Rajshahi University of Engineering & Technology, Rajshahi

Department of Electrical & Computer Engineering

Course Code   : ECE 2216

Course Title   : Database Systems (Sessional)

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Submitted to: Submitted by:
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Experiment No. 01
Experiment Name:
Create a database and perform following operation_

St_id	First Name	Last Name	Department	Marks
1	Shrayas	Chakma	EEE	98
2	Ashik	Rahman	CSE	90
3	Anirban	Sarkar	ECE	85
4	Ripon	Ghosh	EEE	65
5	Afsana	Smrity	GCE	74
6	Shafayet	Sadi	ECE	67
7	Sharif	Hossein	ETE	90

I.	List students with mark greater than 85
II.	Find the average mark of the Dept of EEE
III.	Count the number of students in each department.
IV.	Calculate the total mark of ETE Department.
V.	List the top 3 student.
VI.	Find students where the marks are between 70 to 90.
VII.	List student of ECE department limited to the first one.
VIII.	Count the number of students having marks less than 75.

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 Students_list(
st_id TEXT(12),
First_Name VARCHAR(10),
Last_Name VARCHAR(10),
Department TEXT (5),
Marks VARCHAR (4)
)
```

Fig-1: Code for creating the Table

Output:

15:14:07 CREATE TABLE Students_list(st_id TEXT(12), First_Name VARCHAR(10), Last_Name VARCHAR(10), Department TEXT (5), Marks VARCHAR (4))

Fig-2: Action Output for table creation

Step-2:
Inserting into the Table_

```
INSERT INTO Students (St_id, First_Name, Last_Name, Department, Marks) VALUES
(1, 'Shrayas', 'Chakma', 'EEE', 98),
(2, 'Ashik', 'Rahman', 'CSE', 90),
(3, 'Anirban', 'Sarkar', 'ECE', 85),
(4, 'Ripon', 'Ghosh', 'EEE', 65),
(5, 'Afsana', 'Smrity', 'GCE', 74),
(6, 'Shafayet', 'Sadi', 'ECE', 67),
(7, 'Sharif', 'Hossein', 'ETE', 90);
```

Fig-3: Code for inserting into the Table

Output:

st_id	First_Name	Last_Name	Department	Marks
1	Shrayash	Chakma	ECE	98
2	Ashik	Rahman	CSE	90
3	Anirban	Sarkar	ECE	85
4	Ripon	Ghosh	EEE	65
5	Afsana	Smrity	GCE	74
6	Safayet	Sadi	ECE	67
7	Sharif	Hossein	ETE	90

Fig-4: Output Table

Task-2: List students with mark greater than 85

Step-1:
Code:

```
SELECT * FROM student
WHERE Marks > 85;
```

Fig-5: Code for inserting into the Table

Output:

st_id	First_Name	Last_Name	Department	Marks
1	Shrayash	Chakma	ECE	98
2	Ashik	Rahman	CSE	90
7	Sharif	Hossein	ETE	90

Fig-6: Output Table

Task-3:
Find the average mark of the Dept of EEE
Code:

```
SELECT AVG(Marks) AS Average_Marks
FROM student
WHERE Department = 'EEE';
```

Fig-7: Input code for new column insertion

Output:
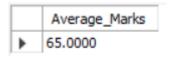
	Average_Marks
▶	65.0000

Fig-8: Average marks

Task-4: Calculate the total mark of ETE Department.

Code:

```
SELECT SUM(Marks) AS Total_Marks
FROM student
WHERE Department = 'ETE';
```

Fig-9: Code for Average marks of ETE Department

Output:

	Total_Marks
▶	90

Fig-10: Output

Task-5:
List the top 3 student.

Code:

```
SELECT *
FROM student
ORDER BY Marks DESC
LIMIT 3;
```

Fig-11: Top 3 student

Output:

	st_id	First_Name	Last_Name	Department	Marks
▶	1	Shrayash	Chakma	ECE	98
	2	Ashik	Rahman	CSE	90
	7	Sharif	Hossein	ETE	90

Fig-12: Table after new information update

Task-6:
Find students where the marks are between 70 to 90.

Code:

```
SELECT *
FROM student
WHERE Marks BETWEEN 70 AND 90;
```

Fig-13:Code for marks between 70 to 90

Output:

st_id	First_Name	Last_Name	Department	Marks
2	Ashik	Rahman	CSE	90
3	Anirban	Sarkar	ECE	85
5	Afsana	Smrity	GCE	74
7	Sharif	Hossein	ETE	90

Fig-12: Table after new information update

Task-7:
List the top 3 student.

Code:

```
SELECT *
FROM student
ORDER BY Marks DESC
LIMIT 3;
```

Fig-13: Top 3 student

Output:

st_id	First_Name	Last_Name	Department	Marks
1	Shrayash	Chakma	ECE	98
2	Ashik	Rahman	CSE	90
7	Sharif	Hossein	ETE	90

Fig-14: Table after new information update

Task-8:
List student of ECE department limited to the first one.
.

Code:

```
SELECT *
FROM student
WHERE Department = 'ECE'
LIMIT 1;
```
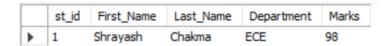
Fig-13:Code for Top 1 student of ECE

Output:

st_id	First_Name	Last_Name	Department	Marks
1	Shrayash	Chakma	ECE	98

Fig-14: Top 1 student of ECE

Task-9:

Count the number of students having marks less than 75.

Code:

```sql
SELECT COUNT(*) AS NumberOfStudents
FROM student
WHERE Marks < 75;
```

Fig-15:Code for marks number of students less than 70

Output:

st_id	First_Name	Last_Name	Department	Marks
2	Ashik	Rahman	CSE	90
3	Anirban	Sarkar	ECE	85
5	Afsana	Smrity	GCE	74
7	Sharif	Hossein	ETE	90

Fig-16: 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).