Introduction to Oracle Database XE and SQLPlus Tool for writing SQL queries

Lab Objective

Familiarize students with Oracle database and SQLPlus tool for writing queries in SQL.

Lab Outcome

After completing this lab successfully, students will be able to:

1. **Use** Oracle database and SQLPlus tool for writing queries.
2. **Write** SQL statements to perform most common and basic database operations.

Psychomotor Learning Levels

This lab involves activities that encompass the following learning levels in psychomotor domain.

Level	Category	Meaning	Keywords
P1	Imitation	Copy action of another; observe and replicate.	Relate, Repeat, Choose, Copy, Follow, Show, Identify, Isolate.
P2	Manipulation	Reproduce activity from instruction or memory	Copy, response, trace, Show, Start, Perform, Execute, Recreate.

Lab Activities

1. **Introducing Oracle Database XE**
   Oracle Database Express Edition (Oracle Database XE) is a free, smaller-footprint edition of OracleDatabase. Oracle Database XE is easy to install and easy to manage.With Oracle Database XE and related tools you can:
   - Administer the database. Create tables, views, and other database objects
   - Import, export, and view table data and Run queries and SQL scripts
2. **Executing SQLPlus tool:**
   SQLPlus is the most basic Oracle Database utility, with a basic command-line interface, commonly used by users, administrators, and programmers. Follow these steps to execute theSQLPlus tool.
   i. Open a command prompt.
   ii. Type **`sqlplus`**
   iii. Then enter **`system`** as user-name
   iv. And enter **`system`** as password
3. **Creating a Database User:**
   To perform database operations, you have to create a user. Follow these steps to create a user.
   i. Type **`create user <username> identified by cse301;`**
   ii. Type **`grant all privileges to <username>;`** [This query will allow performing any operations on the database by the user]
4. **Connecting to the Database as lab user:**
   After successfully creating a database user lab, you could connect to the database in the following way: **`connect <username>/cse301`**
   To see the list of already created tables by any user:
   `select table_name from user_tables;`

5. **Creating a Table:**

The general syntax for creating a table is given below.

```
CREATE TABLE table_name
       (attribute1 datatype [ NULL | NOT NULL ],
       attribute2 datatype [ NULL | NOT NULL ],
       ...);
```

There exist different data types in Oracle. Some of them are given below.

- **char(n)**: value contains exactly n alpha-numeric characters
- **varchar2(n)**: value contains at most n alpha-numeric characters
- **number**: any integer or real numbers
- **date**: DD-MON-YY format like '20-JAN-15'

Assume that you want to create a table named **person** with three attributes which are given below:

i. personId: number type
ii. personName: varchar2 type
iii. personDOB: date type

To create this table, you have to write the following query

```
create table person
(personId number not null,
personName varchar2(50) not null,
personDOB date
);
```

6. **Inserting Records/Rows into a Table:**

The general format of inserting a new record is:

```
insert into table_name values (…,…,…);
```

Now type the following to insert a new record into **person** table.

```
insert into person values (2018001,'Alice','01-JAN-92');
```

7. **Writing Queries:**

The basic SQL syntax of a query is given below.

```
select attribute1, attribute2
from table_name
where <conditional clause> ;
```

To find only the person id of all persons from person table, you have to type the following:

```
select personId from test;
```

To find the name and DOB of the person with id2018001, you have to type the following:

```
select personName, personDOB from test where personId=2018001;
```

To find all records and their information, you have to type the following:

```
select * from test;
```

8. **Executing SQL Script in SQLPlus:**

You can create a file with a.sql extension that contains your SQL statements. Then you can execute it from the SQLPlus command line directly.

Suppose, you have written your SQL statements in a file 'lab1.sql' saved under d:\sampledirectory. To execute that script, you have to type

```
@ d:\sample\lab1.sql
```

You have to write all SQL statements in notepad first and save them with a.sql extension. Then execute your SQL scripts.

Lab Task # 01 (Creating a table):

Write SQL statement to create a table 'instructor' which has 4 attributes – i) id (number), ii) name(text), iii) dept_name(text) and iv) salary(number).

Lab Task # 02 (Inserting data into a table):

Write SQL statements to insert the following records (4-5 rows) into instructor table:

ID	*name*	*dept_name*	*salary*
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

Lab Task # 03 (Writing Queries):

i. Show instructor name only.
ii. Find name and department of instructors who have asalary more than 70000.
iii. Find name and department of instructors who have asalaryin between 80000 and 100000 (inclusive).
iv. Display all records of instructor table.