Lab1

Objectives:

At the end of this lab, you should be able to

- Specify fields and columns of a table.
- To write conditional SQL query statement.

Data represents known facts that can be recorded and that have implicit meaning.
For example:

_____

_____

_____

Database is a collection of related data. Example of database

_____

_____

_____

Database management system (DBMS) is a collection of programs that enables users to create and maintain a databases. Example of DBMS

_____

_____

_____

Manipulating a database includes :
querying the database to retrieve specific data, adding, deleting, or updating.

People who works with database systems:
1-Database administrator (DBA).
2-Database designers
3-Application programmer.
4-End users.

Tables: every database composed of one or more tables, which store the database's data/information. Each table has its own unique name and consists of columns and rows. The columns called fields and the rows called records. A table has a specified number of columns, but can have any number of rows.

Record

A record is the collection of values for all the fields pertaining to one entity: i.e. a person, product, company, transaction, etc.

Field :

A field is an area (within a record) reserved for a specific piece of data. Examples: customer number, customer name, street address,
Fields are defined by:

- Field name
- Data type:Character, Numeric,Date, Logical, ..etc
- Field size

Example: assume you want to save data about students in school, specify some of possible fields that can be in this table, data type, size of each field.
Give two examples of records for that table.

Oracle: is an relational database management system (RDBMS) that provides database tools for storing and managing data. It also provides advanced tools to manage all types of data in web sites.

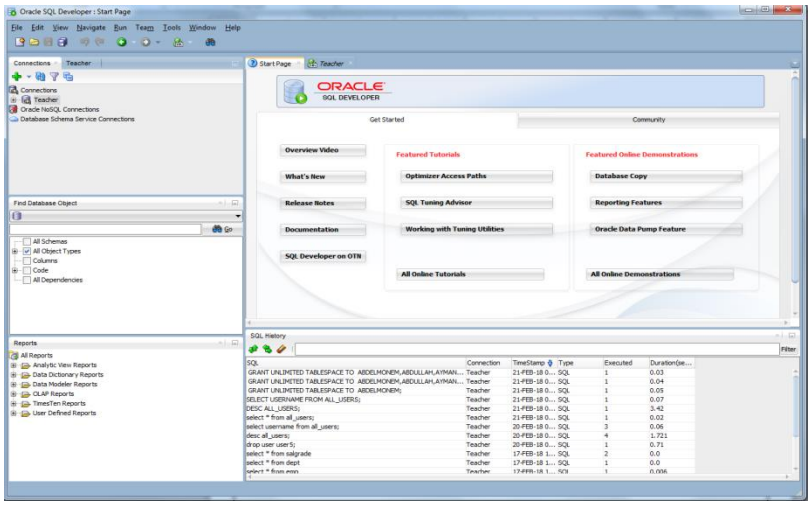
SQL (Structured Query Language) is a standardized programming language used for managing relational databases and performing various operations on the data in them. Initially created in the 1970s, SQL is regularly used by database administrators, as well as by developers.

Writing SQL Statements

- SQL statements are not case sensitive, unless indicated.
- SQL statements can be entered on one or many lines.

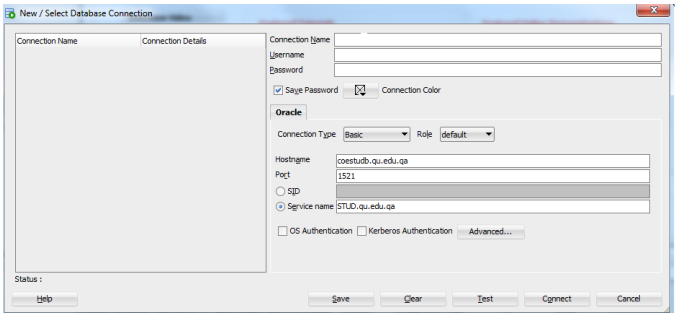
Using SQL Developer

Oracle SQL Developer is an Integrated development environment (IDE) for working with SQL in Oracle databases.



To connect to the database:

1- Create a new connection.
2- Use the given username and initial password.
3- Set the following
   Hostname: coestudb.qu.edu.qa
   Port:1521
   Service name: STUD.qu.edu.qa



Tables used in this course:

There are already three tables created with data to practice:

1- **EMP** table: which gives details of all the employees.
2- **DEPT** table: which gives details of all the departments.
3- **SALGRADE**: which gives details of salaries for various grades.

EMP Table

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	17-DEC-80	1400		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1800	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1450	500	30
7566	JONES	MANAGER	7839	02-APR-81	3175		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1450	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	3050		30
7782	CLARK	MANAGER	7566	09-JUN-81	2650		10
7788	SCOTT	ANALYST		19-APR-87	3200		20
7839	KING	PRESIDENT	7788	17-NOV-81	5200		10
7876	ADAMS	CLERK	7698	23-MAY-87	1300		20
7900	JAMES	CLERK	7566	03-DEC-81	1150	300	30
7902	FORD	ANALYST	7566	03-DEC-81	3200		20
7934	MILLER	CLERK	7782	23-JAN-82	1500		10

DEPT Table

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

SALGRA

GRADE	LOSAL	HISAL
1	700	1200
2	1201	1400
3	1401	2000
4	2001	3000
5	3001	9999

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Displaying Table Structure

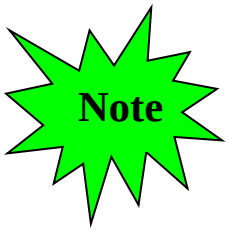
Use the command DESCRIBE command to display the structure of a table.

DESC[RIBE] ***tablename***

Example :

```
SQL> DESCRIBE dept;

Name           Null?    Type
-------------- -------- ------------
DEPTNO         NOT NULL NUMBER(2)
DNAME                   VARCHAR2(14)
LOC                     VARCHAR2(13)
```



NULL : indicates whether a column *must* contain data;

NOT NULL: indicates that a column must contain data

The data types are described in the following table:

Datatype	Description
NUMBER(*p*,*s*)	Number value having a maximum number of digits *p*, the number of digits to the right of the decimal point *s*
VARCHAR2(*s*)	Variable-length character value of maximum size *s*
DATE	Date and time value between January 1, 4712 B.C. and December 31, 9999 A.D.
CHAR(*s*)	Fixed-length character value of size *s*

Basic SELECT Statement

```
SELECT [DISTINCT]{*, column] alias[,...}
FROM   table;
```

Examples:

```
SQL> SELECT *
  2  FROM   dept;

SQL> SELECT deptno, loc
  2  FROM   dept;
```

Using Arithmetic Operators

```
SQL> SELECT ename, sal, sal+300
  2  FROM emp;
```

Exercise: Write SQL statement to display employee name and total of his income(salary +commission)

_____

What do you notice ??!!!_____

Defining a Null Value

- A null is a value that is unavailable, unassigned, unknown, or inapplicable.
- A null is not the same as zero or a blank space.

```
SQL> SELECT ename, job, sal, comm
  2  FROM   emp;
```

Note: *some records do not have values in comm field.*

Duplicate Rows

```
SQL> SELECT deptno  FROM   emp;
```

Eliminating Duplicate Rows

```
SQL> SELECT DISTINCT deptno  FROM   emp;
```

Limiting Rows Selected

SELECT	**[DISTINCT] {*| *column* [*alias*], ...}**
FROM	***table***
[WHERE	***condition(s)*]**;

Example:

```
SQL> SELECT        ename, job, deptno  FROM    emp  WHERE        ename ='JAMES'  ;
```

.

Note

- Character strings and date values are enclosed in single quotation marks.
- Character values are case sensitive and date values are format sensitive.
- The default date format is DD-MON-YY.

Comparison Operators

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

Examples:

```
SQL> SELECT        ename, sal FROM      emp
  WHERE       sal BETWEEN 1000 AND 1500;

SQL> SELECT        empno, ename, sal, mgr  FROM       emp
  WHERE       mgr IN (7902, 7566, 7788);

SQL> SELECT        ename  FROM         emp
  WHERE       ename LIKE 'S%';

SQL> SELECT  ename, mgr  FROM    emp
  WHERE   mgr IS NULL;
```

Logical Operators

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

Examples:

```
SQL> SELECT empno, ename, job, sal
  2  FROM   emp
  3  WHERE  sal>=1100
  4  AND    job='CLERK';

SQL> SELECT empno, ename, job, sal
  2  FROM   emp
  3  WHERE  sal>=1100
  4  OR     job='CLERK';

SQL> SELECT ename, job
  2  FROM   emp
  3  WHERE  job NOT IN ('CLERK','MANAGER','ANALYST');
```

ORDER BY Clause

- Sort rows with the ORDER BY clause
- ASC: ascending order, default
- DESC: descending order
- The ORDER BY clause comes last in the SELECT statement.

Examples:

```
SQL> SELECT          ename, job, deptno, hiredate
  2  FROM        emp
  3  ORDER BY hiredate;

SQL> SELECT   ename, job, deptno, hiredate
  2  FROM        emp
  3  ORDER BY hiredate DESC;
```

Sorting by Multiple Columns

```
SQL> SELECT          ename, deptno, sal  FROM     emp
 ORDER BY    deptno, sal DESC;
```

Practice

1. Show the structure of the EMP table. Create a query to display the name, job, hire date, and employee number for each employee.

2. Create a query to display the name and salary of employees earning more than $2850.

3. Create a query to display unique jobs from the Emp table;

4. Create a query to display the name and salary for all employees whose salary is not in the range of $1500 and $2850.

5. Display the name and job title of all employees who do not have a manager.

6. Display the name, salary, and commission for all employees who earn commissions. Sort data in descending order of salary and commissions.

7. Display the names of all employees where the third letter of their name is an *A*.