**LABORATORY SESSION 1**

**Title:** DDL Commands, Constraints & Insertion of data into table

**Objective:** To understand how to create a table schema with data types and constraints.

To learn insertion of data into a table.

***Note:*** *SQL commands and keywords including table and column names are not case sensitive. The use of block capitals in the examples is only for highlighting the particular words.*

**Theory:**

**Create Table** – Used for creation of a table schema (structure).

Syntax - CREATE TABLE <table\_name> (

<column name> <datatype>[(<size>)] [<constraint>],

<column name> <datatype>[(<size>)] [<constraint>],

...

<column name> <datatype>[(<size>)] [<constraint>],));

Example – CREATE TABLE salespeople (

sname number(10) PRIMARY KEY,

snum varchar2(20) NOT NULL,

comm number(5,2));

**Alter Table** – Used for adding, modifying or deleting column(s) of a table,

Adding column(s)

Syntax - ALTER TABLE <table\_name>

ADD (<column name> <datatype>[(<size>)] [<constraint>],

<column name> <datatype>[(<size>)] [<constraint>],

...

<column name> <datatype>[(<size>)] [<constraint>]);

Example - ALTER TABLE salespeople ADD (city varchar2(15),dob date not null);

Modifying existing column(s)

Syntax - ALTER TABLE <table\_name>

MODIFY (<column name> <datatype>[(<size>)] [<constraint>],

<column name> <datatype>[(<size>)] [<constraint>],

...

<column name> <datatype>[(<size>)] [<constraint>]);

Example - ALTER table salespeople MODIFY (city varchar2(10),comm number(10,2));

Removing existing column

Syntax - ALTER TABLE <table\_name> DROP COLUMN <column name>;

**Constraints –** Constraints are the rules that are imposed on the columns of a table.

Column level and row level constraints

If a constraint involves only one column then it can be specified along with the definition of the column. This is known as column level constraint. The constraints given in Example 1 below are column level constraints.

If a constraint involves more than one column then it must be specified at the end of the table definition. This is known as table level constraint. The constraints given in Example 2 below are table level constraints. However, constraints for a single column can also be specified at table level. Note that for table level constraint the column names have to be mentioned.

Commonly used constraints:

PRIMARY KEY

Syntax - CREATE TABLE <table\_name> (<column name> <datatype> [(<size>)] CONSTRAINT <constraint\_name> PRIMARY KEY);

UNIQUE

Syntax - CREATE TABLE <table\_name> (<column name> <datatype> [(<size>)] CONSTRAINT <constraint\_name> UNIQUE);

FOREIGN KEY

Syntax - CREATE TABLE <table\_name> ( <column name> <datatype>, <column name> <datatype>,

...,

CONSTRAINT <constraint\_name>

FOREIGN KEY (column1, column2, ... column\_n)

REFERENCES <parent\_table> (column1, column2, ... column\_n))

[ON DELETE CASCADE/SET NULL]

[ON UPDATE CASCADE/SET NULL];

CHECK

Syntax - CREATE TABLE <table\_name>(

<column name> <datatype>,

<column name> <datatype>,

...,

CONSTRAINT <constraint\_name>

CHECK (<column name> condition));

NOT NULL

Syntax - CREATE TABLE <table\_name>(

<column name> <datatype> NOT NULL,

<column name> <datatype> NOT NULL);

Example 1 - CREATE TABLE salespeople (

sname number(10) CONSTRAINT PK\_SP PRIMARY KEY,

snum varchar2(20) CONSTRAINT NN\_SN NOT NULL,

dnum varchar2(10) CONSTRAINT FK\_DNO REFERENCES dept(dno)

ON DELETE CASCADE ON UPDATE CASCADE,

area varchar2(15) CONSTRAINT UNQ\_AR UNIQUE,

comm number(5,2) CHECK(comm. < 0.3));

Example 2 - CREATE TABLE student (

ID vachar2(6) CONSTRAINT PK\_ST PRIMARY KEY,

regNo varchar2(10) CONSTRAINT NN\_RN NOT NULL CONSTRAINT UNQ\_RN UNIQUE,

dnum varchar2(10) CONSTRAINT FK\_DNO REFERENCES dept(dno)

ON UPDATE CASCADE,

sem number(1) CONSTRAINT NN\_SEM NOT NULL,

roll number(3) CONSTRAINT NN\_ROLL NOT NULL

CONSTRAINT UNQ\_DSR UNIQUE(dnum,sem,roll));

**Insert Data Into Table** – Used for insertion of data into a table,

Inserting data to all the columns

Syntax – INSERT INTO <table\_name> VALUES (<value>,<value>,…..,<value>)

Example – INSERT INTO salespeople values(1001,’Bikash’,’Kharagpur’,.15);

For specific columns

Syntax – INSERT INTO <table\_name> (<column name>, <column name>,…..,<column name>) VALUES (<value>,<value>,…..,<value>)

Example – INSERT INTO salespeople(snum, sname) values(1002,’Raj’);

**Assignments:**

1. Create the following tables by identifying the primary keys, foreign keys (if any) and other constraints. Which table should you create first? Why?

**EMP**

|  |  |  |
| --- | --- | --- |
| **Column name** | **Data type** | **Description** |
| EMPNO | Number | Employee number |
| ENAME | Varchar2 | Employee name |
| JOB | Char | Designation |
| MGR | Number | Manager’s Emp. Number |
| HIREDATE | Date | Date of joining |
| SAL | Number | Basic Salary |
| COMM | Number | Commission |
| DEPTNO | Number | Department Number |

**DEPT**

|  |  |  |
| --- | --- | --- |
| **Column name** | **Data type** | **Description** |
| DNO | Number | Department number |
| DNAME | Varchar2 | Department name |
| LOC | Varchar2 | Location of department |

1. Add a new attribute Phone to table EMP.
2. Change the data type of attribute Job from char to varchar2.
3. Remove the attribute Phone from table EMP.
4. Describe the tables.
5. Insert the following data into the tables. Which data should you insert first?

**Data for EMP table**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **EMPNO** | **ENAME** | **JOB** | **MGR** | **HIREDATE** | **SAL** | **COMM** | **DEPTNO** |
| 7369 | Smith | Clerk | 7902 | 17/12/80 | 800 |  | 20 |
| 7499 | Allen | Salesman | 7698 | 20/2/81 | 1600 | 300 | 30 |
| 7521 | Ward | Salesman | 7698 | 22/2/81 | 1250 | 500 | 30 |
| 7566 | Jones | Manager | 7839 | 2/4/81 | 2975 |  | 20 |
| 7654 | Martin | Salesman | 7698 | 28/9/81 | 1250 | 1400 | 30 |
| 7698 | Blake | Manager | 7839 | 1/5/81 | 2850 |  | 30 |
| 7782 | Clark | Manager | 7839 | 9/6/81 | 2450 |  | 10 |
| 7788 | Scott | Analyst | 7566 | 9/12/82 | 3000 |  | 20 |
| 7839 | King | President |  | 17/11/81 | 5000 |  | 10 |
| 7844 | Turner | Salesman | 7698 | 8/9/81 | 1500 | 500 | 30 |
| 7876 | Adams | Clerk | 7788 | 12/1/83 | 1100 |  | 20 |
| 7900 | James | Clerk | 7698 | 3/12/81 | 950 |  | 30 |
| 7902 | Ford | Analyst | 7566 | 4/12/81 | 3000 |  | 20 |
| 7934 | Miller | Clerk | 7782 | 23/1/82 | 1300 |  | 10 |

**Data for DEPT table**

|  |  |  |
| --- | --- | --- |
| **DNO** | **DNAME** | **LOC** |
| 10 | Accounting | New York |
| 20 | Research | Dallas |
| 30 | Sales | Chicago |
| 40 | Operations | Boston |

1. Display all records in the tables.