Date: 22 September, 2024

Experiment No: 02

2.1 Experiment Name: Querying and Manipulating Student Marks Data

2.2 Tasks:

- List students with marks greater than 85
- Find the average marks in department EEE
- Count the number of students in each department
- Calculate the total marks given in ETC department
- List the top 3 students
- Find the students where marks are between 70 to 90
- List student in ECE department limited to first one
- Count the number of students having less than 75 marks

2.3 Theory

SQL (Structured Query Language) is essential for querying and managing data in relational databases. It allows users to perform operations like filtering, aggregating, and sorting data efficiently. Common SQL tasks include listing students with marks greater than 85, finding average marks in specific departments, counting students in each department, and calculating total marks for departments like ETC. These operations utilize key SQL functions such as `SELECT`, `WHERE`, `AVG()`, `SUM()`, and `COUNT()`, enabling efficient data retrieval and summarization.

Additionally, SQL enables advanced queries like ranking students using `ORDER BY`, limiting results with `LIMIT`, and filtering marks within ranges using the `BETWEEN` operator. These features allow users to identify top-performing students, retrieve department-specific data, and find students within specific mark ranges. Mastering these SQL techniques is crucial for analyzing academic data and making informed decisions in both academic and professional contexts. (*SQL Query to Find All the Students with Marks Greater than Average Marks - GeeksforGeeks*, n.d.)

2.4 Required Software:

2.4.1 XAMPP Computer Program

2.5 Code Screenshot and Output:

```
SELECT * FROM `second_thirty_info` WHERE marks>85;
```

st_id	first_name	last_name	dept	marks
1	shreyas	chakma	EEE	98
2	ashik	rahman	CSE	90
7	sharif	hossain	ETE	90

```
SELECT AVG(marks) as avg_marks FROM `second_thirty_info` WHERE dept='EEE';
```

avg_marks
81.5000

```
SELECT dept COUNT(*) AS name_dept FROM `second_thirty_info` GROUP BY dept;
```

dept	name_dept
CSE	1
ECE	2
EEE	2
ETE	1
GCE	1

```
SELECT SUM(marks) AS total_marks FROM `second_thirty_info` WHERE dept='ETE';
```

total_marks
90

```
SELECT * FROM `second_thirty_info` ORDER BY marks DESC LIMIT 3;
```

st_id	first_name	last_name	dept	marks ▼ 1
1	shreyas	chakma	EEE	98
2	ashik	rahman	CSE	90
7	sharif	hossain	ETE	90

```
SELECT * FROM `second_thirty_info` WHERE marks BETWEEN 70 AND 90;
```

st_id	first_name	last_name	dept	marks
2	ashik	rahman	CSE	90
3	anirban	sarker	ECE	85
5	afsana	srity	GCE	74
7	sharif	hossain	ETE	90

```
SELECT * FROM `second_thirty_info` WHERE dept='ECE' LIMIT 1;
```

st_id	first_name	last_name	dept	marks
3	anirban	sarker	ECE	85

```
SELECT COUNT(*) AS less_marks FROM `second_thirty_info` WHERE marks<75;
```

less_marks
3

2.6 Discussions:

The SQL queries in this lab demonstrate the fundamental techniques used to extract and analyze data from a student database. Basic operations like filtering students with marks greater than 85, calculating the average marks in the EEE department, and counting students across departments illustrate how SQL helps in obtaining valuable insights quickly. These queries show how essential SQL functions like `SELECT`, `WHERE`, `AVG()`, and `COUNT()` can be applied to real-world data analysis tasks in academic settings.

Additionally, more advanced operations such as ranking the top 3 students using `ORDER BY`, finding students with marks between 70 and 90, and limiting results with `LIMIT` underscore SQL's versatility. These features allow for precise data retrieval and analysis, supporting decision-making and performance evaluation. The lab highlights SQL's role as a critical tool for managing and querying databases, helping users effectively analyze data to make informed academic or professional decisions.

2.7 References:

SQL Query to Find all the Students with Marks Greater than Average Marks - GeeksforGeeks. (n.d.). Retrieved September 28, 2024, from https://www.geeksforgeeks.org/sql-query-to-find-all-the-students-with-marks-greater-than-average-marks/