UIT University

Department of Engineering and Technology

CET 224 Database Application

Lab#2

Objective:

Basic data retrieval operations in SQL*Plus.

Name of Student: ____

Roll No: ____________________________**Sec.** __________

Date of Experiment: ______________________________________

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Marks Obtained/Remarks: ___________________________

Signature: ___________________________

THEORY

SELECT Statement

To extract data from the database, the SQL SELECT statement is used.

Capabilities of SELECT statement

Following are the various operations that can be performed using SELECT:-

i. **Selection**: The selection capability can be used to choose rows in a table depending on the criteria to selectively restrict the rows.

Examples

i. Selecting all employees whose salary is between 3500 and 5000 and who were hired after 31st July, 1981.

```
SELECT  *
FROM  EMP
WHERE (SAL BETWEEN 3500 AND 5000) AND HIREDATE >
TO_DATE('31-JUL-1981', 'DD-MON-YYYY');
```

ii. Selecting all employees whose job is either clerk or analyst and were hired between 23rd July, 1981 and 14th May, 1982.

```
SELECT  *
FROM EMP
WHERE (JOB = 'CLERK' OR JOB = 'ANALYST') AND HIREDATE BETWEEN
        TO_DATE('23-JUL-1981', 'DD-MON-YYYY') AND
TO_DATE('14-MAY-1982', 'DD-MON-YYYY');
```

Figure 2.1: Data in a single table can be useful for several employees

ii. **Projection**: It refers to choosing the columns in a table that are to be returned by a query. We can choose as few or as many columns of the table as we require.

Examples

i. Selecting employee number, name and their job

```
SELECT EMPNO, ENAME, JOB
FROM EMP;
```

ii. Selecting employee number, name and their salary who do not earn commission

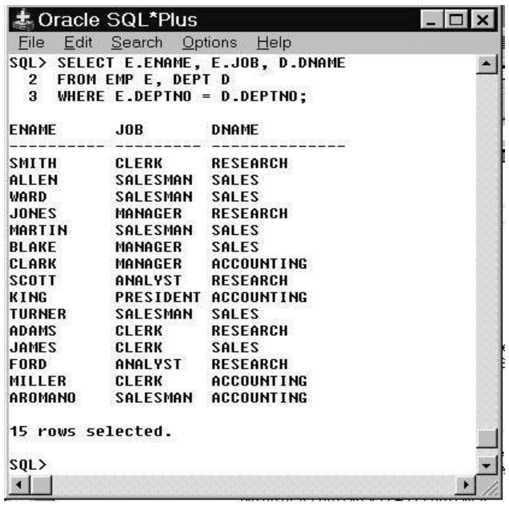
```
SELECT EMPNO, ENAME, SAL
FROM EMP
WHERE COMM IS NULL;
```

iii. **Join**: To bring together data that is stored in different tables by creating a link through a column that both the tables share.

Example

To retrieve the employee name, their job and department name, we need to extract data from two tables, EMP and DEPT. This type of join is called *equijoin*-that is, values in the DEPTNO column on both tables must be equal. Equijoin is also called *simple join* or *inner join*. The output is shown in figure 2.2.

```
SELECT E.ENAME, E.JOB, D.DNAME
FROM EMP E, DEPT D
WHERE E.DEPTNO = D.DEPTNO;
```



```
SQL> SELECT E.ENAME, E.JOB, D.DNAME
  2  FROM EMP E, DEPT D
  3  WHERE E.DEPTNO = D.DEPTNO;

ENAME      JOB       DNAME
---------- --------- --------------
SMITH      CLERK     RESEARCH
ALLEN      SALESMAN  SALES
WARD       SALESMAN  SALES
JONES      MANAGER   RESEARCH
MARTIN     SALESMAN  SALES
BLAKE      MANAGER   SALES
CLARK      MANAGER   ACCOUNTING
SCOTT      ANALYST   RESEARCH
KING       PRESIDENT ACCOUNTING
TURNER     SALESMAN  SALES
ADAMS      CLERK     RESEARCH
JAMES      CLERK     SALES
FORD       ANALYST   RESEARCH
MILLER     CLERK     ACCOUNTING
AROMANO    SALESMAN  ACCOUNTING

15 rows selected.

SQL>
```

Figure 2.2: Joining tables using equi-join

NOTE: Different join operations are discussed in detail in lab session 3.

Comparison Operators

Comparison operators are used in conditions that compare one expression to another. They are used in the WHERE or HAVING clause of the SELECT statement.

Operator	Meaning
=	Equal to
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to
<>	Not equal to

Table 2.1

Besides basic comparison operators (>, <, >=, <=, =, <>), Oracle SQL also supports following comparison operators:-

Operator	Meaning
BETWEEN … AND …	Between two values (inclusive)
IN (list)	Match any of a list of values
LIKE	Match a character pattern
IS NULL	Is a null value

Table 2.2

Examples

a. To display record of employees who are not managers.

```
SELECT *
FROM EMP
WHERE JOB <> 'MANAGER';
```

b. To display the employee number, name, salary and the manager's employee number of all the employees whose manager's employee number is 7902, 7566, or 7788.

```
SELECT EMPNO, ENAME, SAL, MGR
FROM EMP
WHERE MGR IN (7902, 7566, 7788);
```

c. To display the names of all employees with names starting with **S,**

```
SELECT ENAME
FROM EMP
WHERE ENAME LIKE 'S%';
```

Note: Above query performs wildcard searches using LIKE operator. Here % symbol represents any sequence of zero or more characters.

d. To display the names of all employees with second character of name as **A,**

```
SELECT ENAME
FROM EMP
WHERE ENAME LIKE '_A%';
```

Note: Here _ character represents any single character

Logical Operators

A logical operator combines the result of two component conditions to produce a single result based on them or to invert the result of a single condition. Three logical operators are available in SQL as shown below:-

Operator	Meaning
AND	Returns TRUE if both component conditions are TRUE
OR	Returns TRUE if either component condition is TRUE
NOT	Returns TRUE if the following condition is FALSE

Table 2.3

Examples

- To display record of all clerks who earn more than 1100 \

```
SELECT empno, ename, job, sal
FROM emp
WHERE sal >= 1100
AND job = ‘CLERK’;
```

- To display record of all employees who are either clerks or earn more than 1100.

```
SELECT empno, ename, job, sal
FROM emp
WHERE sal >= 1100
OR job = ‘CLERK’;
```

- To display name and job title of all the employees whose are not CLERK, MANAGER, or ANALYST.

```
SELECT ename, job
FROM emp
WHERE job NOT IN (‘CLERK’, ‘MANAGER’, ‘ANALYST’);
```

Rules of Precedence

Order Evaluated	Operator
1	All comparison operators
2	NOT
3	AND
4	OR

Table 2.4

For example, consider the following statement:-

```
SELECT ename, job, sal
FROM emp
WHERE job = 'SALESMAN'
OR job = 'PRESIDENT'
AND sal > 1500;
```

In the above example, there are two conditions:

- The first condition is that job is SALESMAN.
- The second condition is that job is CLERK and salary is greater than 1000.

Therefore the SELECT statement reads as follows:-
Select the row if an employee is a SALESMAN or an employee is a CLERK and earns more than 1000.
In order to force the OR operator to be evaluated before AND, use parentheses as follows:-.

```
SELECT ename, job, sal FROM emp
WHERE (job = 'SALESMAN'
OR job = 'PRESIDENT')
AND sal > 1500;
```

Ordering Data

The order of rows returned in a query result is undefined. The ORDER BY clause can be used to sort the rows. This clause comes last in the SELECT statement. ASC at the end of the ORDER BY clause specifies ascending order where as DESC specifies descending order. ASC is the default order.

<u>Examples</u>

i. To select data in the increasing order of hiredate,

```
SELECT ENAME, JOB, DEPTNO, HIREDATE
FROM EMP
ORDER BY HIREDATE;
```

ii. To select data in the decreasing order of hiredate,

```
SELECT ENAME, JOB, DEPTNO, HIREDATE
FROM EMP
ORDER BY HIREDATE DESC;
```

iii. To sort by column alias,

```
SELECT EMPNO, ENAME, SAL*12 ANNSAL
```

```
FROM EMP
ORDER BY ANNSAL.
```

iv. To sort by multiple columns,

```
SELECT ENAME, DEPTNO, SAL
FROM EMP
ORDER BY DEPTNO, SAL DESC;
```

Note: The DESC applies only to SAL column. The DEPTNO appears in ascending order.

v. To select list of names and jobs of all employees hired in 1987 in the alphabetical order of name

```
SELECT UPPER(ENAME) “EMP NAME”, JOB
FROM EMP
WHERE TO_CHAR(HIREDATE, ‘YYYY’) = 1987
ORDER BY ENAME;
```

vi. To print employee number, name, job, annual salary of all managers and clerks whose monthly salary is between 3000 and 5500 in descending order of annual salary.

```
SELECT EMPNO, ENAME, JOB, 12*SAL + NVL(COMM, 0)
ANNUAL_SALARY
FROM EMP
WHERE JOB = ‘MANAGER’ OR JOB = ‘CLERK’
AND SAL BETWEEN 3000 AND 5500
ORDER BY ANNUAL_SALARY DESC;
```

EXERCISES

1. Define the different capabilities of SELECT statement? Give an example of each.

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2. Write down SQL queries to perform following functions:-

i. To display the name and department number of employee with number 7566.

ii. To display the name and department number of all employees in departments 10 and 30 in alphabetical order by name.

iii. To display the name, department number and hire date of all employees who were hired in *1982*.

iv. To display the name of all employees who have two consecutive Ls in their name and are in department 30 or their manager is 7782

v. To display the name of all clerks of department 10 and 20 hired before 1983.

vi. Display the name and salary for all employees whose salary is not in range of $1500 and $2850.

vii. Display the name, salary and commission for all employees whose commission amount in greater than their salary increased by 10%.

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