Rajshahi University of Engineering & Technology, Rajshahi

Department of Electrical & Computer Engineering

Course Code   : ECE 2216

Course Title   : Database System Sessional

Experiment No.   : 02

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Submitted To-
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Experiment No: 02

Experiment Name:

Students Table

student_id	student_name	age	GPA	department	year_of_admission	fees_paid	credits_earned	enrollment_status
1	Eleven	21	3.8	Engineering	2021	10000	120	active
2	Dustin	22	3.9	Science	2020	9000	110	active
3	Will	19	3.4	Business	2022	8500	95	active
4	Mike	23	3.7	Science	2021	9500	115	inactive
5	Max	20	3.5	Engineering	2020	12000	130	active
6	Eddie	22	4.0	Arts	2019	8000	140	active
7	Billy	24	2.9	Engineering	2022	5000	60	active
8	Alexei	25	3.2	Business	2018	7500	100	inactive
9	Steve	21	3.8	Science	2021	10500	120	active
10	Robin	20	3.6	Engineering	2022	11000	125	active
11	Lucas	18	2.7	Engineering	2023	4000	50	active
12	Nancy	23	3.9	Business	2019	9500	135	active

Task:

1. Find students who are older than 20 and have a GPA above the average GPA of all students

2. Find the top 5 students with the highest fees paid, ordered by GPA (in descending order) as a tiebreaker

3. List students who belong to the "Engineering" department, have a GPA greater than 3.5, and are enrolled after 2020

4. Find students who are not active (i.e., enrollment_status = 'inactive') and have not paid any fees (fees_paid = 0)

5. Calculate the total fees paid and average GPA for each department, but only for departments with more than 10 students

Theory: Structured Query Language (SQL) is a powerful and standardized programming language used for managing and manipulating relational databases. It allows users to perform various operations, including querying, updating, inserting, and deleting data within a database. SQL provides a robust framework for retrieving specific information through the use of various commands such as SELECT, INSERT, UPDATE, and DELETE.A relational database organizes data into tables, which consist of rows and columns. Each table represents a specific entity, with each row corresponding to an individual record and each column representing a particular attribute of that entity. The relationships between tables can be established using foreign keys, enabling complex data interactions and integrity. SQL supports various functions for filtering and sorting data, such as the WHERE clause to specify conditions, the ORDER BY clause to arrange results, and aggregate functions like SUM, AVG, and COUNT to summarize data effectively.

Tools:

1. Computer
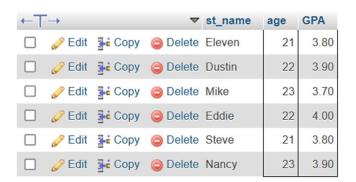2. MySQL
3. Internet
4. Reference Book

Query and Output:

Task-01:

Query:

```
Run SQL query/queries on database ece21:

1 SELECT st_name, fees_paid, GPA
2 FROM students
3 ORDER BY fees_paid DESC, GPA DESC
4 LIMIT 5;
5
```

Output:

				st_name	age	GPA
☐	Edit	Copy	Delete	Eleven	21	3.80
☐	Edit	Copy	Delete	Dustin	22	3.90
☐	Edit	Copy	Delete	Mike	23	3.70
☐	Edit	Copy	Delete	Eddie	22	4.00
☐	Edit	Copy	Delete	Steve	21	3.80
☐	Edit	Copy	Delete	Nancy	23	3.90

Task-02:

Query:

```
Run SQL query/queries on table ece21.Students:  ⓘ

1  SELECT st_name, fees_paid, GPA
2  FROM Students
3  ORDER BY fees_paid DESC, GPA DESC
4  LIMIT 5;
5
```

Output:

st_name	fees_paid ▽ 1	GPA ▽ 2
Max	12000.00	3.50
Robin	11000.00	3.60
Steve	10500.00	3.80
Eleven	10000.00	3.80
Nancy	9500.00	3.90

Task-03:

Query:

```
Run SQL query/queries on table ece21.Students:  ⓘ

1  SELECT st_name, department, GPA, year
2  FROM Students
3  WHERE department = 'Engineering'
4  AND GPA > 3.5
5  AND year > 2020;
6
```

Output:

department	GPA	year
Engineering	3.80	2021
Engineering	3.60	2022

Task-04:

Query:

Run SQL query/queries on table ece21.Students:

```sql
1 SELECT st_name, enrollment_status, fees_paid
2 FROM Students
3 WHERE enrollment_status = 'inactive'
4 AND fees_paid = 0;
5 
```

Output:

st_name	enrollment_status	fees_paid

Task-05:

Query:

Run SQL query/queries on table ece21.Students:

```sql
1 SELECT department,  SUM(fees_paid) AS total_fees,  AVG(GPA)
2 AS avg_GPA
3 FROM students
4 GROUP BY department
5 HAVING COUNT(st_id) > 10;
6 
```

Output:

department	total_fees	avg_GPA

Discussion: In this lab, we successfully explored and applied various SQL operations to manipulate and analyze a structured database system. By utilizing Data Definition Language (DDL), we created the schema for the student data table, effectively organizing the information into relevant attributes such as student ID, name, age, GPA, department, and enrollment status. Using Data Manipulation Language (DML), we executed a series of queries to insert, update, and retrieve data, demonstrating our understanding of essential database operations.