

# CC 105P Database Systems Lab

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Term 1 (2014-15)

SESSION 10

## SQL Data Manipulation Language - SELECT

SQL is a non-procedural relational database language. SQL mainly contains two main sub-components: Data Definition Language (DDL) and Data Manipulation Language (DML).

DML is useful working with the actual data. DML is comprised of the following:

- SELECT
- INSERT
- UPDATE
- DELETE

**The focus for this lab session is SELECT statements.**

## Tasks to be completed

Using accompanying SQL DML tutorial for reference, write SQL queries for the following retrievals on the COMPANYDB database.

1. Unconditional Select:
  - a. Retrieve all columns and all rows from EMPLOYEE table using wild-card column name
  - b. Retrieve all columns and all rows from EMPLOYEE table using explicit column names
  - c. Retrieve a subset of columns and all rows from EMPLOYEE using column alias
  - d. Retrieve a subset of columns and all rows from EMPLOYEE using table alias
2. Distinct values:
  - a. Retrieve all Essn values from WORKS\_ON (how many rows are there?)
  - b. Retrieve DISTINCT Essn values from WORKS\_ON (how many rows are there?)
  - c. Retrieve DISTINCT Essn, Pno values from WORKS\_ON (how many rows are there?)
3. Calculated fields:
  - a. Display essn, monthly salary of all employees (use column aliases – SSN, Monthly Salary)
  - b. Display ssn, full name of employee and Bdate of all employees (use column aliases – SSN, Full Name, Date of Birth)
4. Conditional retrieval:
  - a. Simple condition: Essn of those working in project whose Pno is 2
  - b. Compound Condition: All details of male dependents of essn 333445555
  - c. Compound Condition: Full names of employees who belong to Dno 5 OR Dno 1
5. Range condition
  - a. Essn and annual salary details of all employees whose salary is in the range [30,000 – 50,000]
  - b. Essn and montly salary details of all employees whose MONTHLY salary is in the range [3,000 – 4,000]

6. Set membership
    - a. All employee SSN whose supervisors are in the set (333445555, 987654321)
    - b. All employee SSN who are NOT supervised by those in the set (333445555, 987654321)
  7. Pattern matching
    - a. All Pnames of projects that begin with "Product"
  8. NULL search condition
    - a. Employee ssn who does NOT have a supervisor (NULL value for super\_ssn)
    - b. SSn of employee who work in Pno 20 and has Hours value as NULL
    - c. Employee ssn who have a supervisor assigned (no NULL value for super\_ssn)
  9. Sorting
    - a. Display SSn and full name of employees sorted by salary in ascending order
    - b. Display SSn and full name of employees sorted by salary in descending order
    - c. Display SSn, Dno, Monthly salary of employees sorted by Dno, monthly salary in descending order
  10. Aggregate functions (COUNT, SUM, MIN, MAX, AVG)
    - a. Try out aggregate functions on annual salary and monthly salary of employees
    - b. What happens to aggregate functions when a column being aggregated has NULL values?
    - c. Count the number of employees who do not have a supervisor (super\_ssn is NULL) in two ways: Using Count(\*) and using Count(super\_ssn).
    - d. How many unique projects (Pnos) are there in Works\_On table?
    - e. Compare the output of the following queries:
      - i. Select sum(hours) from works\_on;
      - ii. Select sum(distinct hours) from works\_on;
      - iii. Select min(hours) from works\_on;
      - iv. Select min(distinct hours) from works\_on;
    - f. Display the number of employees, total salary, and average salary from employee table.
  11. Grouping
    - a. Display project-wise total hours spent on projects from WORKS\_ON table
    - b. Display employee-wise number of dependents from DEPENDENT table
  12. Conditional Grouping
    - a. Display dno and average salary of only those departments whose average salary is above 35000
    - b. Display the Pno of only those projects that have at least three employees working in it
  13. Subqueries
    - a. Essn of employees who are working on project named ProductX
    - b. Full name of employees who are working a minimum of 10 hours in specific projects
    - c. Full name of employees whose average project hours is at least 10 hours
    - d. Essn of employees who are working in projects whose name begins with "Product"
  14. Cartesian product
    - a. Perform Cartesian product between department and dept\_locations tables. Display only Dnumber, Dname and Dlocation. How many rows do you see?
  15. Inner JOINS (Try multiple ways of performing these joins as given in the tutorial slides)
    - a. Perform two-way join between Employee and Department
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- b. Perform three-way join between Employee, Department, Dept\_locations
  - c. Perform three-way join between Employee, Works\_on, Project
  - d. Perform two-way join between EMPLOYEE and EMPLOYEE
16. Outer join
- a. Display Essn, Fname, Dependent\_name of all employees using **inner** join
  - b. Display Essn, Fname, Dependent\_name of all employees using **left outer** join
  - c. Using **inner** join, display a report containing two columns of output: Essn, Number of dependents
  - d. Using **outer** join, display a report containing two columns of output: Essn, Number of dependents
17. Other set operations (UNION, INTERSECT, MINUS, etc)