## Sheet 1

**NAME: ARNAB SEN**
**EN.NO: 510519006 (Gx)**
**SUBJECT: DBMS Lab**

# Assignment No: 1

# A. Creation of Tables:

## Creating depts table:

**query:**

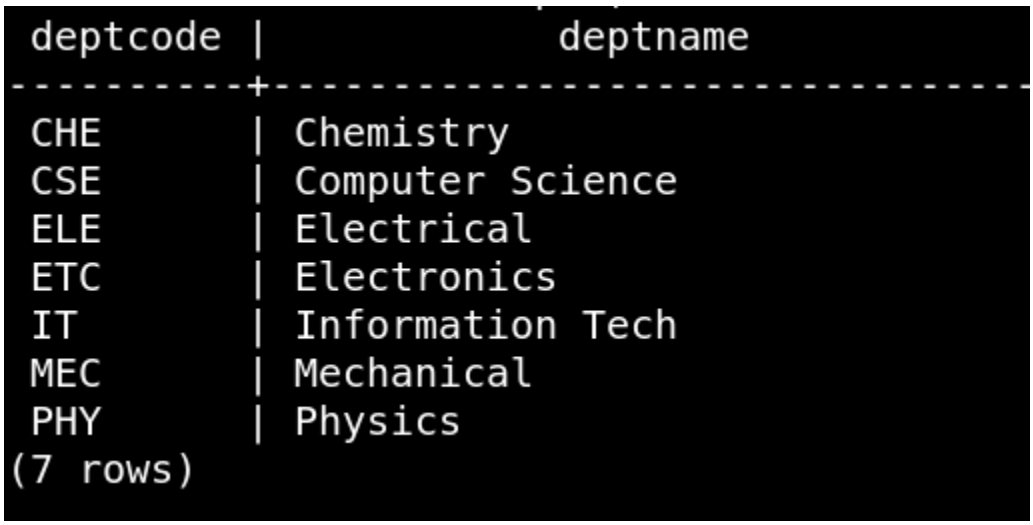
```
CREATE TABLE depts(
  deptcode char(3) PRIMARY KEY,
  deptname char(30) NOT NULL
);
```

```
lab=> \d depts
                  Table "public.depts"
  Column  |     Type      | Collation | Nullable | Default
----------+---------------+-----------+----------+---------
 deptcode | character(3)  |           | not null |
 deptname | character(30) |           | not null |
Indexes:
    "depts_pkey" PRIMARY KEY, btree (deptcode)
```

## Inserting into depts table

**query:**

```
INSERT INTO
  depts(deptcode, deptname)
VALUES
  ('CHE', 'Chemistry'),
  ('CSE', 'Computer Science'),
  ('ELE', 'Electrical'),
  ('ETC', 'Electronics'),
  ('IT', 'Information Tech'),
  ('MEC', 'Mechanical'),
  ('PHY', 'Physics');
```



```
 deptcode |            deptname
----------+--------------------------------
 CHE      | Chemistry
 CSE      | Computer Science
 ELE      | Electrical
 ETC      | Electronics
 IT       | Information Tech
 MEC      | Mechanical
 PHY      | Physics
(7 rows)
```

## Creation of students table:

**query:**

```
CREATE TABLE students(
  rollno numeric(8) PRIMARY KEY,
```

```
  name char(30),
  bdate date CHECK(bdate > date('1997-01-01')),
  deptcode char(3) REFERENCES depts(deptcode) ON DELETE CASCADE,
  hostel numeric CHECK(hostel < 10),
  parent_inc numeric(8, 1)
);
```

```
lab=> \d students
                Table "public.students"
   Column   |     Type      | Collation | Nullable | Default
------------+---------------+-----------+----------+---------
 rollno     | numeric(8,0)  |           | not null |
 name       | character(30) |           |          |
 bdate      | date          |           |          |
 deptcode   | character(3)  |           |          |
 hostel     | numeric       |           |          |
 parent_inc | numeric(8,1)  |           |          |
Indexes:
    "students_pkey" PRIMARY KEY, btree (rollno)
Check constraints:
    "students_bdate_check" CHECK (bdate > '1997-01-01'::date)
    "students_hostel_check" CHECK (hostel < 10::numeric)
Foreign-key constraints:
    "students_deptcode_fkey" FOREIGN KEY (deptcode) REFERENCES depts(deptcode) ON DELETE CASCADE
```

## Inserting into students table

**query:**

```
INSERT INTO students
VALUES      ( '51052985','Jayant','2000-01-01','MEC','1','8780000' );

INSERT INTO students
VALUES      ( '51054491','Shaan','2000-07-25','PHY','2','7460000' );

INSERT INTO students
VALUES      ( '51053017','Chirag','2000-02-03','IT','4','1140000' );

INSERT INTO students
VALUES      ( '51052423','Ehsaan','2000-03-23','ETC','3','5380000' );
```

```
INSERT INTO students
VALUES      ( '51051159','Shanaya','2000-12-03','ETC','6','6800000' );

INSERT INTO students
VALUES      ( '51058167','Divij','2000-02-14','CSE','6','6290000' );

INSERT INTO students
VALUES      ( '51055679','Seher','2000-04-03','ETC','8','5050000' );

INSERT INTO students
VALUES      ( '51055573','Parinaaz','2000-12-20','ELE','9','4850000' );

INSERT INTO students
VALUES      ( '51055787','Riya','2001-07-07','PHY','7','9810000' );

INSERT INTO students
VALUES      ( '51051803','Onkar','2001-07-11','ELE','7','8760000' );

INSERT INTO students
VALUES      ( '51056805','Yakshit','2001-03-19','ETC','9','2820000' );

INSERT INTO students
VALUES      ( '51050567','Ranbir','1999-11-25','ELE','4','5500000' );

INSERT INTO students
VALUES      ( '51054776','Divyansh','2001-04-14','ETC','7','8680000' );

INSERT INTO students
VALUES      ( '51051394','Aayush','2001-06-17','ETC','5','3440000' );

INSERT INTO students
VALUES      ( '51059691','Ayesha','2001-01-02','ETC','7','8710000' );
```

```
INSERT INTO students
VALUES      ( '51057039','Zain','2000-12-06','CHE','8','3330000' );

INSERT INTO students
VALUES      ( '51053522','Shanaya','2000-03-06','ELE','3','2900000' );

INSERT INTO students
VALUES      ( '51059658','Vihaan','2000-11-30','ELE','4','4800000' );

INSERT INTO students
VALUES      ( '51051337','Rania','1999-11-30','ETC','2','8030000' );

INSERT INTO students
VALUES      ( '51059178','Adah','2001-08-07','PHY','7','4620000' );

INSERT INTO students
VALUES      ( '51054427','Pranay','2000-04-13','CHE','1','3570000' );

INSERT INTO students
VALUES      ( '51050243','Elakshi','2000-11-09','CHE','9','5300000' );

INSERT INTO students
VALUES      ( '51054930','Vritika','2000-10-09','CHE','1','3880000' );

INSERT INTO students
VALUES      ( '51050736','Parinaaz','2000-06-22','ELE','1','3950000' );

INSERT INTO students
VALUES      ( '51052529','Rati','2000-04-24','MEC','8','6760000' );

INSERT INTO students
VALUES      ( '51050488','Hunar','2000-11-09','CHE','3','3020000' );

INSERT INTO students
```

```
VALUES      ( '51053419','Keya','2001-07-25','CSE','6','5570000' );

INSERT INTO students
VALUES      ( '51051744','Pari','2001-04-01','ETC','8','7820000' );

INSERT INTO students
VALUES      ( '51050192','Anay','2000-11-18','CHE','7','2500000' );

INSERT INTO students
VALUES      ( '51052466','Misha','2000-09-27','MEC','3','1820000' );
```

```
lab=> SELECT * FROM students;
  rollno  |              name               |   bdate    | deptcode | hostel | parent_inc
----------+---------------------------------+------------+----------+--------+------------
 51052985 | Jayant                          | 2000-01-01 | MEC      |      1 |  8780000.0
 51054491 | Shaan                           | 2000-07-25 | PHY      |      2 |  7460000.0
 51053017 | Chirag                          | 2000-02-03 | IT       |      4 |  1140000.0
 51052423 | Ehsaan                          | 2000-03-23 | ETC      |      3 |  5380000.0
 51051159 | Shanaya                         | 2000-12-03 | ETC      |      6 |  6800000.0
 51058167 | Divij                           | 2000-02-14 | CSE      |      6 |  6290000.0
 51055679 | Seher                           | 2000-04-03 | ETC      |      8 |  5050000.0
 51055573 | Parinaaz                        | 2000-12-20 | ELE      |      9 |  4850000.0
 51055787 | Riya                            | 2001-07-07 | PHY      |      7 |  9810000.0
 51051803 | Onkar                           | 2001-07-11 | ELE      |      7 |  8760000.0
 51056805 | Yakshit                         | 2001-03-19 | ETC      |      9 |  2820000.0
 51050567 | Ranbir                          | 1999-11-25 | ELE      |      4 |  5500000.0
 51054776 | Divyansh                        | 2001-04-14 | ETC      |      7 |  8680000.0
 51051394 | Aayush                          | 2001-06-17 | ETC      |      5 |  3440000.0
 51059691 | Ayesha                          | 2001-01-02 | ETC      |      7 |  8710000.0
 51057039 | Zain                            | 2000-12-06 | CHE      |      8 |  3330000.0
 51053522 | Shanaya                         | 2000-03-06 | ELE      |      3 |  2900000.0
 51059658 | Vihaan                          | 2000-11-30 | ELE      |      4 |  4800000.0
 51051337 | Rania                           | 1999-11-30 | ETC      |      2 |  8030000.0
 51059178 | Adah                            | 2001-08-07 | PHY      |      7 |  4620000.0
 51054427 | Pranay                          | 2000-04-13 | CHE      |      1 |  3570000.0
 51050243 | Elakshi                         | 2000-11-09 | CHE      |      9 |  5300000.0
 51054930 | Vritika                         | 2000-10-09 | CHE      |      1 |  3880000.0
 51050736 | Parinaaz                        | 2000-06-22 | ELE      |      1 |  3950000.0
 51052529 | Rati                            | 2000-04-24 | MEC      |      8 |  6760000.0
 51050488 | Hunar                           | 2000-11-09 | CHE      |      3 |  3020000.0
 51053419 | Keya                            | 2001-07-25 | CSE      |      6 |  5570000.0
 51051744 | Pari                            | 2001-04-01 | ETC      |      8 |  7820000.0
 51050192 | Anay                            | 2000-11-18 | CHE      |      7 |  2500000.0
 51052466 | Misha                           | 2000-09-27 | MEC      |      3 |  1820000.0
(30 rows)
```

## Creation of faculty table:

**query:**

```
CREATE TABLE faculty(
  fac_code char(8) PRIMARY KEY,
  fac_name char(30) NOT NULL,
  fac_dept char(3) REFERENCES depts(deptcode)
);
```

```
lab=> \d faculty
                Table "public.faculty"
  Column  |     Type      | Collation | Nullable | Default
----------+---------------+-----------+----------+---------
 fac_code | character(8)  |           | not null |
 fac_name | character(30) |           | not null |
 fac_dept | character(3)  |           |          |
Indexes:
    "faculty_pkey" PRIMARY KEY, btree (fac_code)
Foreign-key constraints:
    "faculty_fac_dept_fkey" FOREIGN KEY (fac_dept) REFERENCES depts(deptcode)
```

## Inserting into faculty table:

**query:**

```
INSERT INTO faculty
VALUES      ('CHE_F1','Samiha','CHE');

INSERT INTO faculty
VALUES      ('CHE_F2','Aayush','CHE');

INSERT INTO faculty
VALUES      ('CSE_F1','Anya','CSE');
```

```
INSERT INTO faculty
VALUES      ('CSE_F2','Aaryahi','CSE');

INSERT INTO faculty
VALUES      ('ELE_F1','Hrishita','ELE');

INSERT INTO faculty
VALUES      ('ELE_F2','Shlok','ELE');

INSERT INTO faculty
VALUES      ('ETC_F1','Nakul','ETC');

INSERT INTO faculty
VALUES      ('ETC_F2','Vanya','ETC');

INSERT INTO faculty
VALUES      ('IT_F1','Kiaan','IT');

INSERT INTO faculty
VALUES      ('IT_F2','Suhana','IT');

INSERT INTO faculty
VALUES      ('PHY_F1','Advik','PHY');

INSERT INTO faculty
VALUES      ('PHY_F2','Rati','PHY');

INSERT INTO faculty
VALUES      ('MEC_F1','Sahil','MEC');

INSERT INTO faculty
VALUES      ('MEC_F2','Siya','MEC');
```

```
lab=> SELECT * FROM faculty;
 fac_code |            fac_name             | fac_dept
----------+---------------------------------+----------
 CHE_F1   | Samiha                          | CHE
 CHE_F2   | Aayush                          | CHE
 CSE_F1   | Anya                            | CSE
 CSE_F2   | Aaryahi                         | CSE
 ELE_F1   | Hrishita                        | ELE
 ELE_F2   | Shlok                           | ELE
 ETC_F1   | Nakul                           | ETC
 ETC_F2   | Vanya                           | ETC
 IT_F1    | Kiaan                           | IT
 IT_F2    | Suhana                          | IT
 PHY_F1   | Advik                           | PHY
 PHY_F2   | Rati                            | PHY
 MEC_F1   | Sahil                           | MEC
 MEC_F2   | Siya                            | MEC
(14 rows)
```

## Creation of crs_offrd table:

**query:**

```
CREATE TABLE crs_offrd(
  crs_code char(5) PRIMARY KEY,
  crs_name char(35) NOT NULL,
  crs_credits numeric(2, 1),
  crs_fac_cd char(8) REFERENCES faculty(fac_code)
);
```

```
lab=> \d crs_offrd
                Table "public.crs_offrd"
   Column    |     Type      | Collation | Nullable | Default
-------------+---------------+-----------+----------+---------
 crs_code    | character(5)  |           | not null |
 crs_name    | character(35) |           | not null |
 crs_credits | numeric(2,1)  |           |          |
 crs_fac_cd  | character(8)  |           |          |
Indexes:
    "crs_offrd_pkey" PRIMARY KEY, btree (crs_code)
Foreign-key constraints:
    "crs_offrd_crs_fac_cd_fkey" FOREIGN KEY (crs_fac_cd) REFERENCES faculty(fac_code)
```

## Inserting into crs_offrd table:

**query:**

```
INSERT INTO crs_offrd
VALUES      ('CSE_1','CSE Course 1',4,'CSE_F1');

INSERT INTO crs_offrd
VALUES      ('CSE_2','CSE Course 2',5,'CSE_F2');

INSERT INTO crs_offrd
VALUES      ('CSE_3','CSE Course 3',6,'CSE_F1');

INSERT INTO crs_offrd
VALUES      ('CSE_4','CSE Course 4',7,'CSE_F2');

INSERT INTO crs_offrd
VALUES      ('CHE_1','CHE Course 1',4,'CHE_F1');

INSERT INTO crs_offrd
VALUES      ('CHE_2','CHE Course 2',5,'CHE_F2');

INSERT INTO crs_offrd
VALUES      ('CHE_3','CHE Course 3',6,'CHE_F1');
```

```
INSERT INTO crs_offrd
VALUES      ('CHE_4','CHE Course 4',7,'CHE_F2');

INSERT INTO crs_offrd
VALUES      ('ETC_1','ETC Course 1',4,'ETC_F1');

INSERT INTO crs_offrd
VALUES      ('ETC_2','ETC Course 2',5,'ETC_F2');

INSERT INTO crs_offrd
VALUES      ('ETC_3','ETC Course 3',6,'ETC_F1');

INSERT INTO crs_offrd
VALUES      ('ETC_4','ETC Course 4',7,'ETC_F2');

INSERT INTO crs_offrd
VALUES      ('ELE_1','ELE Course 1',4,'ELE_F1');

INSERT INTO crs_offrd
VALUES      ('ELE_2','ELE Course 2',5,'ELE_F2');

INSERT INTO crs_offrd
VALUES      ('ELE_3','ELE Course 3',6,'ELE_F1');

INSERT INTO crs_offrd
VALUES      ('ELE_4','ELE Course 4',7,'ELE_F2');

INSERT INTO crs_offrd
VALUES      ('IT_1','IT Course 1',6,'IT_F1');

INSERT INTO crs_offrd
VALUES      ('IT_2','IT Course 2',7,'IT_F2');
```

```
INSERT INTO crs_offrd
VALUES      ('IT_3','IT Course 3',5,'IT_F1');

INSERT INTO crs_offrd
VALUES      ('IT_4','IT Course 4',4,'IT_F2');

INSERT INTO crs_offrd
VALUES      ('MEC_1','MEC Course 1',6,'MEC_F1');

INSERT INTO crs_offrd
VALUES      ('MEC_2','MEC Course 2',4,'MEC_F2');

INSERT INTO crs_offrd
VALUES      ('MEC_3','MEC Course 3',5,'MEC_F1');

INSERT INTO crs_offrd
VALUES      ('MEC_4','MEC Course 4',7,'MEC_F2');

INSERT INTO crs_offrd
VALUES      ('PHY_1','PHY Course 1',6,'PHY_F1');

INSERT INTO crs_offrd
VALUES      ('PHY_2','PHY Course 2',4,'PHY_F2');

INSERT INTO crs_offrd
VALUES      ('PHY_3','PHY Course 3',5,'PHY_F1');

INSERT INTO crs_offrd
VALUES      ('PHY_4','PHY Course 4',7,'PHY_F2');
```

```
lab=> SELECT * FROM crs_offrd;
 crs_code |              crs_name               | crs_credits | crs_fac_cd
----------+-------------------------------------+-------------+------------
 CSE_1    | CSE Course 1                        |         4.0 | CSE_F1
 CSE_2    | CSE Course 2                        |         5.0 | CSE_F2
 CSE_3    | CSE Course 3                        |         6.0 | CSE_F1
 CSE_4    | CSE Course 4                        |         7.0 | CSE_F2
 CHE_1    | CHE Course 1                        |         4.0 | CHE_F1
 CHE_2    | CHE Course 2                        |         5.0 | CHE_F2
 CHE_3    | CHE Course 3                        |         6.0 | CHE_F1
 CHE_4    | CHE Course 4                        |         7.0 | CHE_F2
 ETC_1    | ETC Course 1                        |         4.0 | ETC_F1
 ETC_2    | ETC Course 2                        |         5.0 | ETC_F2
 ETC_3    | ETC Course 3                        |         6.0 | ETC_F1
 ETC_4    | ETC Course 4                        |         7.0 | ETC_F2
 ELE_1    | ELE Course 1                        |         4.0 | ELE_F1
 ELE_2    | ELE Course 2                        |         5.0 | ELE_F2
 ELE_3    | ELE Course 3                        |         6.0 | ELE_F1
 ELE_4    | ELE Course 4                        |         7.0 | ELE_F2
 IT_1     | IT Course 1                         |         6.0 | IT_F1
 IT_2     | IT Course 2                         |         7.0 | IT_F2
 IT_3     | IT Course 3                         |         5.0 | IT_F1
 IT_4     | IT Course 4                         |         4.0 | IT_F2
 MEC_1    | MEC Course 1                        |         6.0 | MEC_F1
 MEC_2    | MEC Course 2                        |         4.0 | MEC_F2
 MEC_3    | MEC Course 3                        |         5.0 | MEC_F1
 MEC_4    | MEC Course 4                        |         7.0 | MEC_F2
 PHY_1    | PHY Course 1                        |         6.0 | PHY_F1
 PHY_2    | PHY Course 2                        |         4.0 | PHY_F2
 PHY_3    | PHY Course 3                        |         5.0 | PHY_F1
 PHY_4    | PHY Course 4                        |         7.0 | PHY_F2
(28 rows)
```

## Creation of of crs_regd table:

**query:**

```
CREATE TABLE crs_regd(
  crs_rollno numeric(8) REFERENCES students(rollno),
  crs_cd char(5) REFERENCES crs_offrd(crs_code),
  marks numeric(5, 2),
```

```
  PRIMARY KEY(crs_rollno, crs_cd)
);
```

```
lab=> \d crs_regd
                Table "public.crs_regd"
   Column   |     Type     | Collation | Nullable | Default
------------+--------------+-----------+----------+---------
 crs_rollno | numeric(8,0) |           | not null |
 crs_cd     | character(5) |           | not null |
 marks      | numeric(5,2) |           |          |
Indexes:
    "crs_regd_pkey" PRIMARY KEY, btree (crs_rollno, crs_cd)
Foreign-key constraints:
    "crs_regd_crs_cd_fkey" FOREIGN KEY (crs_cd) REFERENCES crs_offrd(crs_code)
    "crs_regd_crs_rollno_fkey" FOREIGN KEY (crs_rollno) REFERENCES students(rollno)
```

## Inserting into crs_regd table:

**query:**

```
INSERT INTO crs_regd
VALUES      ('51052985','MEC_1',100);

INSERT INTO crs_regd
VALUES      ('51052985','MEC_2',71);

INSERT INTO crs_regd
VALUES      ('51052985','MEC_3',93);

INSERT INTO crs_regd
VALUES      ('51052985','MEC_4',84);

INSERT INTO crs_regd
VALUES      ('51052985','ETC_1',77);

INSERT INTO crs_regd
VALUES      ('51052985','ELE_2',74);
```

```
INSERT INTO crs_regd
VALUES      ('51054491','PHY_1',73);

INSERT INTO crs_regd
VALUES      ('51054491','PHY_2',81);

INSERT INTO crs_regd
VALUES      ('51054491','PHY_3',89);

INSERT INTO crs_regd
VALUES      ('51054491','PHY_4',74);

INSERT INTO crs_regd
VALUES      ('51054491','ELE_1',73);
```

| crs_rollno | crs_cd | marks |
|---|---|---|
| 51052985 | MEC_1 | 100.00 |
| 51052985 | MEC_2 | 71.00 |
| 51052985 | MEC_3 | 93.00 |
| 51052985 | MEC_4 | 84.00 |
| 51052985 | ETC_1 | 77.00 |
| 51052985 | ELE_2 | 74.00 |
| 51054491 | PHY_1 | 73.00 |
| 51054491 | PHY_2 | 81.00 |
| 51054491 | PHY_3 | 89.00 |
| 51054491 | PHY_4 | 74.00 |
| 51054491 | ELE_1 | 73.00 |
| 51054491 | CHE_2 | 79.00 |
| 51053017 | IT_1 | 76.00 |
| 51053017 | IT_2 | 72.00 |
| 51053017 | IT_3 | 86.00 |
| 51053017 | IT_4 | 92.00 |
| 51053017 | MEC_1 | 70.00 |
| 51053017 | PHY_2 | 98.00 |

**Note:** For the above table **crs_regd** I have populated the table with a lot of data, but have mentioned only a few queries. The other queries have the same format just the values are a bit different.

# B. Queries and their Solutions:

## 1. Try inserting records that violate the constraints:

### 1. Trying to insert rows with duplicate keys

```
lab=> INSERT INTO
  depts
VALUES
  ('CSE', 'Computer Science');
ERROR:  duplicate key value violates unique constraint "depts_pkey"
DETAIL:  Key (deptcode)=(CSE) already exists.
```

**Explanation: deptcode** is a primary key and hence it has to be UNIQUE. Here, I was trying to insert another record with the same **deptcode** and hence showed the error "Key already exists".

### 2. Violating NOT NULL constraint

```
lab=> INSERT INTO
  depts
VALUES
  ('ABC', Null);
ERROR:  null value in column "deptname" violates not-null constraint
DETAIL:  Failing row contains (ABC, null).
```

**Explanation: deptname** has a NOT NULL constraint which means it must always have a value. Here I was trying to insert a record where **deptname** was NULL and hence we get a "violates not-null constraint" error.

**3. Violating size constraint**

```
lab=> INSERT INTO
  depts
VALUES
  ('ABC', 'aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa');
ERROR:  value too long for type character(30)
```

**Explanation: deptname** has a size constraint of max 30. Here, I was trying to insert a record where **deptname** is longer than 30 chars and hence gives the error "value too long".

## 2. Delete records from dept where deptcode='CSE'. (This deletes records from students whose deptcode='CSE')

**query:**

```
DELETE FROM
  depts
WHERE
  deptcode = 'CSE';
```

**Before Deleting**

**dept table**

```
 deptcode |            deptname
----------+--------------------------------
 CHE      | Chemistry
 CSE      | Computer Science
 ELE      | Electrical
 ETC      | Electronics
 IT       | Information Tech
 MEC      | Mechanical
 PHY      | Physics
(7 rows)
```

**students table (displaying those with deptcode='CSE')**

```
lab=> SELECT * FROM students WHERE deptcode='CSE';
  rollno  |             name             |   bdate    | deptcode | hostel | parent_inc
----------+------------------------------+------------+----------+--------+------------
 51058167 | Divij                        | 2000-02-14 | CSE      |      6 |  6290000.0
 51053419 | Keya                         | 2001-07-25 | CSE      |      6 |  5570000.0
(2 rows)
```

**<u>After Deleting</u>**

**dept table**

```
 deptcode |            deptname
----------+--------------------------------
 CHE      | Chemistry
 ELE      | Electrical
 ETC      | Electronics
 IT       | Information Tech
 MEC      | Mechanical
 PHY      | Physics
(6 rows)
```

**students table (displaying those with deptcode='CSE')**

```
lab=> SELECT * FROM students WHERE deptcode='CSE';
 rollno | name | bdate | deptcode | hostel | parent_inc
--------+------+-------+----------+--------+------------
(0 rows)

lab=> SELECT * FROM students;
  rollno  |              name               |   bdate    | deptcode | hostel | parent_inc
----------+---------------------------------+------------+----------+--------+------------
 51052985 | Jayant                          | 2000-01-01 | MEC      |      1 |  8780000.0
 51054491 | Shaan                           | 2000-07-25 | PHY      |      2 |  7460000.0
 51053017 | Chirag                          | 2000-02-03 | IT       |      4 |  1140000.0
 51052423 | Ehsaan                          | 2000-03-23 | ETC      |      3 |  5380000.0
 51051159 | Shanaya                         | 2000-12-03 | ETC      |      6 |  6800000.0
 51055679 | Seher                           | 2000-04-03 | ETC      |      8 |  5050000.0
 51055573 | Parinaaz                        | 2000-12-20 | ELE      |      9 |  4850000.0
 51055787 | Riya                            | 2001-07-07 | PHY      |      7 |  9810000.0
 51051803 | Onkar                           | 2001-07-11 | ELE      |      7 |  8760000.0
 51056805 | Yakshit                         | 2001-03-19 | ETC      |      9 |  2820000.0
 51050567 | Ranbir                          | 1999-11-25 | ELE      |      4 |  5500000.0
 51054776 | Divyansh                        | 2001-04-14 | ETC      |      7 |  8680000.0
 51051394 | Aayush                          | 2001-06-17 | ETC      |      5 |  3440000.0
 51059691 | Ayesha                          | 2001-01-02 | ETC      |      7 |  8710000.0
 51057039 | Zain                            | 2000-12-06 | CHE      |      8 |  3330000.0
 51053522 | Shanaya                         | 2000-03-06 | ELE      |      3 |  2900000.0
 51059658 | Vihaan                          | 2000-11-30 | ELE      |      4 |  4800000.0
 51051337 | Rania                           | 1999-11-30 | ETC      |      2 |  8030000.0
 51059178 | Adah                            | 2001-08-07 | PHY      |      7 |  4620000.0
 51054427 | Pranay                          | 2000-04-13 | CHE      |      1 |  3570000.0
 51050243 | Elakshi                         | 2000-11-09 | CHE      |      9 |  5300000.0
 51054930 | Vritika                         | 2000-10-09 | CHE      |      1 |  3880000.0
 51050736 | Parinaaz                        | 2000-06-22 | ELE      |      1 |  3950000.0
 51052529 | Rati                            | 2000-04-24 | MEC      |      8 |  6760000.0
 51050488 | Hunar                           | 2000-11-09 | CHE      |      3 |  3020000.0
 51051744 | Pari                            | 2001-04-01 | ETC      |      8 |  7820000.0
 51050192 | Anay                            | 2000-11-18 | CHE      |      7 |  2500000.0
 51052466 | Misha                           | 2000-09-27 | MEC      |      3 |  1820000.0
(28 rows)
```

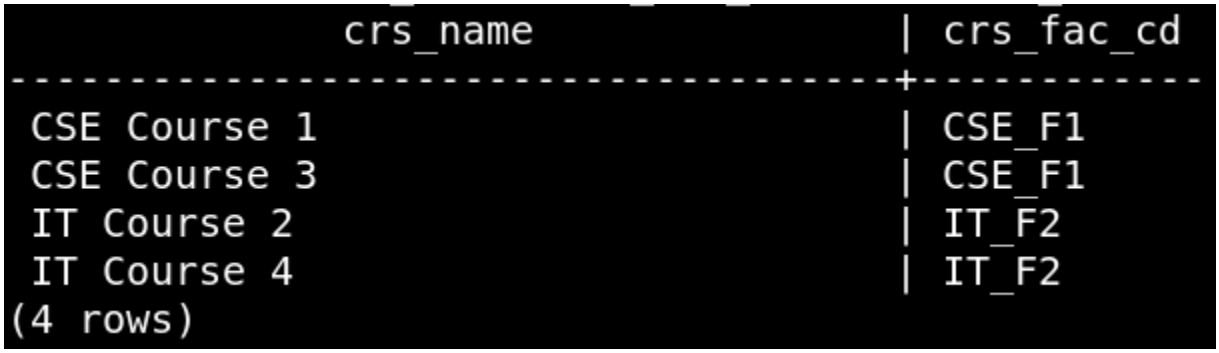
After the delete operation, the record containing **deptcode='CSE'** are deleted from the **depts** table. The records having **deptcode** as **'CSE'** are also deleted from the table students as deptcode is the foreign key in table students referring to the deptcode of table depts and on delete cascading occurs.

## 3. Find out the courses offered by the faculty dbp and nls.

Since I have used different faculty codes so I have replaced **dbp** with **CSE_F1** and **nls** with **IT_F2.**

**query:**

```
SELECT
  crs_name,
  crs_fac_cd
FROM
  crs_offrd
WHERE
  crs_fac_cd = 'CSE_F1'
  OR crs_fac_cd = 'IT_F2';
```



```
             crs_name              | crs_fac_cd
-----------------------------------+------------
 CSE Course 1                      | CSE_F1
 CSE Course 3                      | CSE_F1
 IT Course 2                       | IT_F2
 IT Course 4                       | IT_F2
(4 rows)
```

**Explanation:** We are displaying only two attributes course name and course faculty code so we have specified that under SELECT. And since we will have to find all the courses we are using an OR logical operator.

## 4. Find out the courses with full details offered by dbp.

Since I have used different faculty codes so I have replaced **dbp** with **CSE_F1**.

**query:**

```
SELECT
```

```
  *
FROM
  crs_offrd
WHERE
  crs_fac_cd = 'CSE_F1';
```

```
 crs_code |              crs_name               | crs_credits | crs_fac_cd
----------+-------------------------------------+-------------+------------
 CSE_1    | CSE Course 1                        |         4.0 | CSE_F1
 CSE_3    | CSE Course 3                        |         6.0 | CSE_F1
(2 rows)
```

**Explanation:** We had to display every attribute so I used SELECT * and in the WHERE clause I specified the condition that the course faculty code must be CSE_F1.

## 5. Get the courses the credits of which lie between 4.0 and 6.0.

**query:**

```
SELECT
  *
FROM
  crs_offrd
WHERE
  crs_credits > 4.0
  AND crs_credits < 6.0;
```

```
lab=> SELECT * FROM crs_offrd WHERE crs_credits > 4.0 AND crs_credits < 6.0;
 crs_code |              crs_name               | crs_credits | crs_fac_cd
----------+-------------------------------------+-------------+------------
 CSE_2    | CSE Course 2                        |         5.0 | CSE_F2
 CHE_2    | CHE Course 2                        |         5.0 | CHE_F2
 ETC_2    | ETC Course 2                        |         5.0 | ETC_F2
 ELE_2    | ELE Course 2                        |         5.0 | ELE_F2
 IT_3     | IT Course 3                         |         5.0 | IT_F1
 MEC_3    | MEC Course 3                        |         5.0 | MEC_F1
 PHY_3    | PHY Course 3                        |         5.0 | PHY_F1
(7 rows)
```

**Explanation:** Since we had two conditions so we used the AND operator to specify that we need those courses whose credits lie in the range 4.0 and 6.0.

## 6. Get the courses the credits of which are > 6.5.

**query:**

```
SELECT
  *
FROM
  crs_offrd
WHERE
  crs_credits > 6.5;
```

```
lab=> SELECT * FROM crs_offrd WHERE crs_credits > 6.5;
 crs_code |              crs_name               | crs_credits | crs_fac_cd
----------+-------------------------------------+-------------+------------
 CSE_4    | CSE Course 4                        |         7.0 | CSE_F2
 CHE_4    | CHE Course 4                        |         7.0 | CHE_F2
 ETC_4    | ETC Course 4                        |         7.0 | ETC_F2
 ELE_4    | ELE Course 4                        |         7.0 | ELE_F2
 IT_2     | IT Course 2                         |         7.0 | IT_F2
 MEC_4    | MEC Course 4                        |         7.0 | MEC_F2
 PHY_4    | PHY Course 4                        |         7.0 | PHY_F2
(7 rows)
```

**Explanation:** Here we just have one condition that the crs_credits must be greater than 6.5.

# Assignment No: 2

## 1. Count the number of students in the CSE dept.

**query:**

```
SELECT
  COUNT(*)
FROM
  students
WHERE
  deptcode = 'CSE';
```

```
 count
-------
     2
(1 row)
```

**Explanation:** Since we need the count of the students I used the COUNT keyword, also there is a condition that the student must be in the CSE dept so, I added the WHERE clause specifying that deptcode must be equal to CSE.

## 2. Determine the minimum, maximum, and average marks of each course.

**query:**

```
SELECT
  crs_cd,
  crs_name,
  MIN(marks) AS min_marks,
```

```
  MAX(marks) AS max_marks,
  AVG(marks) AS avg_marks
FROM
  crs_regd,
  crs_offrd
WHERE
  crs_cd = crs_code
GROUP BY
  crs_cd,
  crs_name;
```

| crs_cd | crs_name | min_marks | max_marks | avg_marks |
|---|---|---|---|---|
| ELE_2 | ELE Course 2 | 71.00 | 99.00 | 88.4615384615384615 |
| IT_4 | IT Course 4 | 92.00 | 92.00 | 92.0000000000000000 |
| ELE_4 | ELE Course 4 | 73.00 | 97.00 | 85.3333333333333333 |
| MEC_1 | MEC Course 1 | 70.00 | 100.00 | 81.2500000000000000 |
| ETC_2 | ETC Course 2 | 71.00 | 98.00 | 82.1538461538461538 |
| PHY_3 | PHY Course 3 | 71.00 | 89.00 | 82.0000000000000000 |
| CSE_2 | CSE Course 2 | 74.00 | 97.00 | 88.0000000000000000 |
| MEC_4 | MEC Course 4 | 76.00 | 92.00 | 84.0000000000000000 |
| PHY_4 | PHY Course 4 | 74.00 | 89.00 | 79.0000000000000000 |
| CHE_3 | CHE Course 3 | 72.00 | 99.00 | 91.8333333333333333 |
| CSE_3 | CSE Course 3 | 79.00 | 93.00 | 86.0000000000000000 |
| CSE_4 | CSE Course 4 | 83.00 | 94.00 | 88.5000000000000000 |
| CHE_1 | CHE Course 1 | 72.00 | 86.00 | 78.5714285714285714 |
| IT_1 | IT Course 1 | 76.00 | 96.00 | 85.5714285714285714 |
| CHE_2 | CHE Course 2 | 79.00 | 96.00 | 88.0000000000000000 |
| ELE_1 | ELE Course 1 | 70.00 | 99.00 | 83.3000000000000000 |
| PHY_1 | PHY Course 1 | 71.00 | 94.00 | 81.5000000000000000 |
| IT_3 | IT Course 3 | 86.00 | 86.00 | 86.0000000000000000 |
| CHE_4 | CHE Course 4 | 74.00 | 97.00 | 82.1666666666666667 |
| ETC_3 | ETC Course 3 | 71.00 | 95.00 | 80.4444444444444444 |
| MEC_2 | MEC Course 2 | 71.00 | 98.00 | 86.0000000000000000 |
| PHY_2 | PHY Course 2 | 75.00 | 98.00 | 84.2857142857142857 |
| MEC_3 | MEC Course 3 | 87.00 | 93.00 | 90.6666666666666667 |
| ETC_1 | ETC Course 1 | 71.00 | 99.00 | 82.8750000000000000 |
| CSE_1 | CSE Course 1 | 75.00 | 99.00 | 83.6666666666666667 |
| ETC_4 | ETC Course 4 | 71.00 | 99.00 | 85.4444444444444444 |
| IT_2 | IT Course 2 | 72.00 | 94.00 | 78.5000000000000000 |
| ELE_3 | ELE Course 3 | 77.00 | 100.00 | 87.3333333333333333 |

(28 rows)

## 3. Determine the total credits of the courses registered by a student.

**query:**

```
SELECT
  crs_rollno,
  SUM(crs_credits)
FROM
  crs_regd,
  crs_offrd
WHERE
  crs_cd = crs_code
GROUP BY
  crs_rollno;
```

| crs_rollno | sum |
|---|---|
| 51054491 | 31.0 |
| 51059691 | 31.0 |
| 51054776 | 31.0 |
| 51050488 | 31.0 |
| 51052985 | 31.0 |
| 51059178 | 30.0 |
| 51052423 | 33.0 |
| 51053419 | 30.0 |
| 51056805 | 32.0 |
| 51050192 | 32.0 |
| 51057039 | 31.0 |
| 51054930 | 30.0 |
| 51051394 | 32.0 |
| 51054427 | 35.0 |
| 51055573 | 33.0 |
| 51051159 | 33.0 |
| 51050567 | 32.0 |
| 51059658 | 31.0 |
| 51053017 | 32.0 |
| 51052529 | 31.0 |
| 51055787 | 31.0 |
| 51051744 | 35.0 |
| 51058167 | 32.0 |
| 51050243 | 33.0 |
| 51052466 | 33.0 |
| 51050736 | 32.0 |
| 51055679 | 33.0 |
| 51051337 | 33.0 |
| 51053522 | 31.0 |
| 51051803 | 33.0 |

(30 rows)

## 4. Count the number of students in each hostel whose department is CSE.

**query:**

```
SELECT
  hostel,
  COUNT(*)
```

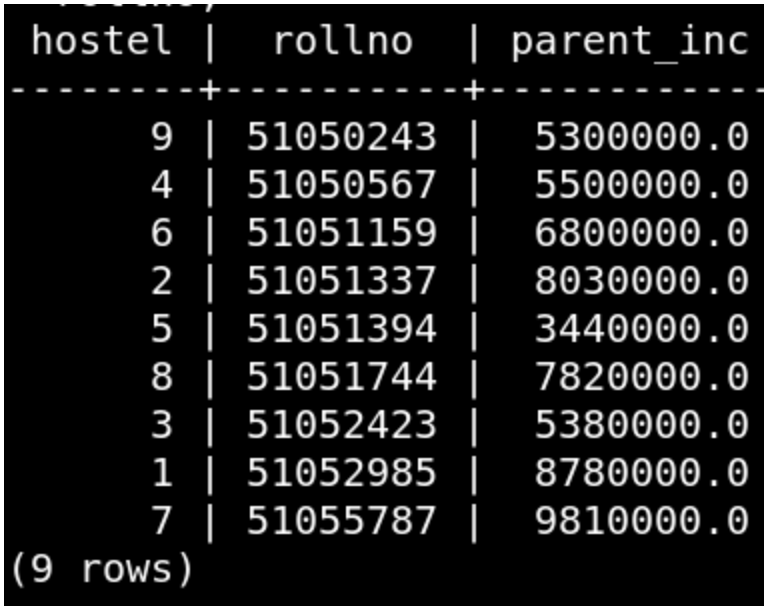
```
FROM
  students
WHERE
  deptcode = 'CSE'
GROUP BY
  hostel;
```

```
 hostel | count
--------+-------
      6 |     2
(1 row)
```

## 5. Display the hostel,rollno,parent_inc of the student who has the max(parent_inc) in a hostel.

**query:**

```
SELECT
  DISTINCT hostel,
  rollno,
  parent_inc
FROM
  students a
WHERE
  parent_inc = (
    SELECT
      max(parent_inc)
    FROM
      students b
    WHERE
      b.hostel = a.hostel
  );
```



| hostel | rollno | parent_inc |
|---|---|---|
| 9 | 51050243 | 5300000.0 |
| 4 | 51050567 | 5500000.0 |
| 6 | 51051159 | 6800000.0 |
| 2 | 51051337 | 8030000.0 |
| 5 | 51051394 | 3440000.0 |
| 8 | 51051744 | 7820000.0 |
| 3 | 51052423 | 5380000.0 |
| 1 | 51052985 | 8780000.0 |
| 7 | 51055787 | 9810000.0 |

(9 rows)

## 5. Display the name and parental income of each student greater than the parental income of some rollno 51054427.

P.S I have used the roll number 51054427.

**query:**

```
SELECT
  name,
  parent_inc
FROM
  students
WHERE
  parent_inc > (
    SELECT
      parent_inc
    FROM
      students
    WHERE
      rollno = 51054427
  )
ORDER BY
```

```
  parent_inc;
```

| name | parent_inc |
|---|---|
| Vritika | 3880000.0 |
| Parinaaz | 3950000.0 |
| Adah | 4620000.0 |
| Vihaan | 4800000.0 |
| Parinaaz | 4850000.0 |
| Seher | 5050000.0 |
| Elakshi | 5300000.0 |
| Ehsaan | 5380000.0 |
| Ranbir | 5500000.0 |
| Keya | 5570000.0 |
| Divij | 6290000.0 |
| Rati | 6760000.0 |
| Shanaya | 6800000.0 |
| Shaan | 7460000.0 |
| Pari | 7820000.0 |
| Rania | 8030000.0 |
| Divyansh | 8680000.0 |
| Ayesha | 8710000.0 |
| Onkar | 8760000.0 |
| Jayant | 8780000.0 |
| Riya | 9810000.0 |

(21 rows)

## 6. Find out marks of students who have marks more than rollno 51052985 for course ETC_1 and MEC_4.

**query:**

```
SELECT
  *
FROM
  crs_regd
```

```
WHERE
  marks > (
    SELECT
      marks
    FROM
      crs_regd
    WHERE
      crs_rollno = 51052985
      AND crs_cd = 'ETC_1'
  )
  AND crs_cd = 'ETC_1'
UNION
SELECT
  *
FROM
  crs_regd
WHERE
  marks > (
    SELECT
      marks
    FROM
      crs_regd
    WHERE
      crs_rollno = 51052985
      AND crs_cd = 'MEC_4'
  )
  AND crs_cd = 'MEC_4';
```

| crs_rollno | crs_cd | marks |
|---|---|---|
| 51053419 | ETC_1 | 95.00 |
| 51052529 | MEC_4 | 92.00 |
| 51051337 | ETC_1 | 80.00 |
| 51056805 | ETC_1 | 82.00 |
| 51055679 | ETC_1 | 88.00 |
| 51052423 | ETC_1 | 92.00 |
| 51051744 | ETC_1 | 82.00 |
| 51057039 | ETC_1 | 80.00 |
| 51051159 | ETC_1 | 91.00 |
| 51054930 | ETC_1 | 99.00 |
| 51059691 | ETC_1 | 84.00 |
| 51050488 | ETC_1 | 85.00 |

(12 rows)

# Assignment No: 3

## 1. List students (rollno,name,deptcode) registered for course EE101.

**query:**

```
SELECT
  rollno,
  name,
  deptcode
FROM
  students,
  crs_regd
WHERE
  rollno = crs_rollno
```

```
  AND crs_cd = 'ETC_1';
```

```
  rollno  |              name               | deptcode
----------+---------------------------------+----------
 51052985 | Jayant                          | MEC
 51052423 | Ehsaan                          | ETC
 51051159 | Shanaya                         | ETC
 51055679 | Seher                           | ETC
 51056805 | Yakshit                         | ETC
 51054776 | Divyansh                        | ETC
 51051394 | Aayush                          | ETC
 51059691 | Ayesha                          | ETC
 51057039 | Zain                            | CHE
 51059658 | Vihaan                          | ELE
 51051337 | Rania                           | ETC
 51054930 | Vritika                         | CHE
 51052529 | Rati                            | MEC
 51050488 | Hunar                           | CHE
 51053419 | Keya                            | CSE
 51051744 | Pari                            | ETC
(16 rows)
```

## 2. List students (rollno,name) in ELE dept registered for course EE101.

**query:**

```
SELECT
  rollno,
  name,
  deptcode
FROM
  students,
  crs_regd
WHERE
  rollno = crs_rollno
```

```
  AND crs_cd = 'ETC_1'
  AND deptcode = 'ETC';
```

```
 rollno  |              name                | deptcode
---------+----------------------------------+----------
 51052423 | Ehsaan                          | ETC
 51051159 | Shanaya                         | ETC
 51055679 | Seher                           | ETC
 51056805 | Yakshit                         | ETC
 51054776 | Divyansh                        | ETC
 51051394 | Aayush                          | ETC
 51059691 | Ayesha                          | ETC
 51051337 | Rania                           | ETC
 51051744 | Pari                            | ETC
(9 rows)
```

## 3. List students (rollno,name) in ELE dept not registered for course EE101.

**query:**

```
SELECT
  rollno,
  name,
  deptcode
FROM
  students,
  crs_regd
WHERE
  rollno = crs_rollno
  AND crs_cd = 'ETC_1'
  AND NOT deptcode = 'ETC';
```

| rollno | name | deptcode |
|---|---|---|
| 51052985 | Jayant | MEC |
| 51057039 | Zain | CHE |
| 51059658 | Vihaan | ELE |
| 51054930 | Vritika | CHE |
| 51052529 | Rati | MEC |
| 51050488 | Hunar | CHE |
| 51053419 | Keya | CSE |

(7 rows)

## 4. List the names of the students who have registered for both the courses 'ETC Course 2' and 'ETC Course 3'.

**query:**

```
SELECT
  name
FROM
  students,
  crs_regd,
  crs_offrd
WHERE
  rollno = crs_rollno
  AND crs_cd = crs_code
  AND crs_name = 'ETC Course 2'
INTERSECT
SELECT
  name
FROM
  students,
  crs_regd,
  crs_offrd
WHERE
```

```
  rollno = crs_rollno
  AND crs_cd = crs_code
  AND crs_name = 'ETC Course 3';
```

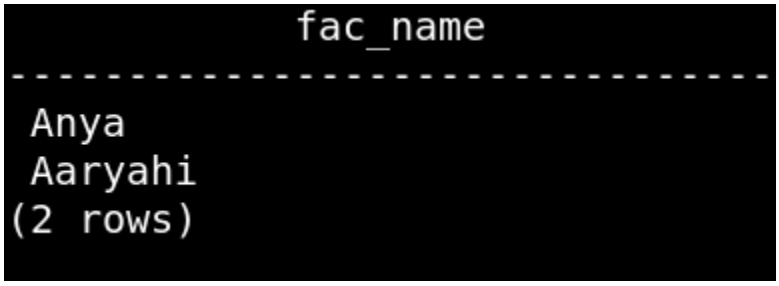
```
              name
--------------------------------
 Ayesha
 Aayush
 Ehsaan
 Rania
 Divyansh
 Yakshit
 Seher
 Pari
 Shanaya
(9 rows)
```

## 5. Find the names of the faculty members who have offered either 'CSE Course 2' or 'CSE Course 3'

**query:**

```
SELECT
  fac_name
FROM
  faculty,
  crs_offrd
WHERE
  fac_code = crs_fac_cd
  AND crs_name = 'CSE Course 2'
UNION
SELECT
  fac_name
FROM
```

```
  faculty,
  crs_offrd
WHERE
  fac_code = crs_fac_cd
  AND crs_name = 'CSE Course 3';
```




## 6. Find the names of the faculty members who have offered 'MIS' but not offered 'Software Engg.'

**query:**

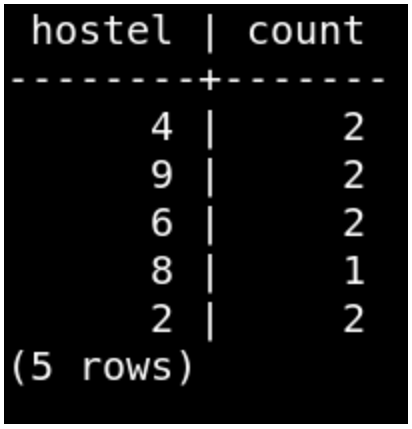
```
SELECT
  fac_name
FROM
  faculty,
  crs_offrd
WHERE
  fac_code = crs_fac_cd
  AND crs_name = 'CSE Course 2'
EXCEPT
SELECT
  fac_name
FROM
  faculty,
  crs_offrd
WHERE
  fac_code = crs_fac_cd
  AND crs_name = 'CSE Course 3';
```

```
  fac_name
------------
 Aaryahi
(1 row)
```

## 7. Find out the students in each hostel who are not registered for any course.

**query:**

```
SELECT
  hostel,
  count(*)
FROM
  students
WHERE
  rollno NOT IN (
    SELECT
      crs_rollno
    FROM
      crs_regd
  )
GROUP BY
  hostel;
```



| hostel | count |
|---|---|
| 4 | 2 |
| 9 | 2 |
| 6 | 2 |
| 8 | 1 |
| 2 | 2 |

(5 rows)

## 8. Select the students who are in ETC dept or who have registered for course CSE_1.

**query:**

```
SELECT
  *
FROM
  students
WHERE
  deptcode = 'ETC'
  OR rollno IN (
    SELECT
      crs_rollno
    FROM
      crs_regd
    WHERE
      crs_cd = 'CSE_1'
  );
```

| rollno | name | bdate | deptcode | hostel | parent_inc |
|---|---|---|---|---|---|
| 51052423 | Ehsaan | 2000-03-23 | ETC | 3 | 5380000.0 |
| 51051159 | Shanaya | 2000-12-03 | ETC | 6 | 6800000.0 |
| 51058167 | Divij | 2000-02-14 | CSE | 6 | 6290000.0 |
| 51055679 | Seher | 2000-04-03 | ETC | 8 | 5050000.0 |
| 51056805 | Yakshit | 2001-03-19 | ETC | 9 | 2820000.0 |
| 51054776 | Divyansh | 2001-04-14 | ETC | 7 | 8680000.0 |
| 51051394 | Aayush | 2001-06-17 | ETC | 5 | 3440000.0 |
| 51059691 | Ayesha | 2001-01-02 | ETC | 7 | 8710000.0 |
| 51053522 | Shanaya | 2000-03-06 | ELE | 3 | 2900000.0 |
| 51051337 | Rania | 1999-11-30 | ETC | 2 | 8030000.0 |
| 51050243 | Elakshi | 2000-11-09 | CHE | 9 | 5300000.0 |
| 51053419 | Keya | 2001-07-25 | CSE | 6 | 5570000.0 |
| 51051744 | Pari | 2001-04-01 | ETC | 8 | 7820000.0 |

(13 rows)

## 9. Display the students who have registered to all the courses.

**query**

```
SELECT
  crs_rollno,
  name
FROM
  students,
  crs_regd
WHERE
  crs_rollno = rollno
GROUP BY
  crs_rollno,
  name
HAVING
  COUNT(*) = (
    SELECT
      COUNT(*)
    FROM
      crs_offrd
  );
```

```
 crs_rollno |              name
------------+--------------------------------
   51052466 | Misha
(1 row)
```

## 10. Give Grace Marks 5 in subject ‘DBMS’to the students who have scored less than 50 in that subject.

**query**

```
UPDATE
  crs_regd
SET
  marks = marks + 5
FROM
  crs_offrd
WHERE
  crs_code = crs_cd
  AND crs_name = 'CSE Course 1'
  AND marks < 80;
```

```
lab=> UPDATE
  crs_regd
SET
  marks = marks + 5
FROM
  crs_offrd
WHERE
  crs_code = crs_cd
  AND crs_name = 'CSE Course 1'
  AND marks < 80;
UPDATE 4
lab=>
```