NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES

CL 203-Database Systems

Lab Session 04

Data Definition Language (DDL) statements are used to define the database structure or schema.

- CREATE - to create objects in the database
- ALTER - alters the structure of the database
- DROP - delete objects from the database
- TRUNCATE - remove all records from a table, including all spaces allocated for the records are removed
- RENAME - rename an object

HOW TO CREATE A TABLE?

SYNTAX;

CREATE TABLE TABLE_NAME

(

Column_name1 data_type [*DEFAULT* **value**],

Column_name2 data_type [*DEFAULT* **value**] ,

Column_name3 data_type [*DEFAULT* **value**],

…..

)

Ex:

CREATE TABLE customer

(Cust_id NUMBER(2),

LastName VARCHAR2(14),

The DEFAULT constraint is used to insert a default value into a column.

The default value will be added to all new records, if no other value is specified.

IMPORTANT

DDL commands are **AUTO-COMMIT**

FirstName VARCHAR2(14),

Address VARCHAR2(20),

Telno NUMBER(20)

);

Use command DESC to confirm the creation of the table.

Constraints

1. NOT NULL:

The NOT NULL constraint enforces a column to NOT accept NULL values. This means that NOT NULL constraint enforces a field to always contain a value.

Ex:

CREATE TABLE customer

(Cust_id NUMBER(2) **NOT NULL**,

LastName VARCHAR2(14),

FirstName VARCHAR2(14) **NOT NULL**,

Address VARCHAR2(20),

Telno NUMBER(20)

);

2. UNIQUE:

The UNIQUE constraint uniquely identifies each record in a database table. The **UNIQUE** and **PRIMARY KEY** constraints both provide a guarantee for uniqueness for a column or set of columns.

Ex:

CREATE TABLE customer

(Cust_id NUMBER(2) NOT NULL **UNIQUE**,

LastName VARCHAR2(14),

FirstName VARCHAR2(14) NOT NULL,

Address VARCHAR2(20),

Telno NUMBER(20) **UNIQUE**

);

Naming of a Unique Constraints and for defining a constraint on multiple columns:

CREATE TABLE customer

(Cust_id NUMBER(2) NOT NULL ,

LastName VARCHAR2(14),

FirstName VARCHAR2(14) NOT NULL,

Address VARCHAR2(20),

Telno NUMBER(20) ,

CONSTRAINT uc_CidTelnum UNIQUE (Cust_id,telno)

);

ADDING UNIQUE CONSTRAINT IN AN ALREADY EXISTING TABLE;

ALTER TABLE Customer
ADD UNIQUE (FirstName);

TO DROP A UNIQUE CONSTRAINT:

ALTER TABLE Customer
DROP CONSTRAINT **uc_CidTelnum;**

3. PRIMARY KEY:

- The PRIMARY KEY constraint uniquely identifies each record in a database table.
- Primary keys must contain unique values.
- A primary key column cannot contain NULL values.
- Each table should have a primary key, and each table can have only ONE primary key.

Ex: In EMP table, **empno** is the primary key, which is unique for all customers. If I wish to relate two tables, primary key plays a vital role. Let's Explore How:

PRIMARY KEY CONSTRAINT ON CREATE TABLE:

CREATE TABLE customer

(Cust_id NUMBER(2) NOT NULL PRIMARY ,

```
    LastName   VARCHAR2(14),
    FirstName    VARCHAR2(14)   NOT NULL,
    Address       VARCHAR2(20),
    Telno          NUMBER(20)
);
```

APPLYING NAMING ON PRIMARY KEY CONTRAINTS AND FOR DEFINING CONSTRAINTS ON MULTIPLE COLUMNS:

```
    CREATE TABLE customer
    (Cust_id     NUMBER(2)  NOT NULL ,
    LastName   VARCHAR2(14),
    FirstName    VARCHAR2(14)   NOT NULL,
    Address       VARCHAR2(20),
    Telno          NUMBER(20),
    CONSTRAINTS pk_custidlname  PRIMARY KEY( cust_id,LastName)
);
```

PRIMARY KEY Constraint on ALTER TABLE

```
ALTER TABLE customer
ADD PRIMARY KEY (cust_Id)
```

To allow naming of a PRIMARY KEY constraint, and for defining a PRIMARY KEY constraint on multiple columns,

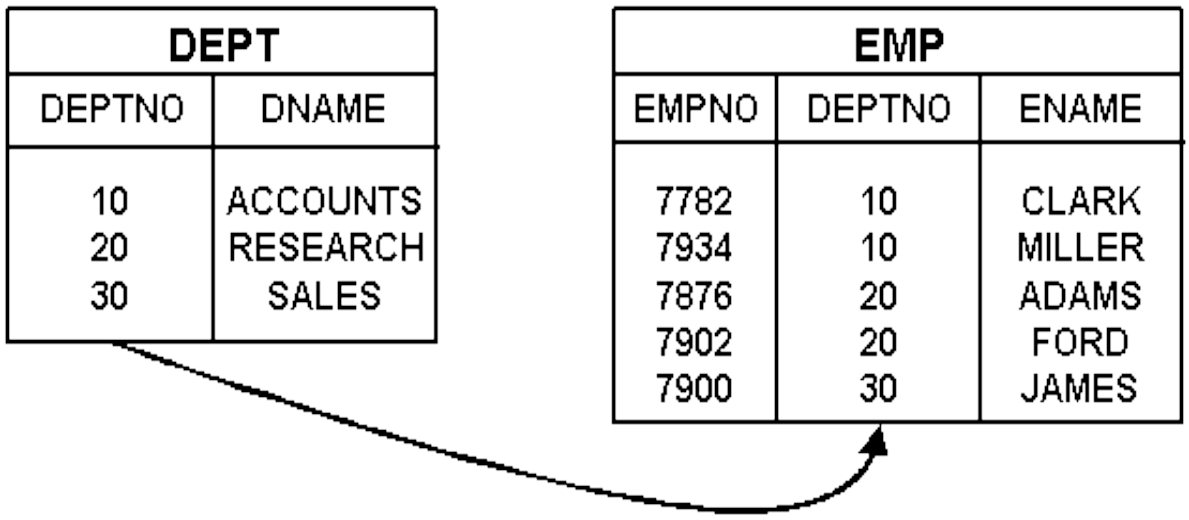
```
ALTER TABLE customer
ADD CONSTRAINT pk_custidlname PRIMARY KEY (Cust_id,LastName)
```

To DROP a PRIMARY KEY Constraint

```
ALTER TABLE customer
DROP CONSTRAINT pk_custidlname
```

4. FOREIGN KEY:

A FOREIGN KEY in one table points to a PRIMARY KEY in another table. Let say we have two tables here, Emp & Dept. Note that DEPTNO column in DEPT table points to column "DEPTNO" in EMP table.



DEPT	
DEPTNO	DNAME
10	ACCOUNTS
20	RESEARCH
30	SALES

EMP		
EMPNO	DEPTNO	ENAME
7782	10	CLARK
7934	10	MILLER
7876	20	ADAMS
7902	20	FORD
7900	30	JAMES

"DEPTNO" column is a PRIMARY KEY in DEPT Table
"DEPTNO" column is a FORIEGN KEY in EMP Table

The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables.

The FOREIGN KEY constraint also prevents that invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the table it points to.

FOREIGN KEY Constraint on CREATE TABLE

```
CREATE TABLE EMP3
(
EMPNO NUMBER(4) NOT NULL PRIMARY KEY,
DEPTNO NUMBER(7,2) NOT NULL,
ENAME VARCHAR2(9) NOT NULL,
CONSTRAINT FK_EMP_DEPTNO FOREIGN KEY (DEPTNO) REFERENCES
DEPT(DEPTNO)
);
```

FOREIGN KEY Constraint on ALTER TABLE

```
ALTER TABLE EMP3
ADD FOREIGN KEY (DEPTNO)
REFERENCES DEPT(DEPTNO)
```

Now name this foreign key by yourself using alter table;

Now write a command to drop this foreign key constraint;

---

5. **Check Constraints:**
   Specifies a condition that must be true

```
CREATE TABLE EMP3
(
EMPNO NUMBER(4) NOT NULL CHECK(EMPNO>0) PRIMARY KEY,
DEPTNO NUMBER(7,2) NOT NULL,
ENAME VARCHAR2(9) NOT NULL,
CONSTRAINT FK_EMP_DEPTNO FOREIGN KEY (DEPTNO) REFERENCES
DEPT(DEPTNO)
);
```

To allow naming of a CHECK constraint, and for defining a CHECK constraint on multiple columns;

```
CREATE TABLE EMP3
(
EMPNO NUMBER(4) NOT NULL PRIMARY KEY,
DEPTNO NUMBER(7,2) NOT NULL,
ENAME VARCHAR2(9) NOT NULL,
CONSTRAINT FK_EMP_DEPTNO FOREIGN KEY (DEPTNO) REFERENCES
DEPT(DEPTNO)

CONSTRAINT chk_EMP CHECK (EMPNO>0 AND DEPTNO='20')
);
```

6. DEFAULT CONSTRAINT:

The DEFAULT constraint is used to insert a default value into a column.

The default value will be added to all new records, if no other value is specified.

```
CREATE TABLE EMP3
(
EMPNO NUMBER(4) NOT NULL,
DEPTNO NUMBER(7,2) NOT NULL,
ENAME VARCHAR2(9) NOT NULL,
HIRE_DATE DATE DEFAULT GETDATE ()
);
```

DEFAULT Constraint on ALTER TABLE

```
ALTER TABLE EMP3
MODIFY hire_date DEFAULT GETDATE ()
```

To DROP a DEFAULT Constraint

```
ALTER TABLE EMP3
ALTER COLUMN HIRE_DATE DROP DEFAULT
```

Example:

The EMP table is being created specifying various constraints:-

```
CREATE TABLE DEPT (
DEPTNO      NUMBER(2) constraint DEPT_DEPTNO_PK PRIMARY KEY,
DNAME       VARCHAR2(14),
LOC         VARCHAR2(13),
CONSTRAINT      DEPT_DNAME_UK       UNIQUE(DNAME)
);
```

```
CREATE TABLE EMP3 (
EMPNO       NUMBER(4) CONSTRAINT  EMP_EMPNO_PK  PRIMARY KEY,
ENAME       VARCHAR2(10) NOT NULL,
JOB         VARCHAR2(9),
MGR         NUMBER(4),
HIREDATE    DATE  DEFAULT     SYSDATE,
SAL         NUMBER(7, 2),
COMM        NUMBER(7, 2),
DEPTNO      NUMBER(7, 2)      NOT NULL,
CONSTRAINT      EMP_DEPTNO_CK  CHECK (DEPTNO BETWEEN 1 AND 50),
CONSTRAINT      EMP_DEPTNO_FK  FOREIGN KEY (DEPTNO)
REFERENCES      DEPT(DEPTNO)
);
```

DROP STATEMENT:

The DROP TABLE statement is used to delete a table.

```
DROP TABLE table_name;
```

To DROP DATABASE:

The DROP DATABASE statement is used to delete a database.

```
DROP DATABASE database_name;
```

What if we only want to delete the data inside the table, and not the table itself?

```
TRUNCATE TABLE table_name
```

The ALTER TABLE Statement

COLUMN OF AN EXISTING TABLE

- **TO ADD A COLUMN IN A TABLE**

  ALTER TABLE table_name
  ADD column_name datatype

- **TO CHANGE THE DATA TYPE OF A COLUMN IN A TABLE**

  ALTER TABLE table_name
  MODIFY column_name datatype

- **TO DELETE A COLUMN IN A TABLE**

  ALTER TABLE table_name
  DROP COLUMN column_name

- **TO RENAME TABLE NAME**

  RENAME table_name TO table_name

ACTIVITY

Consider the following schema, in the form of normalized relations, to represent information about employees, grades, training and projects in an organization.

EMPLOYEE
Empno (eg 6712)
Name
Designation (e.g. Database Developer)
Qualification
Joindate
GRADE
Designation
Grade (1-20)
TotalPosts
PostsAvailable (<= TotalPosts)
PROJECT
PID (eg P812)
Title
Client
Duration (in weeks)
Status (New, In Progress, Complete)
TRAINING
Tcode (eg T902)
Title
StartDate
EndDate
EMP_PROJECT
Empno
PID
Performance (Excellent, Good, Fair, Bad, Poor)
EMP_TRAINING
Empno
Tcode
Attendance (%)

1. Develop a script file **EMPLOYEE.SQL** to create tables for the above schema. Implement all necessary integrity constraints including primary and foreign keys. (NOTE: All **check** constraints should be at table level)

2. Write SQL statements to add:

   - Gender column to **EMP** table. The only possible values are Male and Female.
   - Instructor_Name column to **TRAINING** table.
   - Salary column to **GRADE** table.

BEST OF LUCK