

UE19CS304 – DBMS LABORATORY

Week 4: SQL Constraints, Views, Truncate, delete and update operations.

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Task1:

- Creating database and creating tables (6).

```
postgres=# create database cs545;
CREATE DATABASE
postgres=# \c cs545
You are now connected to database "cs545" as user "postgres".
cs545=#
```

```
cs545=# create table employee_545(fname varchar not null,init varchar,lname varchar not null,ssn int,bdate int,address
varchar,sex varchar(1),salary int,super_ssn int,dno int,primary key(ssn));
CREATE TABLE
cs545=#
```

```
cs545=# create table department_545(dname varchar,dnumber int,mgr_ssn int,mgr_start_date int, primary key(dnumber));
CREATE TABLE
cs545=#
```

```
cs545=# create table dept_locations_545(dnumber int,dlocation int,primary key(dnumber, dlocation));
CREATE TABLE
cs545=#
```

```
cs545=# create table project_545(pname varchar, pnumber int,plocation varchar,dnum int,primary key(pnumber,plocation));
CREATE TABLE
cs545=#
```

```
cs545=# create table works_on_545(essn int,pno int,hours int,primary key(essn, pno));
CREATE TABLE
cs545=#
```

```
cs545=# create table dependent_545(essn int,dependent_name varchar,sex varchar(1),bdate int,relationship varchar,primary
key(essn, dependent_name));
CREATE TABLE
cs545=#
```

- Listing all tables:

```
cs545=# \d
          List of relations
Schema |      Name      | Type | Owner
-----+-----+-----+-----
public | department_545 | table | postgres
public | dependent_545  | table | postgres
public | dept_locations_545 | table | postgres
public | employee_545   | table | postgres
public | project_545    | table | postgres
public | works_on_545   | table | postgres
(6 rows)
```

- Inserting values to:

-Department table:

```
cs545=# insert into department_545 values('CS',1,005,2015);
INSERT 0 1
cs545=# insert into department_545 values('EC',2,006,2016);
INSERT 0 1
cs545=# insert into department_545 values('EE',3,007,2017);
INSERT 0 1
cs545=#
```

```
cs545=# select * from department_545;
 dname | dnumber | mgr_ssn | mgr_start_date
-----+-----+-----+-----
CS    |      1 |      5 |      2015
EC    |      2 |      6 |      2016
EE    |      3 |      7 |      2017
(3 rows)
```

-Employee table:

```
cs545=# insert into employee_545 values('Virat',0,'Kohli',6,1984,'Bangalore','M',300000,6,2);
INSERT 0 1
cs545=# insert into employee_545 values('MS',0,'Dhoni',7,1985,'Ranchi','M',400000,7,3);
INSERT 0 1
cs545=# insert into employee_545 values('KL',0,'Rahul',8,1986,'Shimoga','M',500000,8,4);
INSERT 0 1
cs545=# select * from employee_545;
 fname | minit | lname | ssn | bdate | address | sex | salary | super_ssn | dno
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
Virat | 0     | Kohli | 6   | 1984 | Bangalore | M   | 300000 | 6         | 2
MS    | 0     | Dhoni | 7   | 1985 | Ranchi    | M   | 400000 | 7         | 3
KL    | 0     | Rahul | 8   | 1986 | Shimoga   | M   | 500000 | 8         | 4
(3 rows)
```

- Dept_locations table:

```
cs545=# insert into dept_locations_545 values(1,0);
INSERT 0 1
cs545=# insert into dept_locations_545 values(2,4);
INSERT 0 1
cs545=# insert into dept_locations_545 values(3,6);
INSERT 0 1
cs545=# select * from dept_locations_545;
 dnumber | dlocation
-----+-----
        1 |         0
        2 |         4
        3 |         6
(3 rows)
```

- Project table:

```
cs545=# insert into project_545 values('ML',901,'Bangalore',1);
INSERT 0 1
cs545=# insert into project_545 values('VLSI',902,'Chennai',2);
INSERT 0 1
cs545=# insert into project_545 values('CIS',903,'Pune',3);
INSERT 0 1
cs545=# select * from project_545;
 pname | pnumber | plocation | dnum
-----+-----+-----+-----
  ML   |     901 | Bangalore |    1
  VLSI  |     902 | Chennai  |    2
   CIS  |     903 | Pune     |    3
(3 rows)
```

- Works_on table:

```
cs545=# insert into works_on_545 values(6,901,1);
INSERT 0 1
cs545=# insert into works_on_545 values(7,902,100);
INSERT 0 1
cs545=# insert into works_on_545 values(8,903,10);
INSERT 0 1
cs545=# select * from works_on_545;
 essn | pno | hours
-----+-----+-----
     6 | 901 |     1
     7 | 902 |   100
     8 | 903 |    10
(3 rows)
```

- dependent table:

```
cs545=# insert into dependent_545 values(6,'Anushka','F',1955,'wife');
INSERT 0 1
cs545=# insert into dependent_545 values(7,'Ziva','F',2000,'daughter');
INSERT 0 1
cs545=# insert into dependent_545 values(7,'Sachin','M',2001,'brother');
INSERT 0 1
cs545=# select * from dependent_545;
 essn | dependent_name | sex | bdate | relationship
-----+-----+-----+-----+-----
    6 | Anushka        | F   | 1955 | wife
    7 | Ziva           | F   | 2000 | daughter
    7 | Sachin         | M   | 2001 | brother
(3 rows)
```

- Adding the foreign key constraints:

```
cs545=# alter table employee_545 add constraint fk1 foreign key(dno) references department_545(dnumber);
ERROR: insert or update on table "employee_545" violates foreign key constraint "fk1"
DETAIL: Key (dno)=(4) is not present in table "department_545".
cs545=# alter table department_545 add constraint fk2 foreign key(mgr_ssn) references employee_545(ssn);
ALTER TABLE
cs545=# alter table dept_locations_545 add constraint fk3 foreign key(dnumber) references department_545(dnumber);
ALTER TABLE
cs545=# alter table project_545 add constraint fk4 foreign key(dnum) references department_545(dnumber);
ALTER TABLE
cs545=# alter table works_on_545 add constraint fk5 foreign key(pno) references project_545(pnumber);
ERROR: there is no unique constraint matching given keys for referenced table "project_545"
cs545=# alter table works_on_545 add constraint fk6 foreign key(essn) references employee_545(ssn);
ALTER TABLE
cs545=# alter table dependent_545 add constraint fk7 foreign key(essn) references employee_545(ssn);
ALTER TABLE
cs545=# alter table employee_545 add constraint fk8 foreign key(super_ssn) references employee_545(ssn);
ALTER TABLE
cs545=#
```

Task2:

a) Drop and truncate:

```
cs545=# truncate dependent_545 cascade;  
TRUNCATE TABLE  
cs545=# drop table dependent_545;  
DROP TABLE  
cs545=#
```

b)

- Create views:

```
cs545=# create view ec_dept_students as select * from employee_545 where dno=2016;  
CREATE VIEW  
cs545=# select * from ec_dept_students ;  
  fname |  minit | lname | ssn | bdate | address | sex | salary | super_ssn | dno  
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----  
(0 rows)  
  
cs545=# create view ee_dept_students as select * from employee_545 where dno=2017;  
CREATE VIEW  
cs545=# select * from ee_dept_students ;  
  fname |  minit | lname | ssn | bdate | address | sex | salary | super_ssn | dno  
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----  
(0 rows)  
  
cs545=# create view cs_dept_students as select * from employee_545 where dno=2015;  
CREATE VIEW  
cs545=# select * from cs_dept_students ;  
  fname |  minit | lname | ssn | bdate | address | sex | salary | super_ssn | dno  
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----  
(0 rows)
```

- Drop views:

```
cs545=# drop view cs_dept_students;  
DROP VIEW  
cs545=# select * from cs_dept_students;  
ERROR:  relation "cs_dept_students" does not exist  
LINE 1: select * from cs_dept_students;  
                        ^  
cs545=#
```

c)

- Creating users and granting permissions:

```
cs545=# create user user1 with password 'user1' createdb;
CREATE ROLE
cs545=# create user user2 with password 'user2' createdb;
CREATE ROLE
cs545=# create user user3 with password 'user3' createdb;
CREATE ROLE
cs545=#
cs545=# grant select on employee_545 to user1;
GRANT
cs545=# grant insert on department_545 to user2;
GRANT
cs545=# grant all on all tables in schema public to user3;
GRANT
cs545=# create user user4 with password 'user4' createdb;
CREATE ROLE
cs545=# grant delete,update on project_545,dependent_545 to user4;
GRANT
cs545=# grant select on project_545,dependent_545 to user4;
GRANT
cs545=#
```

- User 1 has only select permission for employee table and hence can only perform select operation on the employee table.

```
postgres=> \c cs545
You are now connected to database "cs545" as user "user1".
cs545=> delete from dependent_545 where dependent_name='Anushka';
ERROR:  permission denied for table dependent_545
cs545=> update project_545 set pname = 'dl' where pnumber=901;
ERROR:  permission denied for table project_545
cs545=> update employee_545 set fname='Steve' where SSN=8;
ERROR:  permission denied for table employee_545
cs545=> select * from employee_545;
  fname |  init |  lname |  ssn |  bdate |  address | sex | salary | super_ssn | dno
-----+-----+-----+-----+-----+-----+---+-----+-----+----
Virat   | 0     | Kohli  | 6    | 1984   | Bangalore | M   | 300000 | 6          | 2
MS      | 0     | Dhoni  | 7    | 1985   | Ranchi    | M   | 400000 | 7          | 3
KL      | 0     | Rahul  | 8    | 1986   | Shimoga   | M   | 500000 | 8          | 4
(3 rows)

cs545=> select * from department_545;
ERROR:  permission denied for table department_545
cs545=> select * from employee_545 where ssn=6;
  fname |  init |  lname |  ssn |  bdate |  address | sex | salary | super_ssn | dno
-----+-----+-----+-----+-----+-----+---+-----+-----+----
Virat   | 0     | Kohli  | 6    | 1984   | Bangalore | M   | 300000 | 6          | 2
(1 row)

cs545=>
```

- User 2 has insert permissions on the employee table. But it throws an error as there are many foreign key constraints. It doesn't deny the permission to insert values.

```
postgres=> \c cs545
You are now connected to database "cs545" as user "user2".
cs545=> select * from department_545;
ERROR: permission denied for table department_545
cs545=> insert into department_545 values('ME',7,10,1995);
ERROR: insert or update on table "department_545" violates foreign key constraint "fk2"
DETAIL: Key is not present in table "employee_545".
cs545=>
```

- User 3 has all permissions on all tables.

```
postgres=> \c cs545
You are now connected to database "cs545" as user "user3".
cs545=> select * from project_545;
 pname | pnumber | plocation | dnum
-----+-----+-----+-----
 ML    |    901  | Bangalore |    1
 VLSI   |    902  | Chennai  |    2
 CIS    |    903  | Pune     |    3
(3 rows)

cs545=> select * from dependent_545;
 essn | dependent_name | sex | bdate | relationship
-----+-----+-----+-----+-----
  6   | Anushka        | F   | 1955  | wife
  7   | Ziva           | F   | 2000  | daughter
  7   | Sachin         | M   | 2001  | brother
(3 rows)
```

- User 4 has delete and update permissions on the project and dependent tables.

```
postgres=> \c cs545
You are now connected to database "cs545" as user "user4".
cs545=> update project_545 set pname='d1' where pnumber=901;
UPDATE 1
cs545=> select * from project_545;
 pname | pnumber | plocation | dnum
-----+-----+-----+-----
 VLSI   |    902  | Chennai  |    2
 CIS    |    903  | Pune     |    3
 d1     |    901  | Bangalore |    1
(3 rows)
```

d)

- Adding a new column to employee table.

Before:

```
cs545=# select * from project_545;
 pname | pnumber | plocation | dnum
-----+-----+-----+-----
 VLSI  |      902 | Chennai   |    2
 CIS   |      903 | Pune      |    3
 dl    |      901 | Bangalore |    1
(3 rows)
```

After adding new column('new_col'):

```
cs545=# alter table project_545 add column new_col int;
ALTER TABLE
cs545=# select * from project_545;
 pname | pnumber | plocation | dnum | new_col
-----+-----+-----+-----+-----
 VLSI  |      902 | Chennai   |    2 | 
 CIS   |      903 | Pune      |    3 | 
 dl    |      901 | Bangalore |    1 | 
(3 rows)
```

- Deleting a column ('new_col' here):

```
cs545=# alter table project_545 drop column new_col;
ALTER TABLE
cs545=# select * from project_545;
 pname | pnumber | plocation | dnum
-----+-----+-----+-----
 VLSI  |      902 | Chennai   |    2
 CIS   |      903 | Pune      |    3
 dl    |      901 | Bangalore |    1
(3 rows)
```