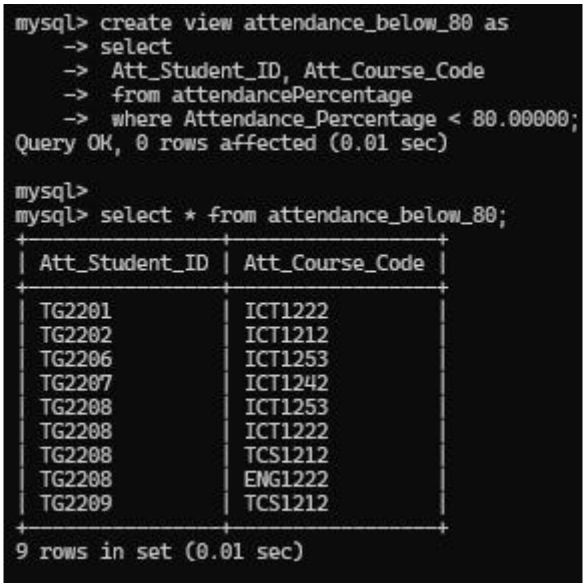
Attendance views and procedures



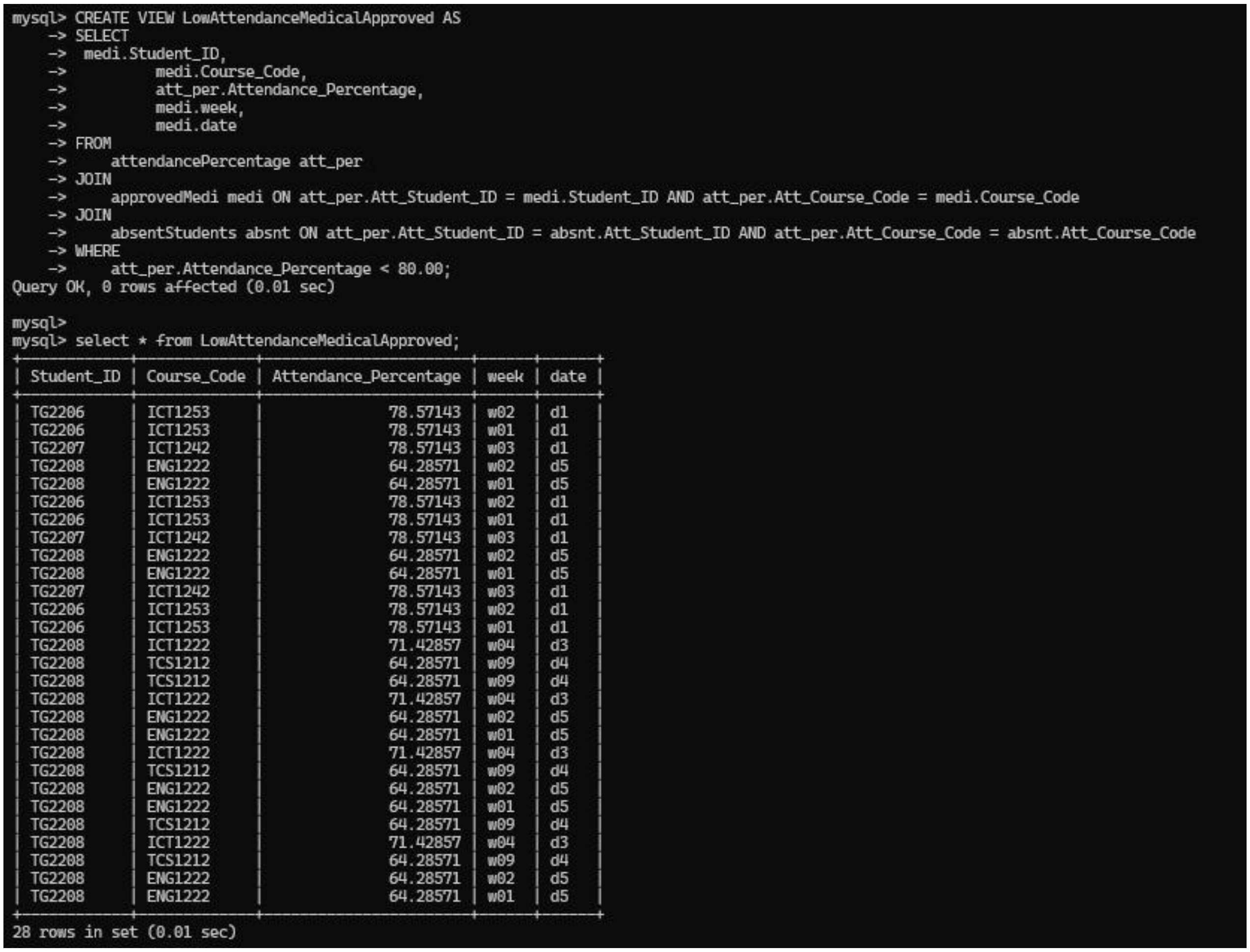
```
mysql> create view approvedMedi as
    -> select
    ->  Medical_ID, Student_ID, Course_Code, Assessment_Type, week, date
    ->  from medical
    ->
    ->  where medical_status = 'Approved';
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from approvedMedi;
+------------+------------+-------------+-----------------+------+------+
| Medical_ID | Student_ID | Course_Code | Assessment_Type | week | date |
+------------+------------+-------------+-----------------+------+------+
| M0001      | TG2206     | ICT1253     | CA              | w01  | d1   |
| M0003      | TG2208     | ENG1222     | Lec             | w01  | d5   |
| M0005      | TG2201     | ICT1233     | Lec             | w02  | d3   |
| M0007      | TG2206     | ICT1253     | CA              | w02  | d1   |
| M0009      | TG2208     | ENG1222     | Lec             | w02  | d5   |
| M0010      | TG2207     | ICT1242     | CA              | w03  | d1   |
| M0012      | TG2210     | ICT1233     | Lec             | w03  | d3   |
| M0014      | TG2206     | ICT1242     | Lec             | w04  | d1   |
| M0016      | TG2208     | ICT1222     | CA              | w04  | d3   |
| M0018      | TG2208     | TMS1233     | Lec             | w04  | d3   |
| M0020      | TG2201     | ICT1242     | Mid             | w06  | d1   |
| M0022      | TG2207     | TCS1212     | CA              | w06  | d4   |
| M0024      | TG2203     | ICT1242     | Lec             | w07  | d1   |
| M0026      | TG2204     | ENG1222     | Lec             | w07  | d5   |
| M0028      | TG2208     | ICT1242     | CA              | w07  | d1   |
| M0030      | TG2208     | ICT1212     | Lec             | w07  | d2   |
| M0032      | TG2201     | ICT1212     | Mid             | w08  | d2   |
| M0034      | TG2201     | ICT1233     | CA              | w08  | d3   |
| M0036      | TG2206     | ICT1222     | Lec             | w08  | d3   |
| M0038      | TG2208     | TCS1212     | Lec             | w09  | d4   |
| M0040      | TG2206     | TCS1212     | CA              | w10  | d4   |
| M0042      | TG2115     | ENG1222     | Final           | w15  | d5   |
| M0043      | TG2210     | ICT1212     | Final           | w15  | d5   |
+------------+------------+-------------+-----------------+------+------+
23 rows in set (0.00 sec)
```



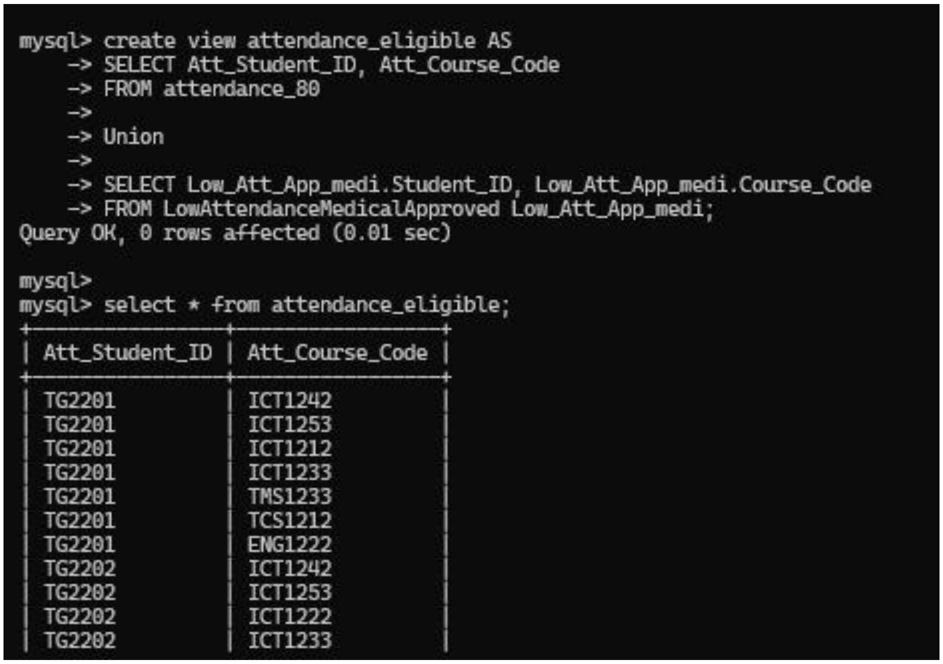
```
mysql> select * from attendance_80;
+----------------+-----------------+
| Att_Student_ID | Att_Course_Code |
+----------------+-----------------+
| TG2201         | ICT1242         |
| TG2201         | ICT1253         |
| TG2201         | ICT1212         |
| TG2201         | ICT1233         |
| TG2201         | TMS1233         |
| TG2201         | TCS1212         |
| TG2201         | ENG1222         |
| TG2202         | ICT1242         |
| TG2202         | ICT1253         |
| TG2202         | ICT1222         |
| TG2202         | ICT1233         |
| TG2202         | TMS1233         |
| TG2202         | TCS1212         |
| TG2202         | ENG1222         |
| TG2203         | ICT1242         |
| TG2203         | ICT1253         |
| TG2203         | ICT1212         |
| TG2203         | ICT1222         |
| TG2203         | ICT1233         |
| TG2203         | TMS1233         |
| TG2203         | TCS1212         |
| TG2203         | ENG1222         |
| TG2204         | ICT1242         |
| TG2204         | ICT1253         |
```



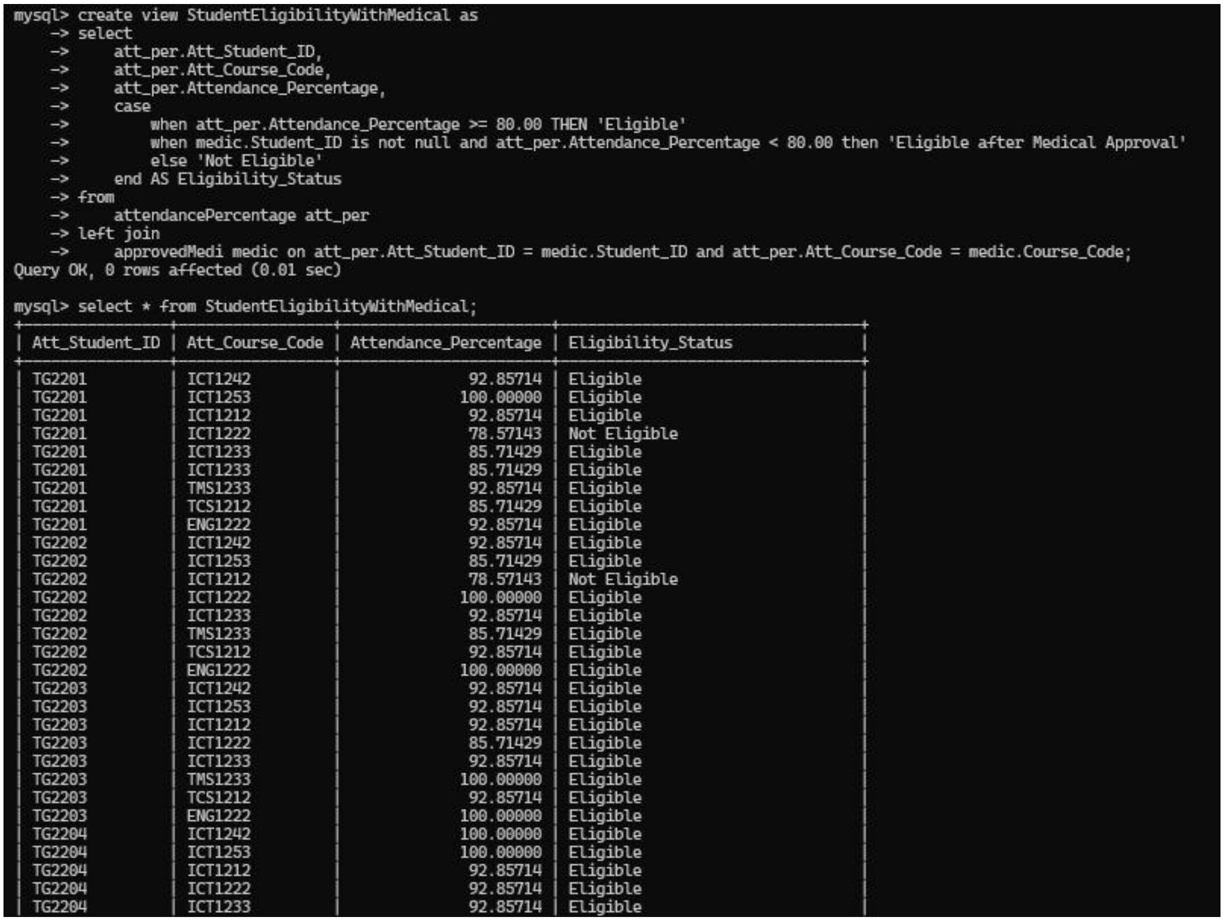
```
mysql> create view attendance_below_80 as
    -> select
    ->  Att_Student_ID, Att_Course_Code
    ->  from attendancePercentage
    ->  where Attendance_Percentage < 80.00000;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from attendance_below_80;
+----------------+-----------------+
| Att_Student_ID | Att_Course_Code |
+----------------+-----------------+
| TG2201         | ICT1222         |
| TG2202         | ICT1212         |
| TG2206         | ICT1253         |
| TG2207         | ICT1242         |
| TG2208         | ICT1253         |
| TG2208         | ICT1222         |
| TG2208         | TCS1212         |
| TG2208         | ENG1222         |
| TG2209         | TCS1212         |
+----------------+-----------------+
9 rows in set (0.01 sec)
```



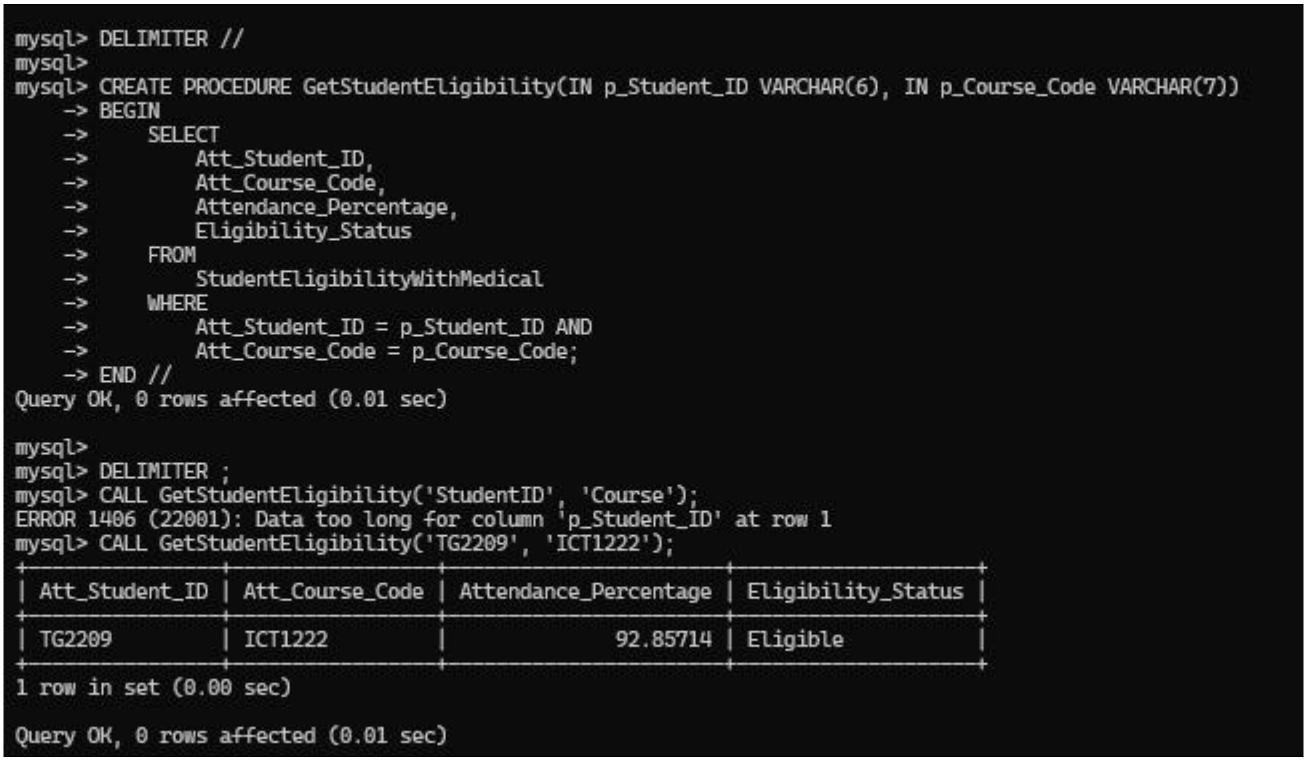
```
mysql> CREATE VIEW LowAttendanceMedicalApproved AS
    -> SELECT
    ->  medi.Student_ID,
    ->          medi.Course_Code,
    ->          att_per.Attendance_Percentage,
    ->          medi.week,
    ->          medi.date
    -> FROM
    ->     attendancePercentage att_per
    -> JOIN
    ->     approvedMedi medi ON att_per.Att_Student_ID = medi.Student_ID AND att_per.Att_Course_Code = medi.Course_Code
    -> JOIN
    ->     absentStudents absnt ON att_per.Att_Student_ID = absnt.Att_Student_ID AND att_per.Att_Course_Code = absnt.Att_Course_Code
    -> WHERE
    ->     att_per.Attendance_Percentage < 80.00;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from LowAttendanceMedicalApproved;
+------------+-------------+-----------------------+------+------+
| Student_ID | Course_Code | Attendance_Percentage | week | date |
+------------+-------------+-----------------------+------+------+
| TG2206     | ICT1253     |              78.57143 | w02  | d1   |
| TG2206     | ICT1253     |              78.57143 | w01  | d1   |
| TG2207     | ICT1242     |              78.57143 | w03  | d1   |
| TG2208     | ENG1222     |              64.28571 | w02  | d5   |
| TG2208     | ENG1222     |              64.28571 | w01  | d5   |
| TG2206     | ICT1253     |              78.57143 | w02  | d1   |
| TG2206     | ICT1253     |              78.57143 | w01  | d1   |
| TG2207     | ICT1242     |              78.57143 | w03  | d1   |
| TG2208     | ENG1222     |              64.28571 | w02  | d5   |
| TG2208     | ENG1222     |              64.28571 | w01  | d5   |
| TG2207     | ICT1242     |              78.57143 | w03  | d1   |
| TG2206     | ICT1253     |              78.57143 | w02  | d1   |
| TG2206     | ICT1253     |              78.57143 | w01  | d1   |
| TG2208     | ICT1222     |              71.42857 | w04  | d3   |
| TG2208     | TCS1212     |              64.28571 | w09  | d4   |
| TG2208     | TCS1212     |              64.28571 | w09  | d4   |
| TG2208     | ICT1222     |              71.42857 | w04  | d3   |
| TG2208     | ENG1222     |              64.28571 | w02  | d5   |
| TG2208     | ENG1222     |              64.28571 | w01  | d5   |
| TG2208     | ICT1222     |              71.42857 | w04  | d3   |
| TG2208     | TCS1212     |              64.28571 | w09  | d4   |
| TG2208     | ENG1222     |              64.28571 | w02  | d5   |
| TG2208     | ENG1222     |              64.28571 | w01  | d5   |
| TG2208     | TCS1212     |              64.28571 | w09  | d4   |
| TG2208     | ICT1222     |              71.42857 | w04  | d3   |
| TG2208     | TCS1212     |              64.28571 | w09  | d4   |
| TG2208     | ENG1222     |              64.28571 | w02  | d5   |
| TG2208     | ENG1222     |              64.28571 | w01  | d5   |
+------------+-------------+-----------------------+------+------+
28 rows in set (0.01 sec)
```



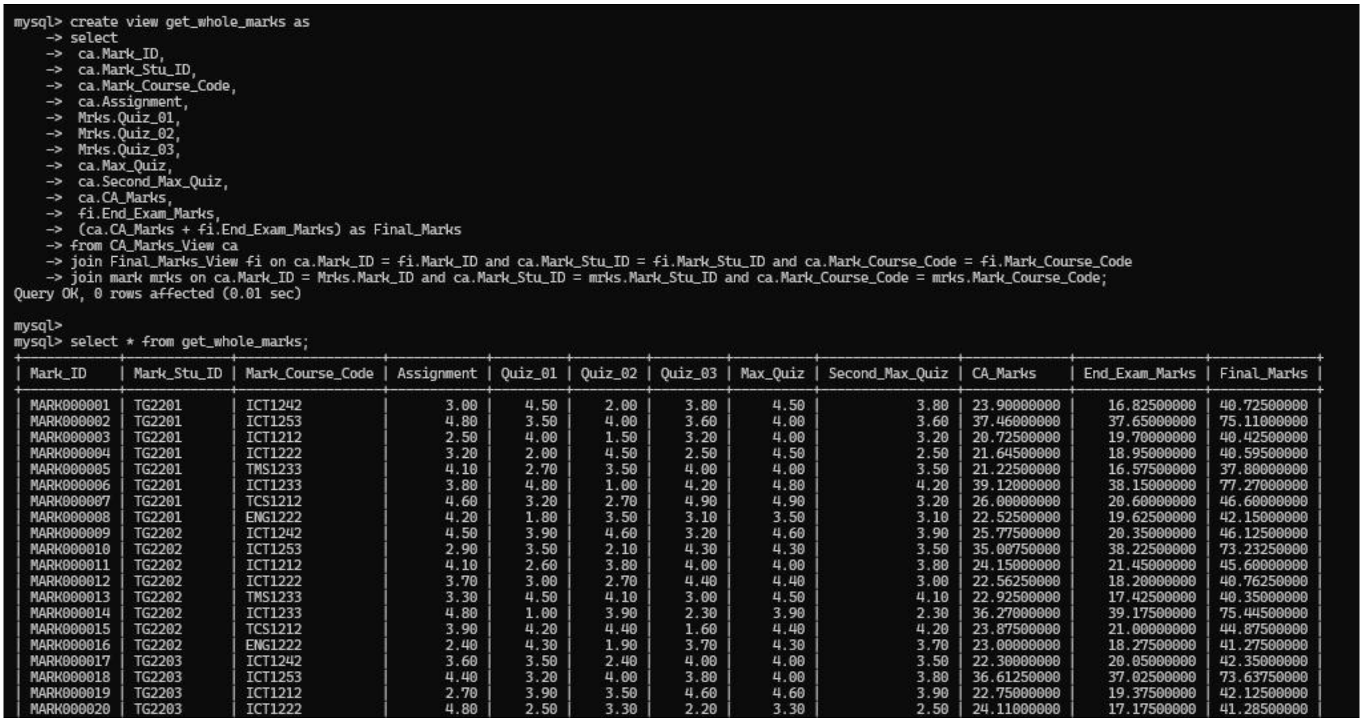
```
mysql> create view attendance_eligible AS
    -> SELECT Att_Student_ID, Att_Course_Code
    -> FROM attendance_80
    ->
    -> Union
    ->
    -> SELECT Low_Att_App_medi.Student_ID, Low_Att_App_medi.Course_Code
    -> FROM LowAttendanceMedicalApproved Low_Att_App_medi;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from attendance_eligible;
+----------------+-----------------+
| Att_Student_ID | Att_Course_Code |
+----------------+-----------------+
| TG2201         | ICT1242         |
| TG2201         | ICT1253         |
| TG2201         | ICT1212         |
| TG2201         | ICT1233         |
| TG2201         | TMS1233         |
| TG2201         | TCS1212         |
| TG2201         | ENG1222         |
| TG2202         | ICT1242         |
| TG2202         | ICT1253         |
| TG2202         | ICT1222         |
| TG2202         | ICT1233         |
```



```
mysql> create view StudentEligibilityWithMedical as
    -> select
    ->     att_per.Att_Student_ID,
    ->     att_per.Att_Course_Code,
    ->     att_per.Attendance_Percentage,
    ->     case
    ->         when att_per.Attendance_Percentage >= 80.00 THEN 'Eligible'
    ->         when medic.Student_ID is not null and att_per.Attendance_Percentage < 80.00 then 'Eligible after Medical Approval'
    ->         else 'Not Eligible'
    ->     end AS Eligibility_Status
    -> from
    ->     attendancePercentage att_per
    -> left join
    ->     approvedMedi medic on att_per.Att_Student_ID = medic.Student_ID and att_per.Att_Course_Code = medic.Course_Code;
Query OK, 0 rows affected (0.01 sec)

mysql> select * from StudentEligibilityWithMedical;
+----------------+-----------------+-----------------------+---------------------------------+
| Att_Student_ID | Att_Course_Code | Attendance_Percentage | Eligibility_Status              |
+----------------+-----------------+-----------------------+---------------------------------+
| TG2201         | ICT1242         |              92.85714 | Eligible                        |
| TG2201         | ICT1253         |             100.00000 | Eligible                        |
| TG2201         | ICT1212         |              92.85714 | Eligible                        |
| TG2201         | ICT1222         |              78.57143 | Not Eligible                    |
| TG2201         | ICT1233         |              85.71429 | Eligible                        |
| TG2201         | ICT1233         |              85.71429 | Eligible                        |
| TG2201         | TMS1233         |              92.85714 | Eligible                        |
| TG2201         | TCS1212         |              85.71429 | Eligible                        |
| TG2201         | ENG1222         |              92.85714 | Eligible                        |
| TG2202         | ICT1242         |              92.85714 | Eligible                        |
| TG2202         | ICT1253         |              85.71429 | Eligible                        |
| TG2202         | ICT1212         |              78.57143 | Not Eligible                    |
| TG2202         | ICT1222         |             100.00000 | Eligible                        |
| TG2202         | ICT1233         |              92.85714 | Eligible                        |
| TG2202         | TMS1233         |              85.71429 | Eligible                        |
| TG2202         | TCS1212         |              92.85714 | Eligible                        |
| TG2202         | ENG1222         |             100.00000 | Eligible                        |
| TG2203         | ICT1242         |              92.85714 | Eligible                        |
| TG2203         | ICT1253         |              92.85714 | Eligible                        |
| TG2203         | ICT1212         |              92.85714 | Eligible                        |
| TG2203         | ICT1222         |              85.71429 | Eligible                        |
| TG2203         | ICT1233         |              92.85714 | Eligible                        |
| TG2203         | TMS1233         |             100.00000 | Eligible                        |
| TG2203         | TCS1212         |              92.85714 | Eligible                        |
| TG2203         | ENG1222         |             100.00000 | Eligible                        |
| TG2204         | ICT1242         |             100.00000 | Eligible                        |
| TG2204         | ICT1253         |             100.00000 | Eligible                        |
| TG2204         | ICT1212         |              92.85714 | Eligible                        |
| TG2204         | ICT1222         |              92.85714 | Eligible                        |
| TG2204         | ICT1233         |              92.85714 | Eligible                        |
```



```
mysql> DELIMITER //
mysql>
mysql> CREATE PROCEDURE GetStudentEligibility(IN p_Student_ID VARCHAR(6), IN p_Course_Code VARCHAR(7))
    -> BEGIN
    ->     SELECT
    ->         Att_Student_ID,
    ->         Att_Course_Code,
    ->         Attendance_Percentage,
    ->         Eligibility_Status
    ->     FROM
    ->         StudentEligibilityWithMedical
    ->     WHERE
    ->         Att_Student_ID = p_Student_ID AND
    ->         Att_Course_Code = p_Course_Code;
    -> END //
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> DELIMITER ;
mysql> CALL GetStudentEligibility('StudentID', 'Course');
ERROR 1406 (22001): Data too long for column 'p_Student_ID' at row 1
mysql> CALL GetStudentEligibility('TG2209', 'ICT1222');
+----------------+-----------------+-----------------------+--------------------+
| Att_Student_ID | Att_Course_Code | Attendance_Percentage | Eligibility_Status |
+----------------+-----------------+-----------------------+--------------------+
| TG2209         | ICT1222         |              92.85714 | Eligible           |
+----------------+-----------------+-----------------------+--------------------+
1 row in set (0.00 sec)

Query OK, 0 rows affected (0.01 sec)
```



```
mysql> create view get_whole_marks as
    -> select
    ->  ca.Mark_ID,
    ->  ca.Mark_Stu_ID,
    ->  ca.Mark_Course_Code,
    ->  ca.Assignment,
    ->  Mrks.Quiz_01,
    ->  Mrks.Quiz_02,
    ->  Mrks.Quiz_03,
    ->  ca.Max_Quiz,
    ->  ca.Second_Max_Quiz,
    ->  ca.CA_Marks,
    ->  fi.End_Exam_Marks,
    ->  (ca.CA_Marks + fi.End_Exam_Marks) as Final_Marks
    -> from CA_Marks_View ca
    -> join Final_Marks_View fi on ca.Mark_ID = fi.Mark_ID and ca.Mark_Stu_ID = fi.Mark_Stu_ID and ca.Mark_Course_Code = fi.Mark_Course_Code
    -> join mark mrks on ca.Mark_ID = Mrks.Mark_ID and ca.Mark_Stu_ID = mrks.Mark_Stu_ID and ca.Mark_Course_Code = mrks.Mark_Course_Code;
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> select * from get_whole_marks;
+------------+-------------+------------------+------------+---------+---------+---------+----------+-----------------+-------------+----------------+-------------+
| Mark_ID    | Mark_Stu_ID | Mark_Course_Code | Assignment | Quiz_01 | Quiz_02 | Quiz_03 | Max_Quiz | Second_Max_Quiz | CA_Marks    | End_Exam_Marks | Final_Marks |
+------------+-------------+------------------+------------+---------+---------+---------+----------+-----------------+-------------+----------------+-------------+
| MARK000001 | TG2201      | ICT1242          |       3.00 |    4.50 |    2.00 |    3.80 |     4.50 |            3.80 | 23.90000000 |    16.82500000 | 40.72500000 |
| MARK000002 | TG2201      | ICT1253          |       4.80 |    3.50 |    4.00 |    3.60 |     4.00 |            3.60 | 37.46000000 |    37.65000000 | 75.11000000 |
| MARK000003 | TG2201      | ICT1212          |       2.50 |    4.00 |    1.50 |    3.20 |     4.00 |            3.20 | 20.72500000 |    19.70000000 | 40.42500000 |
| MARK000004 | TG2201      | ICT1222          |       3.20 |    2.00 |    4.50 |    2.50 |     4.50 |            2.50 | 21.64500000 |    18.95000000 | 40.59500000 |
| MARK000005 | TG2201      | TMS1233          |       4.10 |    2.70 |    3.50 |    4.00 |     4.00 |            3.50 | 21.22500000 |    16.57500000 | 37.80000000 |
| MARK000006 | TG2201      | ICT1233          |       3.80 |    4.80 |    1.00 |    4.20 |     4.80 |            4.20 | 39.12000000 |    38.15000000 | 77.27000000 |
| MARK000007 | TG2201      | TCS1212          |       4.60 |    3.20 |    2.70 |    4.90 |     4.90 |            3.20 | 26.00000000 |    20.60000000 | 46.60000000 |
| MARK000008 | TG2201      | ENG1222          |       4.20 |    1.80 |    3.50 |    3.10 |     3.50 |            3.10 | 22.52500000 |    19.62500000 | 42.15000000 |
| MARK000009 | TG2202      | ICT1242          |       4.50 |    3.90 |    4.60 |    3.20 |     4.60 |            3.90 | 25.77500000 |    20.35000000 | 46.12500000 |
| MARK000010 | TG2202      | ICT1253          |       2.90 |    3.50 |    2.10 |    4.30 |     4.30 |            3.50 | 35.00750000 |    38.22500000 | 73.23250000 |
| MARK000011 | TG2202      | ICT1212          |       4.10 |    2.60 |    3.80 |    4.00 |     4.00 |            3.80 | 24.15000000 |    21.45000000 | 45.60000000 |
| MARK000012 | TG2202      | ICT1222          |       3.70 |    3.00 |    2.70 |    4.40 |     4.40 |            3.00 | 22.56250000 |    18.20000000 | 40.76250000 |
| MARK000013 | TG2202      | TMS1233          |       3.30 |    4.50 |    4.10 |    3.00 |     4.50 |            4.10 | 22.92500000 |    17.42500000 | 40.35000000 |
| MARK000014 | TG2202      | ICT1233          |       4.80 |    1.00 |    3.90 |    2.30 |     3.90 |            2.30 | 36.27000000 |    39.17500000 | 75.44500000 |
| MARK000015 | TG2202      | TCS1212          |       3.90 |    4.20 |    4.40 |    1.60 |     4.40 |            4.20 | 23.87500000 |    21.00000000 | 44.87500000 |
| MARK000016 | TG2202      | ENG1222          |       2.40 |    4.30 |    1.90 |    3.70 |     4.30 |            3.70 | 23.00000000 |    18.27500000 | 41.27500000 |
| MARK000017 | TG2203      | ICT1242          |       3.60 |    3.50 |    2.40 |    4.00 |     4.00 |            3.50 | 22.30000000 |    20.05000000 | 42.35000000 |
| MARK000018 | TG2203      | ICT1253          |       4.40 |    3.20 |    4.00 |    3.80 |     4.00 |            3.80 | 36.61250000 |    37.02500000 | 73.63750000 |
| MARK000019 | TG2203      | ICT1212          |       2.70 |    3.90 |    3.50 |    4.60 |     4.60 |            3.90 | 22.75000000 |    19.37500000 | 42.12500000 |
| MARK000020 | TG2203      | ICT1222          |       4.80 |    2.50 |    3.30 |    2.20 |     3.30 |            2.50 | 24.11000000 |    17.17500000 | 41.28500000 |
```

Problems that you faced during the development of the solution.

- **Data Complexity**

  The intricate structure of the data posed difficulties in creating and inserting entries for the attendance and marks tables.
- **Foreign Key Constraints**

  Establishing foreign keys before defining primary keys in the tables proved to be a complex task.
- **ER Diagram and Relational Schema Design**

  Designing the ER diagram and relational schema using Draw.io presented challenges, requiring considerable effort to accurately represent the relationships.
- As subject module theory and practical were not separated in the marks and attendance table, we could not take their theory practicals attendance and theort practicals marks separately.

Solutions /How you have overcome the above the identified problems

- **Separate Dataset for Attendance**

  To address the complexity of the data, we created a dedicated dataset specifically for the attendance table, simplifying the data management process.
- **Online Tutorials for Diagram Design**

  We utilized online tutorials to guide us in drawing the ER diagram and relational schema, allowing us to enhance our understanding and improve the accuracy of our designs.

New database techniques / trends you have used to develop the backend

- MySQL command line client
- Windows command line (connect MySQL)
- Notepad ++
- GitHub

If you are going to host your backend, where are you going to host it and reasons for the selection

- Anyone can access the database in any place in any time.
- Backup and recovery
- Easy to maintain

If you are going to host your backend in a cloud environment what are the things/changes that you have to do in your backend

- We want to buy a database server
- Change some data types.
- We have a lot of data in our database.
- We must change the data structures

Individual contribution to the backend development

TG Number	Individual contribution
TG/2022/1357	Collect data related to tasks Create tables Create views and procedures Create database Create ER diagram
TG/2022/1361	Collect data related to tasks Create tables Create views Create procedures
TG/2022/1359	Collect data related to tasks Create tables Create views Create procedures Create Relational Mapping Diagram
TG/2022/1360	Collect data related to tasks Create tables Create views Create procedures

Github Repository Link - https://github.com/Hasalapera/Database_miniproject_G09

References

- W3 schools
- MYSQL documentation
- Lecture notes