"Heaven's Light is Our Guide"

Rajshahi University of Engineering & Technology, Rajshahi

Department of Electrical & Computer Engineering

Course Code : ECE 2216

Course Title : Database Systems (Sessional)

Submission Date : September 21,2024

Submitted to:
Oishi Jyoti,
Assistant Professor,
Department of ECE,
RUET.

Submitted by:
Md. Ashikur Rahman
Roll-2110059
Department of ECE,
RUET.

Experiment No. 01
Experiment Name:
Create a database containing following info for 10 students_

I. Roll
II. Name
III. Semester
IV. Major Subject
V. Obtained Mark

Theory:
SQL (Structured Query Language) is a standardized programming language used for managing relational databases. It allows users to perform tasks like querying data, inserting records, updating information, and deleting data. SQL is supported by most relational database systems, such as MySQL, PostgreSQL, and Oracle.

We use SQL to efficiently retrieve specific information from large datasets. It enables data management by allowing the addition, modification, and removal of records. SQL also lets users create and alter database structures, including tables and relationships.

Additionally, SQL enforces data integrity through constraints and manages access with security features. It supports efficient data handling with operations like sorting, filtering, and aggregating. Its relational model organizes data into tables linked by relationships, reflecting real-world entities.

In summary, SQL is essential for interacting with databases, making it a crucial tool for data management and analysis.[1]

Task-1: Create a Database and Table

Step-1: Creating the Table
Input:

```
CREATE TABLE Student_Data(
ID VARCHAR(20),
Student_Name VARCHAR(100),
Semester TEXT(20),
Major_Subject TEXT(50),
Obtained_Mark VARCHAR(5)
);
```

Fig-1: Code for creating the Table

Output:

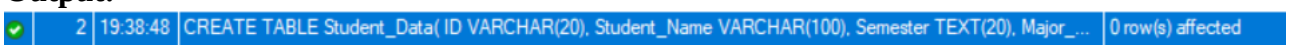

Fig-2: Action Output for table creation

Step-2:
Inserting into the Table_

```
INSERT INTO Student_Data (ID, Student_Name, Semester, Major_Subject, Obtained_Mark)
VALUES
('2110059', 'Md. Ashikur Rahman', '2nd Year even', 'ECE', '72'),
('2110058', 'Fardin Shahriar Chowdhury', '2nd Year even', 'ECE', '72'),
('2110007', 'Himel Reza', '2nd Year even', 'ECE', '92'),
('1910059', 'Shaikh Ahsan Abid ', '4th Year odd', 'ECE', '85'),
('2110038', 'Abdur Rafiu', '2nd Year even', 'ECE', '72'),
('2110037', 'Nayeem Hasan Olid', '2nd Year even', 'ECE', '82'),
('2110051', 'Afsana Islam', '2nd Year even', 'ECE', '78'),
('2110057', 'Shafayetul Huda Sadi', '2nd Year even', 'ECE', '82'),
('2110010', 'Md. Rubaid Haque', '2nd Year even', 'ECE', '76');
SELECT * FROM Student_Data;
```

Fig-3: Code for inserting into the Table

Output:

ID	Student_Name	Semester	Major_Subject	Obtained_Mark
2110059	Md. Ashikur Rahman	2nd Year even	ECE	72
2110058	Fardin Shahriar Chowdhury	2nd Year even	ECE	72
2110007	Himel Reza	2nd Year even	ECE	92
1910059	Shaikh Ahsan Abid	4th Year odd	ECE	85
2110038	Abdur Rafiu	2nd Year even	ECE	72
2110037	Nayeem Hasan Olid	2nd Year even	ECE	82
2110051	Afsana Islam	2nd Year even	ECE	78
2110057	Shafayetul Huda Sadi	2nd Year even	ECE	82
2110010	Md. Rubaid Haque	2nd Year even	ECE	76

Fig-4: Output Table

Task-2: Change a column name and its datatype.

Step-1:
Code:

```
ALTER TABLE Student_Data
CHANGE Obtained_Mark Total_Mark FLOAT;
SELECT * FROM Student_Data;
```

Fig-5: Code for inserting into the Table

Output:

ID	Student_Name	Semester	Major_Subject	Total_Mark
2110059	Md. Ashikur Rahman	2nd Year even	ECE	72
2110058	Fardin Shahriar Chowdhury	2nd Year even	ECE	72
2110007	Himel Reza	2nd Year even	ECE	92
1910059	Shaikh Ahsan Abid	4th Year odd	ECE	85
2110038	Abdur Rafiu	2nd Year even	ECE	72
2110037	Nayeem Hasan Olid	2nd Year even	ECE	82
2110051	Afsana Islam	2nd Year even	ECE	78
2110057	Shafayetul Huda Sadi	2nd Year even	ECE	82
2110010	Md. Rubaid Haque	2nd Year even	ECE	76

Fig-6: Output Table

Task-3:
Add a new column.
Step-1: Adding a new column.
Code:

```
ALTER TABLE Student_Data
ADD COLUMN `A+` VARCHAR(5);
```

Fig-7: Input code for new column insertion

Output:

ID	Student_Name	Semester	Major_Subject	Total_Mark	A+
2110059	Md. Ashikur Rahman	2nd Year even	ECE	72	NULL
2110058	Fardin Shahriar Chowdhury	2nd Year even	ECE	72	NULL
2110007	Himel Reza	2nd Year even	ECE	92	NULL
1910059	Shaikh Ahsan Abid	4th Year odd	ECE	85	NULL
2110038	Abdur Rafiu	2nd Year even	ECE	72	NULL
2110037	Nayeem Hasan Olid	2nd Year even	ECE	82	NULL
2110051	Afsana Islam	2nd Year even	ECE	78	NULL
2110057	Shafayetul Huda Sadi	2nd Year even	ECE	82	NULL
2110010	Md. Rubaid Haque	2nd Year even	ECE	76	NULL

Fig-8: Table after new column insertion

Task-4: Inserting information into it
Code:

```
SET SQL_SAFE_UPDATES = 0;
UPDATE Student_Data
SET `A+` =
    CASE
        WHEN Total_Mark >= 80 THEN 'Yes'
        ELSE 'No'
    END;
SELECT * FROM Student_Data;
SET SQL_SAFE_UPDATES = 1;
```

Fig-9: Code for new column insertion

Output:

ID	Student_Name	Semester	Major_Subject	Total_Mark	A+
2110059	Md. Ashikur Rahman	2nd Year even	ECE	72	No
2110058	Fardin Shahriar Chowdhury	2nd Year even	ECE	72	No
2110007	Himel Reza	2nd Year even	ECE	92	Yes
1910059	Shaikh Ahsan Abid	4th Year odd	ECE	85	Yes
2110038	Abdur Rafiu	2nd Year even	ECE	72	No
2110037	Nayeem Hasan Olid	2nd Year even	ECE	82	Yes
2110051	Afsana Islam	2nd Year even	ECE	78	No
2110057	Shafayetul Huda Sadi	2nd Year even	ECE	82	Yes
2110010	Md. Rubaid Haque	2nd Year even	ECE	76	No

Fig-10: Table after new information update

Task-5:
Deleting rows if A+ column contains value ‘No’.
Code:

```
SET SQL_SAFE_UPDATES = 0;
DELETE FROM Student_Data
WHERE `A+` = 'No';
SELECT * FROM student_data;
SET SQL_SAFE_UPDATES = 1;
```

Fig-11: Code for row deletion

Output:

ID	Student_Name	Semester	Major_Subject	Total_Mark	A+
2110007	Himel Reza	2nd Year even	ECE	92	Yes
1910059	Shaikh Ahsan Abid	4th Year odd	ECE	85	Yes
2110037	Nayeem Hasan Olid	2nd Year even	ECE	82	Yes
2110057	Shafayetul Huda Sadi	2nd Year even	ECE	82	Yes

Fig-12: Table after new information update

Discussion:

In this SQL report, we performed several key operations on a ‘Student_Data’ table. First, we created a table with fields for student information, including marks. Next, we inserted multiple records into the table. Afterward, we altered the structure by renaming the ‘Obtained_Mark’ column to ‘Total_Mark’ and added a new column ‘A+’. Using conditional logic, we updated the ‘A+’ column to indicate ‘Yes’ for students with a ‘Total_Mark’ of 80 or more, and ‘No’ otherwise. Finally, we deleted rows where ‘A+ was 'No', completing the data refinement process.

References:

[1] “What is Structured Query Language (SQL)? | Definition from TechTarget.” https://www.techtarget.com/searchdatamanagement/definition/SQL (accessed Sep. 22, 2024).