Lecture Notes – Compound Conditions

Section 1: Lecture Summary

The lecture covers **compound conditional statements** in SQL WHERE clauses, which are used to filter records based on multiple conditions. Rather than using simple single conditions, compound conditionals combine multiple conditions using **logical operators**: AND, OR, and NOT. Understanding how these operators work is essential for writing correct queries that return accurate results.

Section 2: Key Concepts and Explanations

Logical Operators for Compound Conditions

AND Operator

The AND operator joins two or more conditions and returns true only when ALL conditions are true. If any condition is false, the entire expression evaluates to false. Use AND when you need records that satisfy every condition simultaneously.

Truth table for AND:

- True AND True = True

- True AND False = False

- False AND True = False

- False AND False = False

OR Operator

The OR operator joins two or more conditions and returns true when AT LEAST ONE condition is true. The expression is false only when all conditions are false. Use OR when you need records that satisfy any one of multiple conditions.

Truth table for OR:

- True OR True = True

- True OR False = True

- False OR True = True

- False OR False = False

NOT Operator

The NOT operator reverses the truth value of a single condition. If a condition is true, NOT makes it false, and vice versa. This can be applied to an individual condition or an entire compound expression.

Truth table for NOT:

- NOT True = False

- NOT False = True

Section 3: Example Code and Use Cases

Using AND to Filter Multiple Conditions

```
SELECT * FROM Employees
WHERE DeptID = 3 AND HireDate >= '2020-01-01';
```

This query retrieves all employees who work in Department 3 AND were hired on or after January 1, 2020. Both conditions must be satisfied for a record to be included in the results.

Using OR for Alternative Conditions

```
SELECT * FROM Employees
WHERE DeptID = 1 OR DeptID = 2;
```

This query returns employees from Department 1 OR Department 2. Records matching either department are included.

Using NOT to Exclude Conditions

```
SELECT * FROM Employees
WHERE NOT (DeptID = 3);
```

This query retrieves all employees except those in Department 3.

Combining Multiple Operators

```
SELECT * FROM Employees
WHERE (DeptID = 3 AND Salary > 50000) OR (DeptID = 2 AND HireDate >=
'2020-01-01');
```

This query returns employees who either (1) work in Department 3 with salary greater than 50,000 OR (2) work in Department 2 and were hired in 2020 or later.

Section 4: Key Takeaways

- **AND requires all conditions to be true** before a record is included in results.

- **OR requires at least one condition to be true** to include a record.

- **NOT reverses the truth value** of a condition or expression.

- Precision in using logical operators is critical; incorrect operator choice will produce wrong results.

- When combining multiple operators, use parentheses to clarify the order of evaluation and ensure correct logic flow.

- Practice writing truth tables manually to internalize operator behavior before applying them in queries.