

# Database Systems

Spring 2019  
Lab Manual 2

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## Purpose:

Retrieving and Restricting data using the SQL SELECT statement

## Reading Material:

### Capabilities of SQL SELECT Statements

A SELECT statement retrieves information from the database. With SELECT statement you can use the following capabilities:

- **Projection:** Select the columns in a table that are returned by a query. Select as few or as many of the columns as required.
- **Selection:** Select the rows in a table that are returned by a query. Various criteria can be used to restrict the rows that are retrieved.
- **Joining:** Bring together data that is stored in different tables by specifying the link between them. SQL joins are covered in more detail in the next labs.
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### Structure of basic select statement

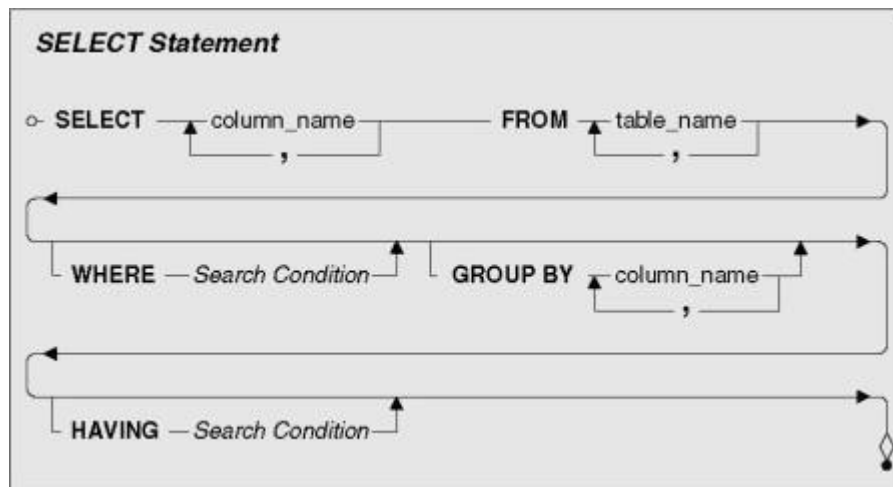


Figure 1 Select statement graphical flow

In its simplest form, a SELECT statement must include the follow in:

- A SELECT clause, which specifies the columns to be displayed
- A FROM clause, which identifies the table containing the columns that are listed in the SELECT statement **Note:**

Throughout this course, the words keyword, *clause*, and *statement* are used as follows:

- A keyword refers to an individual SQL element. For example, SELECT and FROM are keywords.
- A clause is a part of a SQL statement. For example, SELECT name, cnic and so on is a clause.
- A statement is a combination of two or more clauses. For example, SELECT FROM Student is a SQL statement.

**Note:**

- SQL statements are not case-sensitive.
- SQL statements can be entered on one or more lines.
- Keywords cannot be abbreviated or split across lines.
- Clauses are usually placed on separate lines.
- Indents are used to enhance readability.
- SQL statements can optionally be terminated by a semicolon (;). Semicolons are required when you execute multiple SQL statements.

**Activity:**

- Create a new table Student which have the following schema Student(RegNo,FirstName,LastName,GPA>Contact)
- Add at least 5 records of your own class in which one or two students have GPA undefined.
- Display all the data from the table Student
- Display specific columns form the table Student
- Display all the data of students where GPA > 3.5 • Display all the data of students where GPA <= 3.5
- Does the above 2 queries covers all the data?
- Display first and last name of all students as single column using concatenation operator.

### Operator Precedence:

Operator	Precedence
Unary operators, bitwise NOT	1
Multiplication and division	2
Addition, subtraction, and concatenation	3
SQL conditions	4

### Activity:

- Identify at least one SQL statement in which precedence can affect the result of query.
- Identify how the result of a mathematical expression on null value affect the result of a query.

### DISTINCT clause:

- Use the distinct operator to eliminate the duplicates in your sql statement

### Comparison and Logical Operators:

- Following comparison operators are commonly used in SQL server ◦ = ◦ <> ◦ > ◦ >= ◦ <= ◦ < ◦ IS NULL
  - BETWEEN
  - AND
  - IN(set) ◦ LIKE
- Following Logical operators are used ◦ NOT ◦ OR ◦ AND
- Your task is to write sql statements corresponding to each operator using Northwind schema

**ORDER BY Clause**

- Write at least 3 SQL statements using Northwind schema which use ORDER BY clause

**TOP N clause:**

- Limit the result of 3 ORDER BY queries to 10 rows.