College

Database

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INTRODUCTION

The College Database SQL project is aimed at creating a comprehensive database system for managing various aspects of a college. This project utilizes the Structured Query Language (SQL) to design and implement a relational database that stores and organizes information related to students, faculty, courses, departments, and other administrative functions within a college or university.

DATABASE ENTITIES:

The database will consist of several entities, including:

*Students

*Departments

*Courses

*Faculty

*Enrollments

DATABASE - COLLEGE DATABASE

TABLES:-

*Students

*Departments

*Courses

*Faculty

*Enrollments

Show, create and use database

```
MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| mysql26            |
| performance_schema |
| phpmyadmin         |
| test               |
+--------------------+
6 rows in set (0.002 sec)

MariaDB        )]> create database college;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> use college;
Database changed
MariaDB [college]> _
```

CREATE TABLES

1.DEPARTMENT

```
MariaDB [college]> create table department(DepartmentID INT PRIMARY KEY, DepartmentName VARCHAR(50),Location VARCHAR(50));
Query OK, 0 rows affected (0.037 sec)
```

2.COURSE

```
MariaDB [college]> create table course(CourseID INT PRIMARY KEY, CourseName VARCHAR(100), Credits INT,DepartmentID INT,FOREIG
N KEY(DepartmentID) REFERENCES Department(DepartmentID));
Query OK, 0 rows affected (0.018 sec)
```

3.FACULTY

```
MariaDB [college]> create table faculty(FacultyID INT PRIMARY KEY,FirstName VARCHAR(50),LastName VARCHAR(50),DepartmentID INT
,EMAIL VARCHAR(100),FOREIGN KEY (DepartmentID) REFERENCES Department(DepartmentID));
Query OK, 0 rows affected (0.019 sec)
```

4.STUDENT

```
MariaDB [college]> CREATE TABLE Student (
    ->    StudentID INT PRIMARY KEY,
    ->    FirstName VARCHAR(50),
    ->    LastName VARCHAR(50),
    ->    DepartmentID INT,
    ->    Email VARCHAR(100),
    ->    FOREIGN KEY (DepartmentID) REFERENCES Department(DepartmentID)
    -> );
Query OK, 0 rows affected (0.014 sec)
```

5.ENROLLMENT

```
MariaDB [college]> CREATE TABLE Enrollment (
    ->    EnrollmentID INT PRIMARY KEY,
    ->    StudentID INT,
    ->    CourseID INT,
    ->    EnrollmentDate DATE,
    ->    Grade VARCHAR(2),
    ->    FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
    ->    FOREIGN KEY (CourseID) REFERENCES Course(CourseID)
    -> );
Query OK, 0 rows affected (0.015 sec)
```

TABLES IN DATABASE

```
MariaDB [college]> show tables;
+------------------+
| Tables_in_college |
+------------------+
| course           |
| department       |
| enrollment       |
| faculty          |
| student          |
+------------------+
5 rows in set (0.008 sec)
```

DATA DEFINITION LANGUAGE (DDL)

DESCRIPTION OF CREATED TABLE

- ### COURSE

```
MariaDB [college]> desc course;
+--------------+--------------+------+-----+---------+-------+
| Field        | Type         | Null | Key | Default | Extra |
+--------------+--------------+------+-----+---------+-------+
| CourseID     | int(11)      | NO   | PRI | NULL    |       |
| CourseName   | varchar(100) | YES  |     | NULL    |       |
| Credits      | int(11)      | YES  |     | NULL    |       |
| DepartmentID | int(11)      | YES  | MUL | NULL    |       |
+--------------+--------------+------+-----+---------+-------+
4 rows in set (0.020 sec)
```

- ### DEPARTMENT

```
MariaDB [college]> desc department;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| DepartmentID   | int(11)     | NO   | PRI | NULL    |       |
| DepartmentName | varchar(50) | YES  |     | NULL    |       |
| Location       | varchar(50) | YES  |     | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
3 rows in set (0.014 sec)
```

- ## ENROLLMENT

```
MariaDB [college]> desc enrollment;
+----------------+------------+------+-----+---------+-------+
| Field          | Type       | Null | Key | Default | Extra |
+----------------+------------+------+-----+---------+-------+
| EnrollmentID   | int(11)    | NO   | PRI | NULL    |       |
| StudentID      | int(11)    | YES  | MUL | NULL    |       |
| CourseID       | int(11)    | YES  | MUL | NULL    |       |
| EnrollmentDate | date       | YES  |     | NULL    |       |
| Grade          | varchar(2) | YES  |     | NULL    |       |
+----------------+------------+------+-----+---------+-------+
5 rows in set (0.007 sec)
```

- ## FACULTY

```
MariaDB [college]> desc faculty;
+--------------+--------------+------+-----+---------+-------+
| Field        | Type         | Null | Key | Default | Extra |
+--------------+--------------+------+-----+---------+-------+
| FacultyID    | int(11)      | NO   | PRI | NULL    |       |
| FirstName    | varchar(50)  | YES  |     | NULL    |       |
| LastName     | varchar(50)  | YES  |     | NULL    |       |
| DepartmentID | int(11)      | YES  | MUL | NULL    |       |
| Email        | varchar(100) | YES  |     | NULL    |       |
+--------------+--------------+------+-----+---------+-------+
5 rows in set (0.013 sec)
```

- ## STUDENT

```
MariaDB [college]> desc student;
+--------------+--------------+------+-----+---------+-------+
| Field        | Type         | Null | Key | Default | Extra |
+--------------+--------------+------+-----+---------+-------+
| StudentID    | int(11)      | NO   | PRI | NULL    |       |
| FirstName    | varchar(50)  | YES  |     | NULL    |       |
| LastName     | varchar(50)  | YES  |     | NULL    |       |
| DepartmentID | int(11)      | YES  | MUL | NULL    |       |
| Email        | varchar(100) | YES  |     | NULL    |       |
+--------------+--------------+------+-----+---------+-------+
5 rows in set (0.012 sec)
```

ALTER TABLE

- ### ALTER TABLE ADD COLUMN

```
MariaDB [college]> alter table student add contact_no int;
Query OK, 0 rows affected (0.012 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

● ALTER TABLE MODIFY COLUMN

```
MariaDB [college]> alter table student modify contact_no bigint;
Query OK, 0 rows affected (0.061 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

- ### ALTER TABLE RENAME COLUMN

```
MariaDB [college]> alter table student change contact_no student_contact bigint;
Query OK, 0 rows affected (0.013 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

- ### ALTER TABLE DROP COLUMN

```
MariaDB [college]> alter table student drop student_contact;
Query OK, 0 rows affected (0.010 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

- # FILENAME TABLE

```
MariaDB [college]> Alter table enrollment
    -> Rename admission;
Query OK, 0 rows affected (0.021 sec)
```

- # TRUNCATE TABLE

```
MariaDB [college]> truncate admission;
Query OK, 0 rows affected (0.025 sec)
```

- # DROP TABLE

```
MariaDB [college]> drop table admission;
Query OK, 0 rows affected (0.021 sec)
```

DATA MANIPULATION LANGUAGE (DML)

- ## INSERT DATA INTO TABLE

```
MariaDB [college]> INSERT INTO Department (DepartmentID, DepartmentName, Location)
    -> VALUES
    ->   (1, 'Computer Science', 'Building A'),
    ->   (2, 'Mathematics', 'Building B'),
    ->   (3, 'Physics', 'Building C'),
    ->   (4, 'English', 'Building D');
Query OK, 4 rows affected (0.009 sec)
Records: 4  Duplicates: 0  Warnings: 0
```

- ## UPDATE DATA INTO TABLE

```
MariaDB [college]> update student
    -> set email='emilybrown1@example.com'
    -> where studentid=301;
Query OK, 1 row affected (0.016 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

- # DELETE FROM TABLE

```
MariaDB [college]> delete from enrollments where enrollmentid=401;
Query OK, 1 row affected (0.007 sec)
```

```
MariaDB [college]> select * from enrollments;
+--------------+-----------+----------+----------------+-------+
| enrollmentid | studentid | courseid | enrollmentdate | grade |
+--------------+-----------+----------+----------------+-------+
|          402 |       302 |      102 | 2022-09-01     | B     |
|          403 |       303 |      103 | 2022-09-01     | B+    |
|          404 |       304 |      104 | 2022-09-01     | A-    |
+--------------+-----------+----------+----------------+-------+
3 rows in set (0.001 sec)
```

DATA QUERY LANGUAGE (DQL)

- Select Query

```
MariaDB [college]> select * from student;
+-----------+-----------+-----------+--------------+-----------------------------+
| StudentID | FirstName | LastName  | DepartmentID | Email                       |
+-----------+-----------+-----------+--------------+-----------------------------+
|       301 | Emily     | Brown     |            1 | emilybrown1@example.com     |
|       302 | James     | Davis     |            2 | jamesdavis@example.com      |
|       303 | Olivia    | Wilson    |            1 | oliviawilson@example.com    |
|       304 | Emma      | Miller    |            3 | emmamiller@example.com      |
+-----------+-----------+-----------+--------------+-----------------------------+
4 rows in set (0.001 sec)
```

```
MariaDB [college]> select * from faculty;
+-----------+-----------+-----------+--------------+------------------------------+
| FacultyID | FirstName | LastName  | DepartmentID | Email                        |
+-----------+-----------+-----------+--------------+------------------------------+
|       201 | John      | Doe       |            1 | johndoe@example.com          |
|       202 | Jane      | Smith     |            2 | janesmith@example.com        |
|       203 | Michael   | Johnson   |            3 | michaeljohnson@example.com   |
+-----------+-----------+-----------+--------------+------------------------------+
3 rows in set (0.007 sec)
```

• ORDER BY QUERY ASCENDING

```
MariaDB [college]> select * from student
    -> order by firstname asc;
+-----------+-----------+-----------+--------------+-----------------------------+
| StudentID | FirstName | LastName  | DepartmentID | Email                       |
+-----------+-----------+-----------+--------------+-----------------------------+
|       301 | Emily     | Brown     |            1 | emilybrown1@example.com     |
|       304 | Emma      | Miller    |            3 | emmamiller@example.com      |
|       302 | James     | Davis     |            2 | jamesdavis@example.com      |
|       303 | Olivia    | Wilson    |            1 | oliviawilson@example.com    |
+-----------+-----------+-----------+--------------+-----------------------------+
4 rows in set (0.002 sec)
```

- ## LIMIT QUERY

```
MariaDB [college]> select * from course
    -> limit 3;
+----------+-----------------------------------+---------+--------------+
| CourseID | CourseName                        | Credits | DepartmentID |
+----------+-----------------------------------+---------+--------------+
|      101 | Introduction to Computer Science  |       3 |            1 |
|      102 | Calculus I                        |       4 |            2 |
|      103 | Mechanics                         |       3 |            3 |
+----------+-----------------------------------+---------+--------------+
3 rows in set (0.001 sec)
```

- ## SELECT QUERY WITH SPECIFIC COLUMN

```
MariaDB [college]> select departmentname, location
    -> from department;
+------------------+------------+
| departmentname   | location   |
+------------------+------------+
| Computer Science | Building A |
| Mathematics      | Building B |
| Physics          | Building C |
| English          | Building D |
+------------------+------------+
4 rows in set (0.001 sec)
```

SELECT QUERY WITH COLUMN ALIAS NAME

```
MariaDB [college]> select departmentname as course, location as venue
    -> from department;
+------------------+------------+
| course           | venue      |
+------------------+------------+
| Computer Science | Building A |
| Mathematics      | Building B |
| Physics          | Building C |
| English          | Building D |
+------------------+------------+
4 rows in set (0.006 sec)
```

DISTINCT QUERY

```
MariaDB [college]> select distinct(departmentid)
    -> from department;
+--------------+
| departmentid |
+--------------+
|            1 |
|            2 |
|            3 |
|            4 |
+--------------+
4 rows in set (0.008 sec)
```

USING WHERE CLAUSE

- ## WITH COMPARISON OPERATOR

```
MariaDB [college]> select * from course
    -> where departmentid=2;
+----------+----------------+---------+--------------+
| CourseID | CourseName     | Credits | DepartmentID |
+----------+----------------+---------+--------------+
|      102 | Calculus I     |       4 |            2 |
|      106 | Linear Algebra |       3 |            2 |
+----------+----------------+---------+--------------+
2 rows in set (0.014 sec)
```

```
MariaDB [college]> select * from faculty
    -> where departmentid=2;
+-----------+-----------+----------+--------------+-----------------------+
| FacultyID | FirstName | LastName | DepartmentID | Email                 |
+-----------+-----------+----------+--------------+-----------------------+
|       202 | Jane      | Smith    |            2 | janesmith@example.com |
+-----------+-----------+----------+--------------+-----------------------+
1 row in set (0.006 sec)
```

```
MariaDB [college]> select * from student
    -> where departmentid=2;
+-----------+-----------+----------+--------------+-----------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                 |
+-----------+-----------+----------+--------------+-----------------------+
|       302 | James     | Davis    |            2 | jamesdavis@example.com |
+-----------+-----------+----------+--------------+-----------------------+
1 row in set (0.007 sec)
```

- ## USING BETWEEN CLAUSE

```
MariaDB [college]> select * from student
    -> where studentid between 304 and 307;
+-----------+-----------+----------+--------------+---------------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                     |
+-----------+-----------+----------+--------------+---------------------------+
|       304 | Emma      | Miller   |            3 | emmamiller@example.com    |
|       305 | jessica   | gomez    |            1 | jessicagomez@example.com  |
|       306 | cyrus     | dangur   |            2 | cyrusdangur@example.com   |
|       307 | ellya     | tambani  |            1 | ellyatambani@example.com  |
+-----------+-----------+----------+--------------+---------------------------+
4 rows in set (0.010 sec)
```

- ## USING IN CLAUSE

```
MariaDB [college]> select * from student
    -> where firstname in ('emma','ellya','cyrus','jessica');
+-----------+-----------+----------+--------------+---------------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                     |
+-----------+-----------+----------+--------------+---------------------------+
|       304 | Emma      | Miller   |            3 | emmamiller@example.com    |
|       305 | jessica   | gomez    |            1 | jessicagomez@example.com  |
|       306 | cyrus     | dangur   |            2 | cyrusdangur@example.com   |
|       307 | ellya     | tambani  |            1 | ellyatambani@example.com  |
+-----------+-----------+----------+--------------+---------------------------+
4 rows in set (0.009 sec)
```

- ## GROUP BY CLAUSE

```
MariaDB [college]> --Find out the counts of department id --
MariaDB [college]> select count(departmentid), departmentid from student
    -> group by departmentid;
+---------------------+--------------+
| count(departmentid) | departmentid |
+---------------------+--------------+
|                   4 |            1 |
|                   2 |            2 |
|                   2 |            3 |
+---------------------+--------------+
3 rows in set (0.001 sec)

MariaDB [college]>
```

- ## LIKE OPERATOR

```
MariaDB [college]> --Find student whos first name ends with 'Y'--
MariaDB [college]> Select * from student
    -> where firstname like '%y';
+-----------+-----------+----------+--------------+-------------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                   |
+-----------+-----------+----------+--------------+-------------------------+
|       301 | Emily     | Brown    |            1 | emilybrown1@example.com |
+-----------+-----------+----------+--------------+-------------------------+
1 row in set (0.001 sec)
```

- **UNION**

```
MariaDB [college]> select departmentid,studentid,firstname from student
    -> union
    -> select departmentid, departmentname,location from department;
+--------------+------------------+------------+
| departmentid | studentid        | firstname  |
+--------------+------------------+------------+
|            1 | 301              | Emily      |
|            2 | 302              | James      |
|            1 | 303              | Olivia     |
|            3 | 304              | Emma       |
|            1 | 305              | jessica    |
|            2 | 306              | cyrus      |
|            1 | 307              | ellya      |
|            3 | 308              | sam        |
|            1 | Computer Science | Building A |
|            2 | Mathematics      | Building B |
|            3 | Physics          | Building C |
|            4 | English          | Building D |
+--------------+------------------+------------+
12 rows in set (0.007 sec)
```

- **JOINS**

```
MariaDB [college]> --Perform join function on student and department--
MariaDB [college]> SELECT s.studentid, s.firstname, d.departmentname
    -> FROM student s
    -> JOIN department d ON s.departmentid = d.departmentid;
+-----------+-----------+------------------+
| studentid | firstname | departmentname   |
+-----------+-----------+------------------+
|       301 | Emily     | Computer Science |
|       302 | James     | Mathematics      |
|       303 | Olivia    | Computer Science |
|       304 | Emma      | Physics          |
|       305 | jessica   | Computer Science |
|       306 | cyrus     | Mathematics      |
|       307 | ellya     | Computer Science |
|       308 | sam       | Physics          |
+-----------+-----------+------------------+
8 rows in set (0.001 sec)
```

- ## SUBQUERY

```
MariaDB [college]> --Find who else have same department as Emily--
MariaDB [college]> select * from student
    -> where departmentid=(select departmentid from student where firstname='emily');
+-----------+-----------+----------+--------------+--------------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                    |
+-----------+-----------+----------+--------------+--------------------------+
|       301 | Emily     | Brown    |            1 | emilybrown1@example.com  |
|       303 | Olivia    | Wilson   |            1 | oliviawilson@example.com |
|       305 | jessica   | gomez    |            1 | jessicagomez@example.com |
|       307 | ellya     | tambani  |            1 | ellyatambani@example.com |
+-----------+-----------+----------+--------------+--------------------------+
4 rows in set (0.010 sec)
```

```
MariaDB [college]> --Find who else have same department as sam--
MariaDB [college]> select * from student
    -> where departmentid=(select departmentid from student where firstname='sam');
+-----------+-----------+----------+--------------+------------------------+
| StudentID | FirstName | LastName | DepartmentID | Email                  |
+-----------+-----------+----------+--------------+------------------------+
|       304 | Emma      | Miller   |            3 | emmamiller@example.com |
|       308 | sam       | jason    |            3 | jasonsam@example.com   |
+-----------+-----------+----------+--------------+------------------------+
2 rows in set (0.001 sec)
```

VIEWS

```
MariaDB [college]> create view student_view as
    -> select studentid,firstname,departmentid
    -> from student;
Query OK, 0 rows affected (0.017 sec)
```

```
MariaDB [college]> select * from student_view;
+-----------+-----------+--------------+
| studentid | firstname | departmentid |
+-----------+-----------+--------------+
|       301 | Emily     |            1 |
|       302 | James     |            2 |
|       303 | Olivia    |            1 |
|       304 | Emma      |            3 |
|       305 | jessica   |            1 |
|       306 | cyrus     |            2 |
|       307 | ellya     |            1 |
|       308 | sam       |            3 |
+-----------+-----------+--------------+
8 rows in set (0.008 sec)
```