



National University of Computer & Emerging Sciences, Karachi
Computer Science Department
Fall 2022, Lab Manual - 01



| | |
|-----------------------------|---|
| Course Code: CL-2005 | Course : Database Systems Lab |
| Instructor : | Erum Shaheen, Mafaza Mohi, Amin Sadiq, Ulya Seerat |

Contents:

1. Database
2. SQL
3. Basic SQL Concepts

Database

A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy.

Example #1

An online telephone directory uses a database to store data of people, phone numbers, and other contact details. Your electricity service provider uses a database to manage billing, client-related issues, handle fault data, etc.

Example #2

Facebook needs to store, manipulate, and present data related to members, their friends, member activities, messages, advertisements, and a lot more. We can provide a countless number of examples for the usage of databases.

SQL

SQL is the standard language for dealing with Relational Databases. SQL can be used to insert, search, update, and delete database records. SQL can do lots of other operations, including optimizing and maintenance of databases. SQL stands for Structured Query language, pronounced as "S-Q-L" or sometimes as "See-Quel"... Relational databases like MySQL Database, Oracle, MS SQL Server, Sybase, etc. use ANSI SQL.

Basic SQL Concepts

I. Data Types

| | | | | |
|----------------|------------|---------------|--------------|---------------|
| bigint | decimal | real | char | nvarchar |
| int | numeric | datetime | varchar | nvarchar(max) |
| smallint | money | smalldatetime | varchar(max) | ntext |
| tinyint | smallmoney | date | text | binary |
| bit | float | time | nchar | varbinary |
| varbinary(max) | image | | | |

II. Arithmetic operators

| | | | | |
|----------|-------------|----------------|----------|---------|
| Addition | Subtraction | Multiplication | Division | Modulus |
| + | - | * | / | % |

III. SQL Comparison Operators

| | |
|----|---|
| = | Checks if the values of two operands are equal or not, if yes then condition becomes true. |
| != | Checks if the values of two operands are equal or not, if values are not equal then condition becomes true. |
| <> | Checks if the values of two operands are equal or not, if values are not equal then condition becomes true. |
| > | Checks if the value of left operand is greater than the value of right operand, if yes then condition becomes true. |
| < | Checks if the value of left operand is less than the value of right operand, if yes then condition becomes true. |
| >= | Checks if the value of left operand is greater than or equal to the value of right operand, if yes then condition becomes true. |
| <= | Checks if the value of left operand is less than or equal to the value of right operand, if yes then condition becomes true. |

IV. SQL Logical Operators

| | |
|---------------|--|
| AND | The AND operator allows the existence of multiple conditions in an SQL statement's WHERE clause |
| NOT | The NOT operator reverses the meaning of the logical operator with which it is used. Eg: NOT EXISTS, NOT BETWEEN, NOT IN, etc. This is a negate operator. |
| OR | The OR operator is used to combine multiple conditions in an SQL statement's WHERE clause. |
| NULL | The NULL operator is used to compare a value with a NULL value. |
| UNIQUE | The UNIQUE operator searches every row of a specified table for uniqueness (no duplicates). |

V. Basic SQL Queries

Note: Connect the HR Database in SqlDeveloper

- Select * from EMPLOYEES

| EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID |
|-------------|------------|-----------|------------|--------------|-----------|---------|
| 100 | Steven | King | SKING | 515.123.4567 | 17-Jun-03 | AD_PRES |
| 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-Sep-05 | AD_VP |
| 102 | Lex | De Haan | LDEHAAN | 515.123.4569 | 13-Jan-01 | AD_VP |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 1023 | Lex3 | De Haanas | LDEsdaHAAN | 515.123.4569 | 13-Jan-01 | AD_VPP |

- Select EMPLOYEE_ID, FIRST_NAME, SALARY from EMPLOYEES

| EMPLOYEE_ID | FIRST_NAME | SALARY |
|-------------|------------|--------|
| 100 | Steven | 24000 |
| 101 | Neena | 17000 |
| 102 | Lex | 17000 |
| ----- | ----- | ----- |
| 1023 | Lex3 | 12000 |

- Select EMPLOYEE_ID, FIRST_NAME, SALARY from EMPLOYEES where salary > 2300

| EMPLOYEE_ID | FIRST_NAME | SALARY |
|-------------|------------|--------|
| 100 | Steven | 24000 |

- Select EMPLOYEE_ID, FIRST_NAME, SALARY from EMPLOYEES where salary greater than or equal to 10000 and less than or equal to 12000

| EMPLOYEE_ID | FIRST_NAME | SALARY |
|-------------|------------|--------|
| 114 | Den | 11000 |
| 147 | Alberto | 12000 |
| 148 | Gerald | 11000 |
| 149 | Eleni | 10500 |
| 114 | Den | 11000 |

Let's Practice More!!

Comparison operator:

- SELECT * FROM EMPLOYEES WHERE MANAGER_ID = 101;
- SELECT * FROM EMPLOYEES WHERE MANAGER_ID < 110;
- SELECT * FROM EMPLOYEES WHERE MANAGER_ID > 200;
- SELECT * FROM EMPLOYEES WHERE MANAGER_ID >= 200;
- SELECT * FROM EMPLOYEES WHERE MANAGER_ID <= 150;
- SELECT * FROM EMPLOYEES WHERE MANAGER_ID <> 114;

Logical Operators:

- SELECT FIRST_NAME,SALARY,JOB_ID,DEPARTMENT_ID FROM EMPLOYEES WHERE JOB_ID = 'AD_VP' AND DEPARTMENT_ID = 90;
- SELECT FIRST_NAME,SALARY,JOB_ID,DEPARTMENT_ID FROM EMPLOYEES WHERE JOB_ID = 'AD_VP' OR DEPARTMENT_ID = 90;
- SELECT FIRST_NAME,SALARY,JOB_ID,DEPARTMENT_ID FROM EMPLOYEES WHERE Not JOB_ID = 'AD_VP';

LAB#01 TASKS:

1. Write a SQL statement to display all the information of table Jobs.
2. Write a SQL query to find min and max salary of the Job table with Job title 'President' from Jobs table.
3. Write a SQL query to find those employees whose Salaries is 20000 from Employees table.
4. Write a SQL query to find the Jobs whose salary are higher than or equal to \$15000 from Employees table.
5. Write a SQL query to find the details of employees whose last name is 'King'. Return emp_idno, emp_fname, emp_lname, and emp_dept.
6. Write a SQL query to find the details of the employees who work in the department 50. Return emp_idno, emp_fname, emp_lname and emp_dept.
7. Write a query to find the PHONE_NUMBER of the DEPARTMENT_ID=80 and MANAGER_ID=100 of Employees table.
8. write a SQL query to find the Employees with the First name "John" "NEENA" and "Lency"
9. Write a query to find the list of cities with country ID 'IT' from locations table.
10. Write a query to find the list of city except country ID 'IN' and 'CH' from locations table.
11. Write a query to find the list of jobs whose min salary is greater than 8000 and less than 15,000 from job table.
12. Write a query to find list of phone with DEPARTMENT_ID '90' but not with job_id 'IT_PROG' from Employees table.
13. Write a query to find the list of employees who are hired after '12-Dec-07' from employee table.
14. Write a query to find the list of employees who are hired after '12-Dec-07' in Department with DEPARTMENT_ID=100 from employee table.
15. Write a query to find the list of employees who are hired after '12-Dec-07' but not in Department with DEPARTMENT_ID=100 from employee table.