Lab 1: Basic Data Manipulation in SQL

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1: Objective

This lab introduces the fundamental SQL commands for creating tables and performing basic data retrieval operations. You will learn how to define a table structure and query it using selection, projection, union, and intersection.

2: Prerequisites

Make sure you have access to a working SQL environment (e.g., SQLite, MySQL, PostgreSQL).

3: CREATE TABLE

The `CREATE TABLE` statement is used to create a new table in a database. The basic syntax is:

```
CREATE TABLE table_name (
    column1 datatype constraint,
    column2 datatype constraint,
    ...
);
```

Task

Create two tables: `Students` and `Faculty`.

Students Table:

- `StudentID` (Integer, Primary Key)
- `FirstName` (Text, Not Null)
- `LastName` (Text, Not Null)
- `Discipline` (Text)

Faculty Table:

- `FacultyID` (Integer, Primary Key)
- `FirstName` (Text, Not Null)
- `LastName` (Text, Not Null)
- `Department` (Text)

4: INSERT INTO

Before querying, you need to populate your tables with data using the `INSERT INTO` statement.

```
INSERT INTO table_name (column1, column2, ...)
VALUES (value1, value2, ...);
```

Task

Insert at least 3 records into both the `Students` and `Faculty` tables. Ensure some students and faculty share the same first or last names to make the union and intersection queries more interesting.

5: Selection (WHERE Clause)

Selection is the operation of retrieving a subset of rows from a table that meets a certain condition. This is done using the `WHERE` clause.

```
SELECT * FROM table_name WHERE condition;
```

Task

1. Find all students with discipline 'CSE'.
2. Find all faculty in the 'CSE' department.

6: Projection (SELECT Clause)

Projection is the operation of selecting specific columns from a table. You list the column names you want to see in the `SELECT` clause.

```
SELECT column1, column2 FROM table_name;
```

Task

1. List the first and last names of all students.
2. List the last names and departments of all faculty.

7: UNION

The `UNION` operator combines the result-set of two or more `SELECT` statements. It removes duplicate rows from the combined result.

```
SELECT column_name(s) FROM table1
UNION
SELECT column_name(s) FROM table2;
```

Task

1. List all unique first names of both students and faculty.
2. List all unique last names of both students and faculty.

8: INTERSECT

The `INTERSECT` operator returns only the rows that appear in both result sets of two `SELECT` statements.

```
SELECT column_name(s) FROM table1
INTERSECT
SELECT column_name(s) FROM table2;
```

Task

1. Find all first names that are common to both students and faculty.
2. Find all last names that are common to both students and faculty.

9: Submission

Write a single SQL script file named `lab2_solution.sql` that contains all the commands to perform the tasks above (CREATE, INSERT, and all SELECT queries). Add comments in the SQL file to indicate which task each query corresponds to.