Heaven's Light is Our Guide

Rajshahi University of Engineering & Technology

Course Title
Database Systems Sessional
Course No.
ECE 2216
Lab Report
01

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1   Problemt Statement

Create a database system for ECE'21 with table containing following information of 10 students:

1. ID

2. Name

3. Contact

4. Blood Group

5. Major Subject

6. Obtained Marks

2   Objective

- Creating, modifying and managing a database.

- Studying various operations of Data Definition Language (DDL).

- Studying various operations of Data Manipulation Language (DML).

3   Theory

A **database** is a structured collection of data, organized for efficient storage, retrieval, and management. In this lab, we design and manage a database using SQL commands.

3.1   Data Definition Language (DDL)

DDL defines the structure of a database:

- **CREATE**: Creates tables and database objects.

- **ALTER**: Modifies existing table structures.

- **DROP**: Deletes tables or objects.

- **TRUNCATE**: Removes all data but keeps the table structure.

3.2   Data Manipulation Language (DML)

DML handles data operations within the database:

- **INSERT**: Adds new records to a table.

- **UPDATE**: Modifies existing data.

- **DELETE**: Removes specific records.

- **SELECT**: Retrieves data from tables.

Through DDL and DML, we structure and manipulate student data efficiently.

4   Tools

1. Computer

2. MySQL

3. Internet

4. Reference Book

5   Solution

Creating a database name ECE21:

```
1  mysql> CREATE DATABASE ECE21;
2  Query OK, 1 row affected (0.01 sec)
```

Creating a table for students:

```
1  mysql> CREATE TABLE students (
2      -> ID int,
3      -> Name VARCHAR(255),
4      -> Contact VARCHAR(255),
5      -> Blood_group VARCHAR(20),
6      -> Major_sub VARCHAR(255),
7      -> Obtained_mark INT
8      -> );
9  Query OK, 0 rows affected (0.04 sec)
```

Inserting 10 students in the students table:

```
1  mysql> INSERT INTO students (ID, Name, Contact, Blood_group, Major_sub, Obtained_mark)
       VALUES
2      ->      (1, 'Sadik', 01735048393, 'O+', 'Electrical', 68),
3      ->      (2, 'Nahid', 01735048394, 'A+', 'Computer', 78),
4      ->      (3, 'Samia', 01735048395, 'b+', 'Electrical', 88),
5      ->      (4, 'Radia', 01735048396, 'O+', 'Electrical', 60),
6      ->      (6, 'Prattay', 01735048393, 'O+', 'DBMS', 68),
7      ->      (7, 'Nahid', 01735048394, 'A+', 'Analog', 78),
8      ->      (8, 'Samia', 01735048395, 'b+', 'Electrical', 88),
9      ->      (9, 'Arif', 01735048396, 'O+', 'DBMS', 60),
10     ->      (10, 'Chotan', 01735048397, 'A+', 'OOP', 66);
11 Query OK, 9 rows affected (0.01 sec)
12 Records: 9  Duplicates: 0  Warnings: 0
```

Output:

```
1  mysql> SELECT * FROM students;
2  +------+---------+------------+-------------+------------+---------------+
3  | ID   | Name    | Contact    | Blood_group | Major_sub  | Obtained_mark |
4  +------+---------+------------+-------------+------------+---------------+
5  |    1 | Sadik   | 1735048393 | O+          | Electrical |            68 |
6  |    2 | Nahid   | 1735048394 | A+          | Computer   |            78 |
7  |    3 | Samia   | 1735048395 | b+          | Electrical |            88 |
8  |    4 | Radia   | 1735048396 | O+          | Electrical |            60 |
9  |    6 | Prattay | 1735048393 | O+          | DBMS       |            68 |
10 |    7 | Nahid   | 1735048394 | A+          | Analog     |            78 |
11 |    8 | Samia   | 1735048395 | b+          | Electrical |            88 |
```

```
12  |    9 | Arif    | 1735048396 | O+          | DBMS       |            60 |
13  |   10 | Chotan  | 1735048397 | A+          | OOP        |            66 |
14  +------+---------+------------+-------------+------------+---------------+
15  9 rows in set (0.00 sec)
```

Changing a specific column name and data type:

```
1  mysql> ALTER TABLE students
2      -> CHANGE Obtained_mark Marks DECIMAL(5,2);
3  Query OK, 9 rows affected (0.09 sec)
4  Records: 9  Duplicates: 0  Warnings: 0
```

Delete the students info whose marks is below 65:

```
1  mysql> DELETE FROM students WHERE marks < 65;
2  Query OK, 2 rows affected (0.01 sec)
```

Add a new column named as log. Set the value applicable and not applicable for the condition (marks ¡ 30):

```
1  mysql> ALTER TABLE students
2      -> ADD COLUMN log VARCHAR(20);
3  Query OK, 0 rows affected (0.02 sec)
4  Records: 0  Duplicates: 0  Warnings: 0
5
6  mysql> UPDATE students
7      -> SET log = CASE
8      ->     WHEN Marks < 30 THEN 'applicable'
9      ->     ELSE 'not applicable'
10     -> END;
11 Query OK, 7 rows affected (0.01 sec)
12 Rows matched: 7  Changed: 7  Warnings: 0
```

6 Conclusion

In this lab, we successfully designed and implemented a structured database system using SQL. By utilizing Data Definition Language (DDL), we were able to create and modify the schema for two tables, organizing student data for odd and even semesters. With Data Manipulation Language (DML), we effectively inserted, updated, and queried the data, reinforcing our understanding of core database operations.

This exercise provided valuable hands-on experience with SQL, helping us grasp the importance of defining database structures, maintaining data integrity through constraints, and efficiently handling data in a real-world scenario. These skills are essential for managing databases in practical applications.

7 Reference

References

[1] C. J. Date, *An Introduction to Database Systems*, 8th ed. Boston: Addison-Wesley, 2003.

[2] R. Elmasri and S. B. Navathe, *Fundamentals of Database Systems*, 7th ed. Boston: Pearson, 2016.

[3] A. Silberschatz, H. F. Korth, and S. Sudarshan, *Database System Concepts*, 6th ed. New York: McGraw-Hill, 2010.