Lecture Notes – SQLCommand-Categories

Section 1: Lecture Summary

SQL commands are categorized into five main types: **DDL** (Data Definition Language), **DML** (Data Manipulation Language), **DQL** (Data Query Language), **DCL** (Data Control Language), and **TCL** (Transaction Control Language). Each category includes specific commands for managing database structure, data, retrieval, permissions, and transactions.

Section 2: Key Concepts and Explanations

DDL commands manage table structure: **CREATE** builds a table with headers but no data; **ALTER** adds or modifies columns; **RENAME** changes table names; **TRUNCATE** removes all data while keeping the table; **DROP** deletes the entire table and its definition.

DML commands handle data rows: **INSERT** adds new rows; **DELETE** removes specific rows; **UPDATE** modifies existing data in rows.

DQL focuses on data retrieval using commands like **SELECT**, **FROM**, **WHERE**, **GROUP BY**, **HAVING**, **ORDER BY**, which query one or more tables and form the core of SQL usage.

DCL manages user permissions: **GRANT** provides access to databases or tables for users; **REVOKE** removes those permissions.

TCL controls transaction permanence: **COMMIT** saves changes permanently to storage; **ROLLBACK** undoes changes; **SAVEPOINT** marks a point for partial rollbacks.

Section 3: Example Code and Use Cases

Using companyDB schema:

DDL Examples:

```
CREATE TABLE Employees (
  EmpID int,
  FirstName varchar(50),
  LastName varchar(50),
  JobTitle varchar(100),
  DeptID int,
  HireDate date,
  Salary decimal(10,2)
);

ALTER TABLE Employees ADD COLUMN BirthDate date;

ALTER TABLE Employees MODIFY COLUMN Salary decimal(12,2);

RENAME TABLE Employees TO Staff;

TRUNCATE TABLE Employees;

DROP TABLE Employees;
```

DML Examples:

```
INSERT INTO Employees (EmpID, FirstName, LastName, JobTitle, DeptID,
HireDate, Salary)
VALUES (1, 'John', 'Doe', 'Manager', 1, '2020-01-15', 75000.00);

DELETE FROM Employees WHERE EmpID = 1;

UPDATE Employees SET Salary = 80000.00 WHERE EmpID = 2;
```

DQL Example (retrieving data):

```
SELECT FirstName, LastName, Salary FROM Employees
WHERE DeptID = 1
ORDER BY Salary DESC;
```

DCL Examples:

```
GRANT SELECT ON companyDB.Employees TO 'user1'@'localhost';

REVOKE INSERT ON companyDB.Employees FROM 'user1'@'localhost';
```

TCL Examples (after DML):

```
UPDATE Employees SET Salary = 60000.00 WHERE EmpID = 3;
COMMIT;

UPDATE Employees SET Salary = 65000.00 WHERE EmpID = 4;
ROLLBACK;

SAVEPOINT emp_update;
```

Section 4: Key Takeaways

Master **DQL** for frequent data retrieval, use **DDL** for one-time structure setup, **DML** for data changes, **DCL** for security, and **TCL** to ensure transaction reliability. These categories cover all SQL operations and are essential for practical use and interviews.