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METROPOLITAN
UNIVERSITY

islington college
(इस्लिङ्टन कलेज)

Module Code & Module Title

CC6001KP Advanced Database Systems Development

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50% Individual Coursework

Year and Semester

2018-19 Autumn

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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a marks of zero will be awarded.

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1. Company Introduction

1.1. Introduction of the hospital:

City hospital is one of the best hospital in janakpur, which was founded in 2001 AD. This hospital is government organizer and started by late Prime Minister Susil koirala. For palace this hospital is going good for local people.

The main purpose for the established of this hospital to provide best health facilities to middle south people. In this hospital, many kinds of treatment are done with 24*7 hours emergency facilities. It provide facilities like; hospital give 1000 rupees to newly born daughter‘mother for their heath and food. Now people haven’t to Kathmandu and other city for their treatment. Day by day this hospital going advance and popular

1.2. Current Business Activities and operations:

City hospital provide best facilities to patients, they have more than 400 patients seats, more than 120 rooms and 3 wards. It used to provide facilities not for fee, but for duty. In order to make patient happy they concern patient daily about their health. They provide free medical facilities to disable patient and old person < 80 years. If staffs of hospital are certified than they can get free treatment.

Patient who are regular they can get some discount in appointment charge. Hospital are thinking to increase bed number with wards as patients are increasing day by day.

1.3. Business Rules:

- Staff can be a doctor/nurse/assistant.
- Staff can be a certified/uncertified and can be a patient.
- Patient should be regular and new.
- Appointment can be done by staff with appointment_charge at the same time.
- Appointment is fixed by staff in specific date, in fix ward.
- Patients are free to queries in customer services.
- All staffs should be polite and co-operative.
- Mobile phone should be in silent mode.
- Smoking is not allowed in hospital area.

1.4. Creation of Entities and Attributes:

- Staff (staff_id, staff_name, staff_type, categories, patient_type, country, phone, email)
- Patient (patient_id, staff_id, patient_name, patient_type, country, phone, email)
- Appointment (Appointment_id, patient_id, appointment_type, appointment_fee)
- Treatment (treatment_id, treatment_name, treatment_type)
- Ward (ward_id, ward_name)

1.5. Initial ER Diagram (ERD):

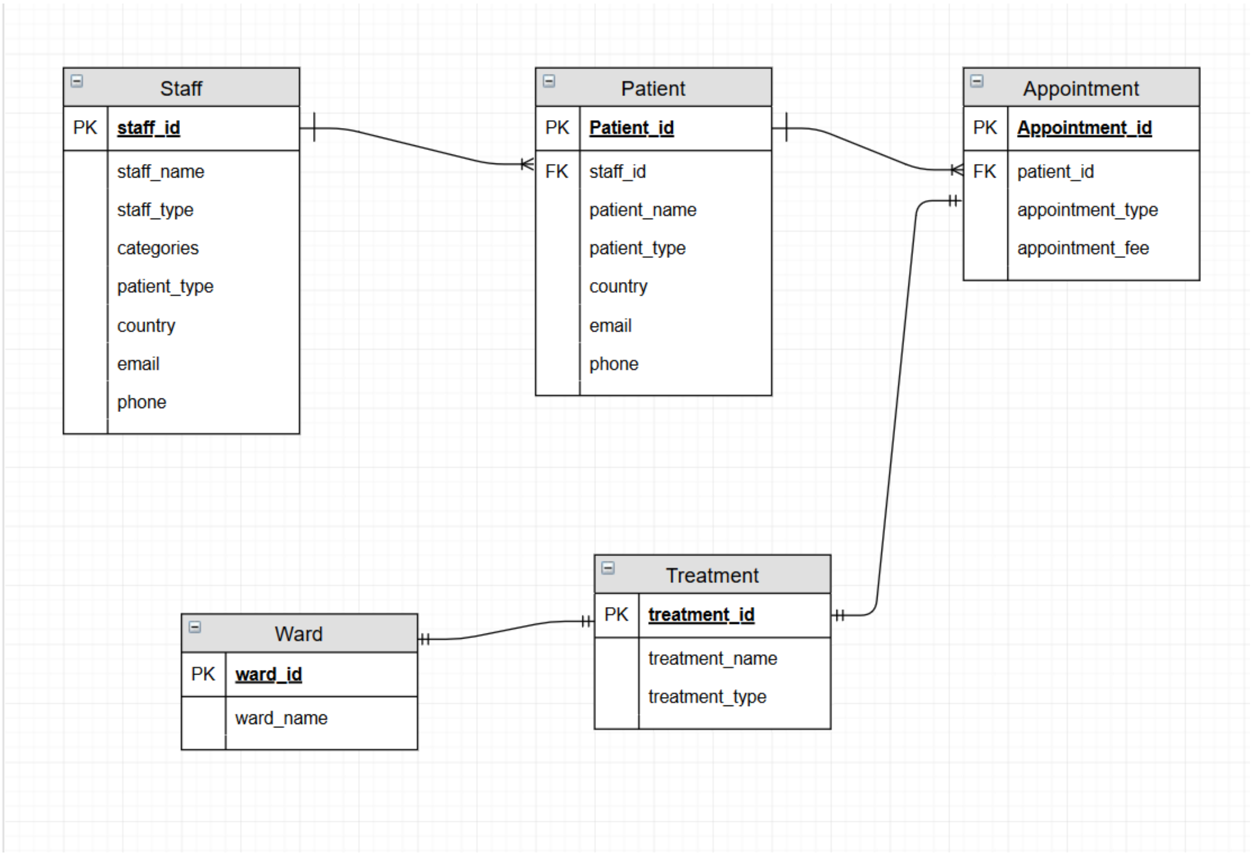


Figure 1: initial ER Diagram

1.6. Assumptions

- Regular and new patient are known by patient_type.
- Staffs are Doctor/nurse/assistant which are known by staff_type.
- Certified and uncertified staffs are known by staffs_catogories.
- Patient_type can only store Boolean values i.e. yes or no.
- One patient and one staffs have single address.
- Patients and Staffs address contains country, street, streeeNo, unique phone and unique email.
- Patient should be regular and new and one patient have many information.
- One patient appointment have one treatment in one ward.
- Many staffs will be in one appointment and many staffs will check one patient.

2. Database Design

2.1. Normalization:

Normalization is the process of efficiently organizing data in a database which eliminates data redundant. Normalization is the process to get data into simple form that truly reflects separate entity types. Normalisation starts from pre-documented sets of attributes and tries to group and regroup them without causing data inconsistencies in such a way that Anomalies are avoided. Steps in normalization are UNF, 1NF, 2NF, 3NF and so on, but we are doing up to 3NF in our coursework (Shah, 2005).

We are doing normalization of above ERD to decrease data repetition and to get all details deeply. The steps are:

UNF:

In UNF, repeating groups were inside in curly bracket i.e. {}, which we have to remove in UNF.

Staffs (staffs_id, staff_name, staff_type, categories, patient_type , country, phone, email, {patient_id, staff_id, patient_name, patient_type, country, phone, email, {appointment_id, patient_id, appointment_type, appointment_fee, (treatment_id, treatment_name, treatment_type, ward_id, ward_name)}})

1NF:

In 1Nf, repeating group are removed, primary key is defined.

Staff (staff_id, staff_name, staff_type, categories, patient_type)

Staff_address (staff_email, staff_id, staff_country, staff_state, staff_street, staff_street_number, staff_phone)

Patient (patient_id, staff_id, patient_name, patient_type)

Patient_address (patient_email, patient_id, patient_country, patient_state, patient_street, patient_street_number, patient_phone)

Appointment (appointment_id, patient_id, staff_id, appointment_type, appointment_charge, (treatment_id, treatment_name, treatment_type, ward_id, ward_name))

2NF:

In 2NF, all 1NF requirement are fulfilled and there is no partial dependency. (Partial dependency exists in a table in which nonkey columns are partially dependent on part of a composite key)

Patient_id → staff_id

Patient_id → patient_name, patient_type

Patient_id, staff_id → null

Staff_id → Appointment_id, patient_id

Appointment_id → patient_id

Appointment_id → appointment_type, appointment_charge, (treatment_id, treatment_name, treatment_type, ward_id, ward_name))

Staff_id, Appointment_id, patient_id → null

Staff (staff_id, staff_name, staff_type, categories, patient_type)

Staff_address (staff_email, staff_id, staff_country, staff_state, staff_street, staff_street_number, staff_phone)

Patient (patient_id, staff_id)

Patient_information (patient_id, patient_name, patient_type)

Patient_address (patient_email, patient_id, patient_country, patient_state, patient_street, patient_street_number, patient_phone)

Appointment (appointment_id, patient_id, staff_id)

Appointment_Details (appointment_id, appointment_date, appointment_charge, (treatment_id, treatment_name, treatment_type, ward_id, ward_name))

3NF:

In 3NF, all 2NF requirement are fulfilled and there is no transitive dependency.

Appointment_id → treatment_id and treatment_id → treatment_name, treatment_type

Appointment_id → ward_id and ward_id → ward_name

Staff (staff_id, staff_name, staff_type, categories, patient_type)

Staff_address (staff_email, staff_id, staff_country, staff_state, staff_street, staff_street_number, staff_phone)

Patient (patient_id, staff_id)

Patient_information (patient_id, patient_name, patient_type)

Patient_address (patient_email, patient_id, patient_country, patient_state, patient_street, patient_street_number, patient_phone)

Appointment (appointment_id, patient_id, staff_id)

Appointment_details (appointment_id, appointment_date, appointment_charge)

Ward (ward_id, appointment_id, ward_name)

Treatment (treatment_id, appointment_id, treatment_name)

2.2. ER Diagram of normalised database

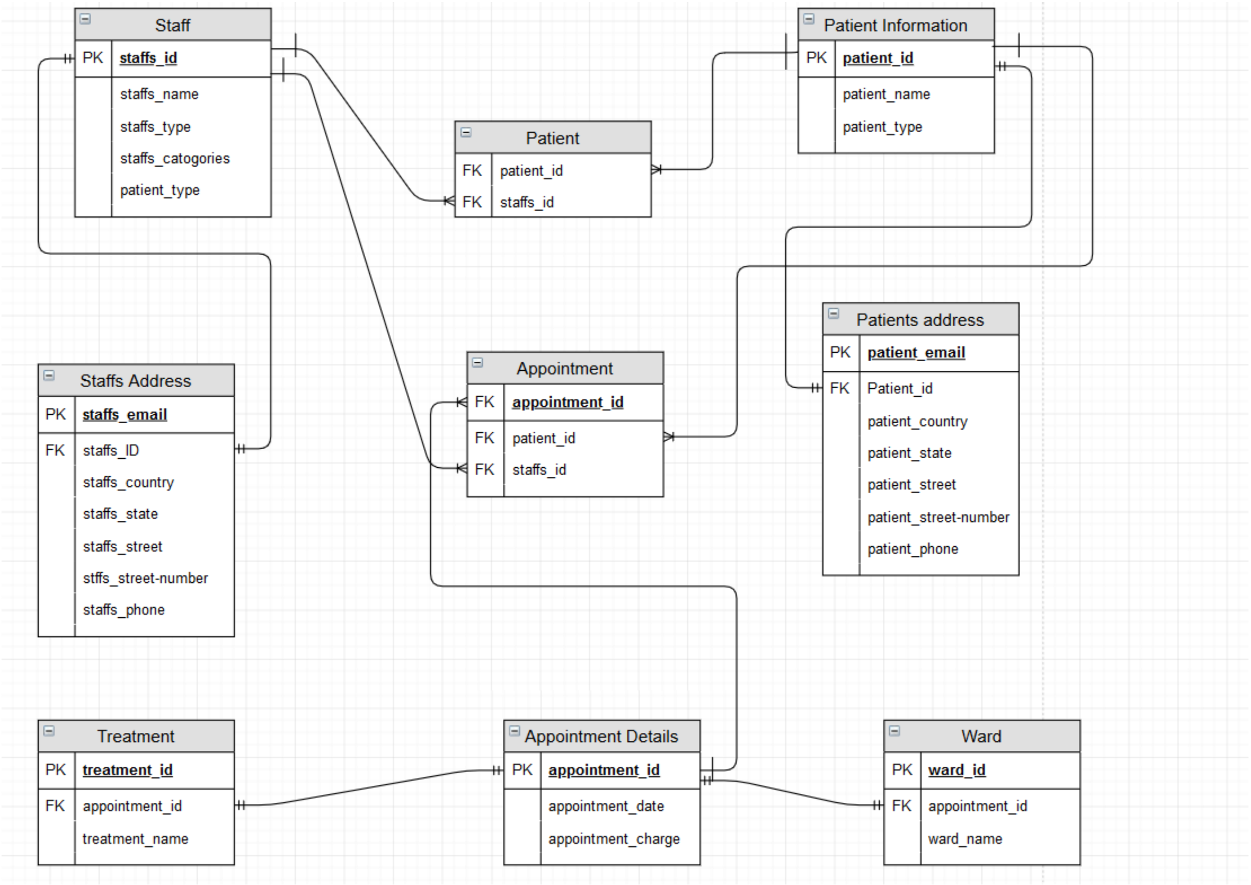
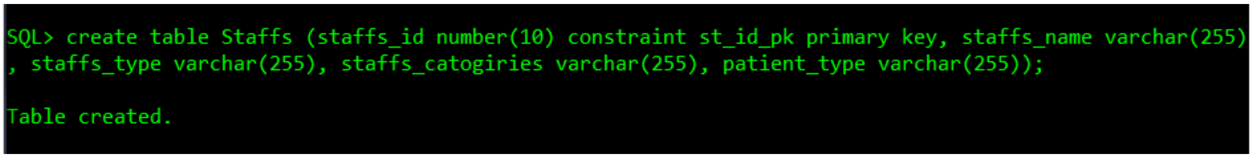


Figure 2: ER Diagram after normalization

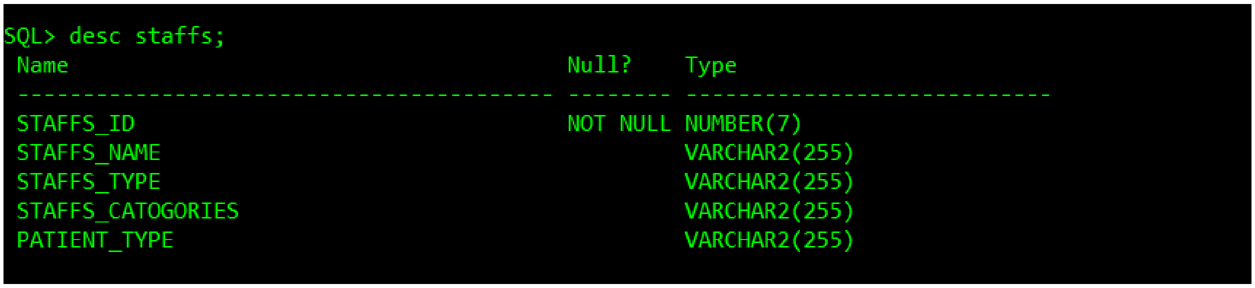
3. Database implementation

3.1. Table Generation



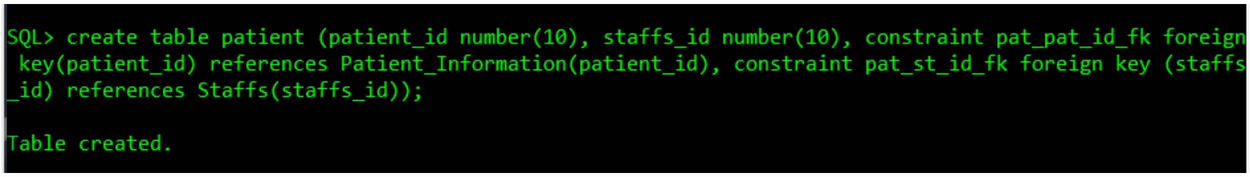
```
SQL> create table Staffs (staffs_id number(10) constraint st_id_pk primary key, staffs_name varchar(255)
, staffs_type varchar(255), staffs_catogiries varchar(255), patient_type varchar(255));

Table created.
```

Figure 3: creating staffs table



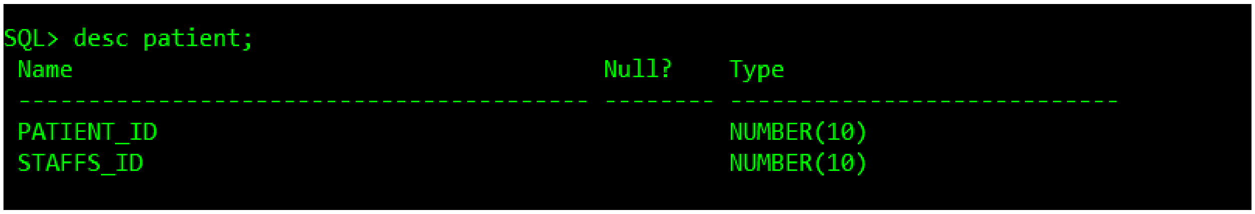
```
SQL> desc staffs;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 STAFFS_ID                                 NOT NULL NUMBER(7)
 STAFFS_NAME                                        VARCHAR2(255)
 STAFFS_TYPE                                        VARCHAR2(255)
 STAFFS_CATOGORIES                                  VARCHAR2(255)
 PATIENT_TYPE                                       VARCHAR2(255)
```

Figure 4: describing staffs table



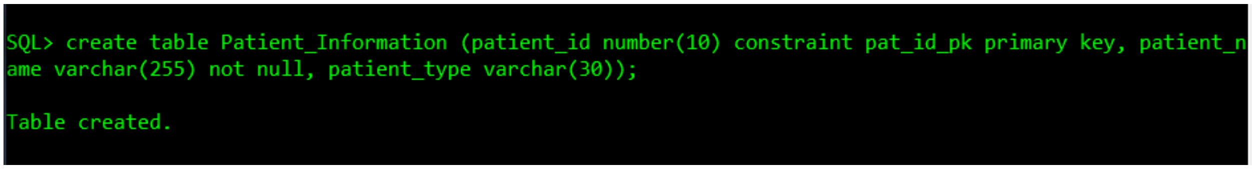
```
SQL> create table patient (patient_id number(10), staffs_id number(10), constraint pat_pat_id_fk foreign
 key(patient_id) references Patient_Information(patient_id), constraint pat_st_id_fk foreign key (staffs
_id) references Staffs(staffs_id));

Table created.
```

Figure 5: creating patient table



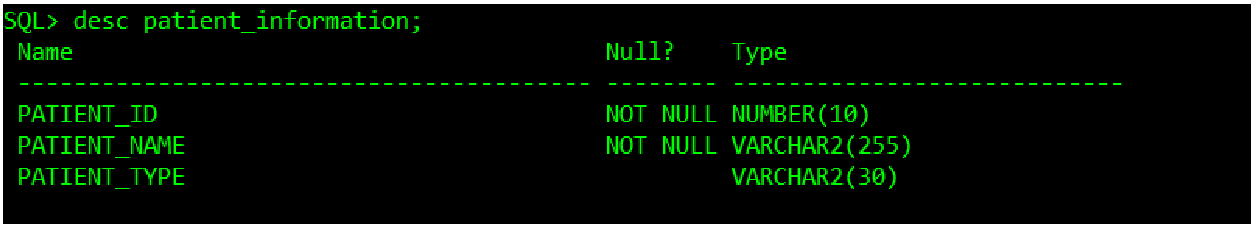
```
SQL> desc patient;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PATIENT_ID                                         NUMBER(10)
 STAFFS_ID                                          NUMBER(10)
```

Figure 6: describing patient table



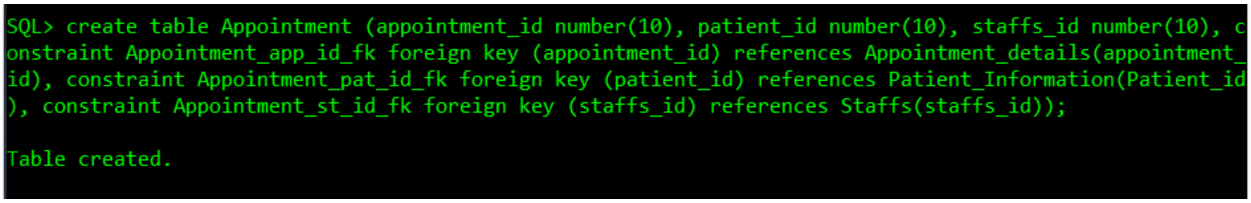
```
SQL> create table Patient_Information (patient_id number(10) constraint pat_id_pk primary key, patient_n
ame varchar(255) not null, patient_type varchar(30));

Table created.
```

Figure 7: creating patient_information table



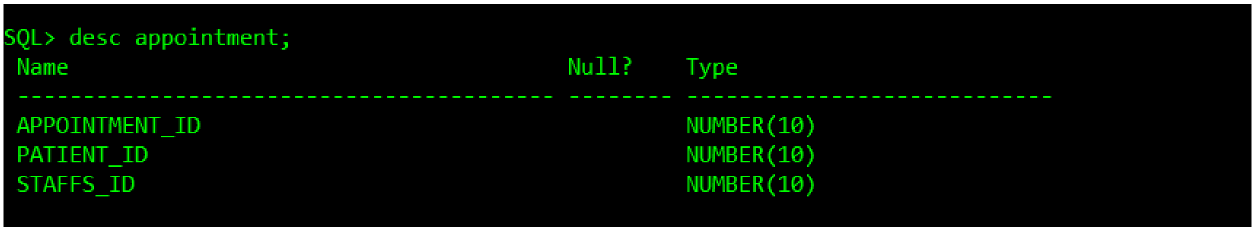
```
SQL> desc patient_information;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PATIENT_ID                                NOT NULL NUMBER(10)
 PATIENT_NAME                              NOT NULL VARCHAR2(255)
 PATIENT_TYPE                                       VARCHAR2(30)
```

Figure 8: describing patient_information table



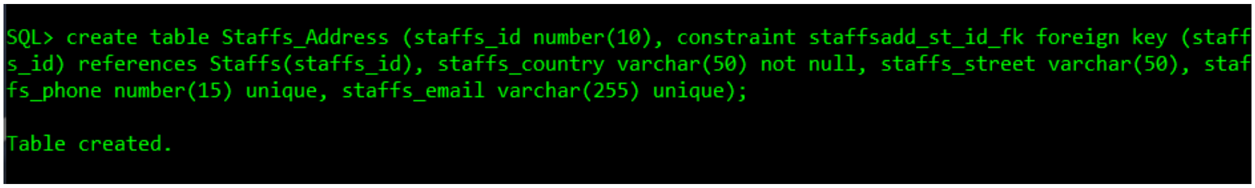
```
SQL> create table Appointment (appointment_id number(10), patient_id number(10), staffs_id number(10), c
onstraint Appointment_app_id_fk foreign key (appointment_id) references Appointment_details(appointment_
id), constraint Appointment_pat_id_fk foreign key (patient_id) references Patient_Information(Patient_id
), constraint Appointment_st_id_fk foreign key (staffs_id) references Staffs(staffs_id));

Table created.
```

Figure 9: creating appointment table



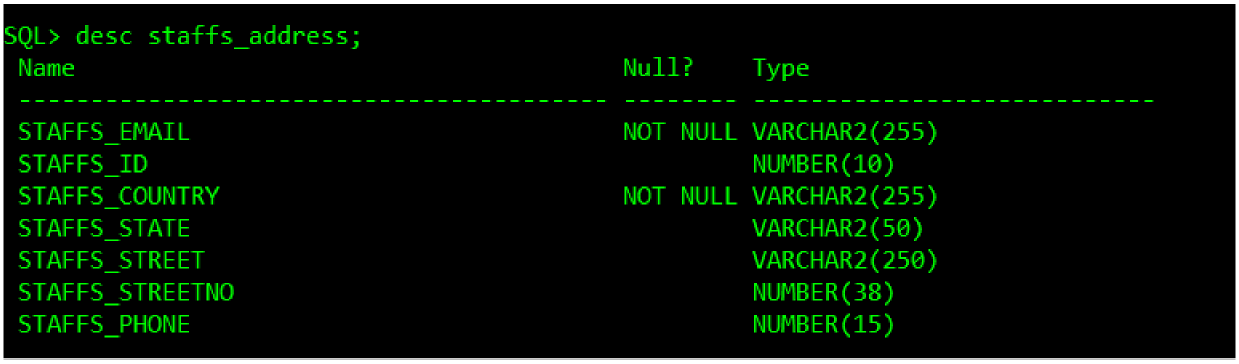
```
SQL> desc appointment;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 APPOINTMENT_ID                                     NUMBER(10)
 PATIENT_ID                                         NUMBER(10)
 STAFFS_ID                                          NUMBER(10)
```

Figure 10: describing appointment table



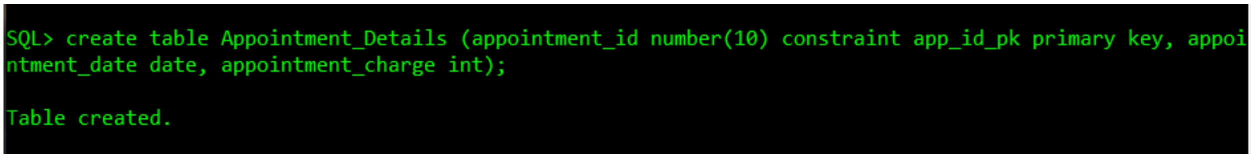
```
SQL> create table Staffs_Address (staffs_id number(10), constraint staffsadd_st_id_fk foreign key (staff
s_id) references Staffs(staffs_id), staffs_country varchar(50) not null, staffs_street varchar(50), staf
fs_phone number(15) unique, staffs_email varchar(255) unique);

Table created.
```

Figure 11: creating staffs_address table



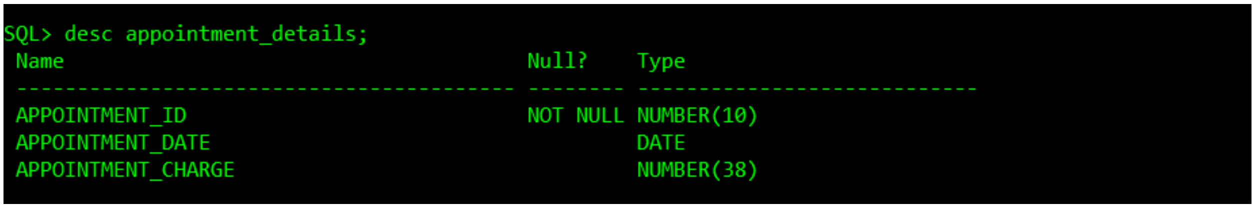
```
SQL> desc staffs_address;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 STAFFS_EMAIL                              NOT NULL VARCHAR2(255)
 STAFFS_ID                                          NUMBER(10)
 STAFFS_COUNTRY                            NOT NULL VARCHAR2(255)
 STAFFS_STATE                                       VARCHAR2(50)
 STAFFS_STREET                                      VARCHAR2(250)
 STAFFS_STREETNO                                    NUMBER(38)
 STAFFS_PHONE                                       NUMBER(15)
```

Figure 12: describing staffs_address table



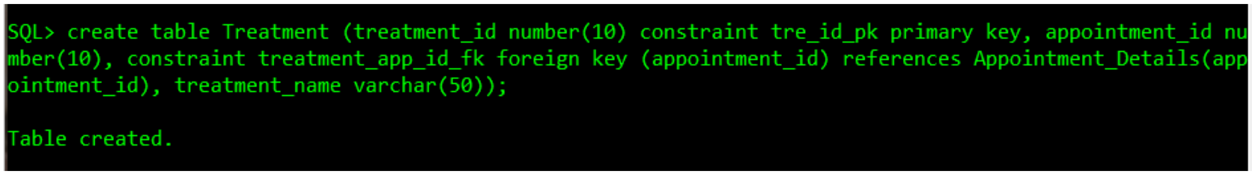
```
SQL> create table Appointment_Details (appointment_id number(10) constraint app_id_pk primary key, appoi
ntment_date date, appointment_charge int);

Table created.
```

Figure 13: creating appointment_details table



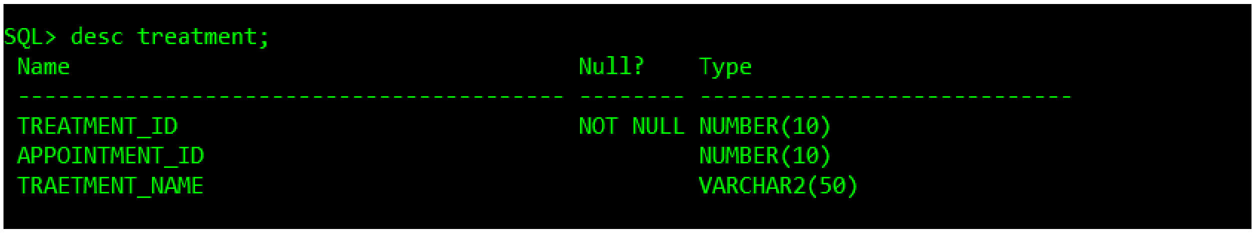
```
SQL> desc appointment_details;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 APPOINTMENT_ID                            NOT NULL NUMBER(10)
 APPOINTMENT_DATE                                   DATE
 APPOINTMENT_CHARGE                                 NUMBER(38)
```

Figure 14: describing appointment_details table



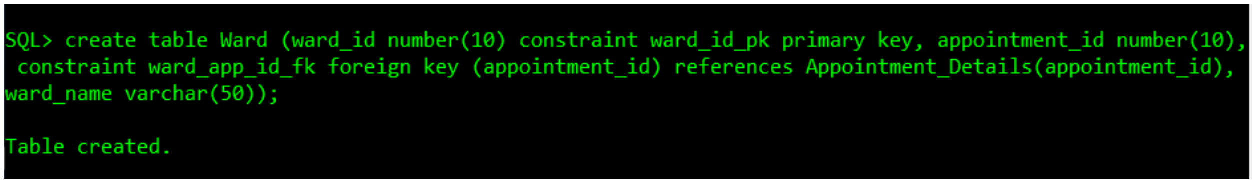
```
SQL> create table Treatment (treatment_id number(10) constraint tre_id_pk primary key, appointment_id nu
mber(10), constraint treatment_app_id_fk foreign key (appointment_id) references Appointment_Details(app
ointment_id), treatment_name varchar(50));

Table created.
```

Figure 15: creating treatment table



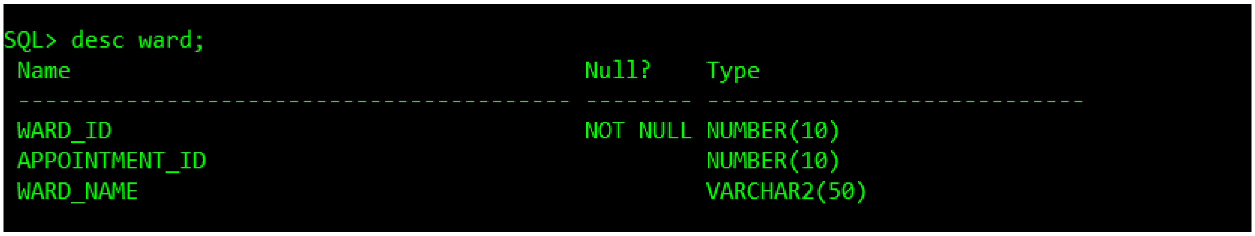
```
SQL> desc treatment;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 TREATMENT_ID                              NOT NULL NUMBER(10)
 APPOINTMENT_ID                                     NUMBER(10)
 TRAETMENT_NAME                                     VARCHAR2(50)
```

Figure 16: describing treatment table



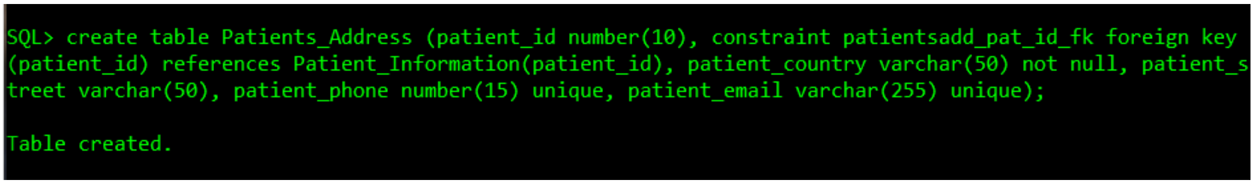
```
SQL> create table Ward (ward_id number(10) constraint ward_id_pk primary key, appointment_id number(10),
 constraint ward_app_id_fk foreign key (appointment_id) references Appointment_Details(appointment_id),
ward_name varchar(50));

Table created.
```

Figure 17: creating ward table



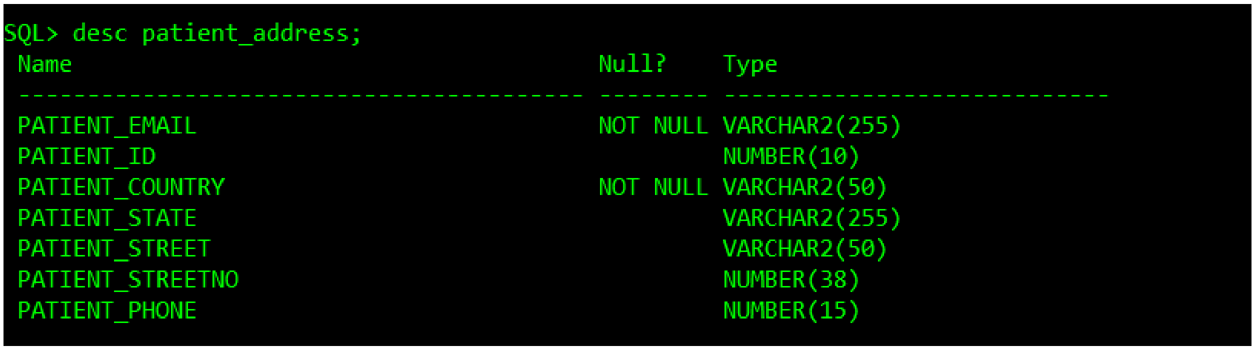
```
SQL> desc ward;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 WARD_ID                                   NOT NULL NUMBER(10)
 APPOINTMENT_ID                                     NUMBER(10)
 WARD_NAME                                          VARCHAR2(50)
```

Figure 18: describing ward table



```
SQL> create table Patients_Address (patient_id number(10), constraint patientsadd_pat_id_fk foreign key
(patient_id) references Patient_Information(patient_id), patient_country varchar(50) not null, patient_s
treet varchar(50), patient_phone number(15) unique, patient_email varchar(255) unique);

Table created.
```

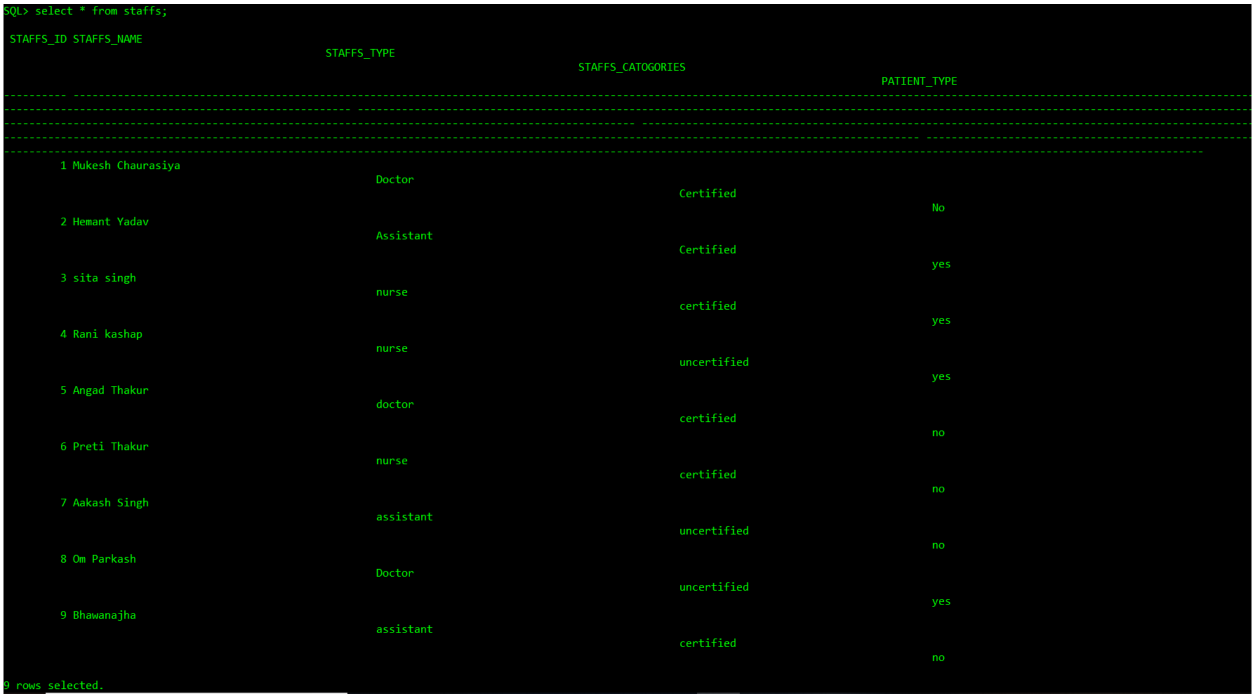
Figure 19: creating patients_address table



```
SQL> desc patient_address;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PATIENT_EMAIL                             NOT NULL VARCHAR2(255)
 PATIENT_ID                                         NUMBER(10)
 PATIENT_COUNTRY                           NOT NULL VARCHAR2(50)
 PATIENT_STATE                                      VARCHAR2(255)
 PATIENT_STREET                                     VARCHAR2(50)
 PATIENT_STREETNO                                   NUMBER(38)
 PATIENT_PHONE                                      NUMBER(15)
```

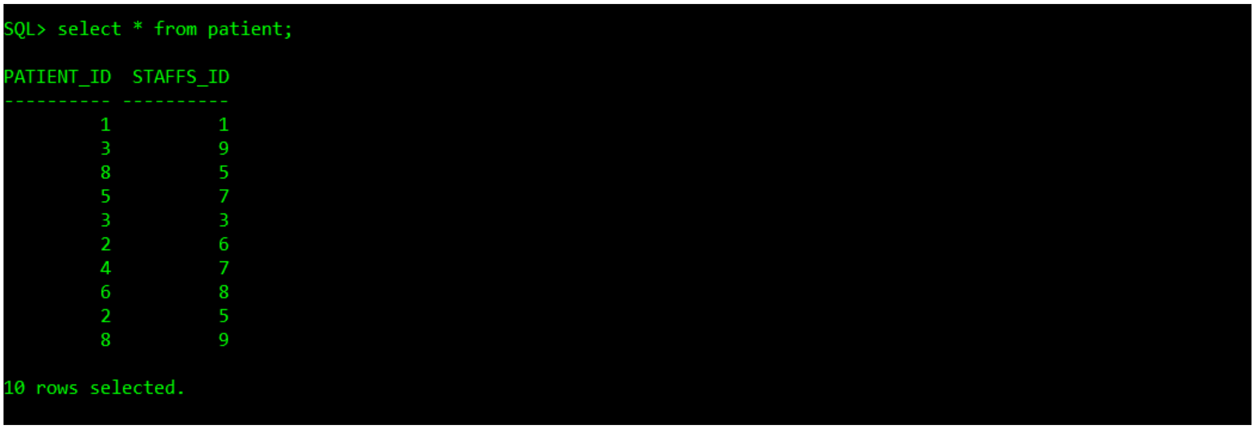
Figure 20: describing patients_address table

3.2. Final Tables



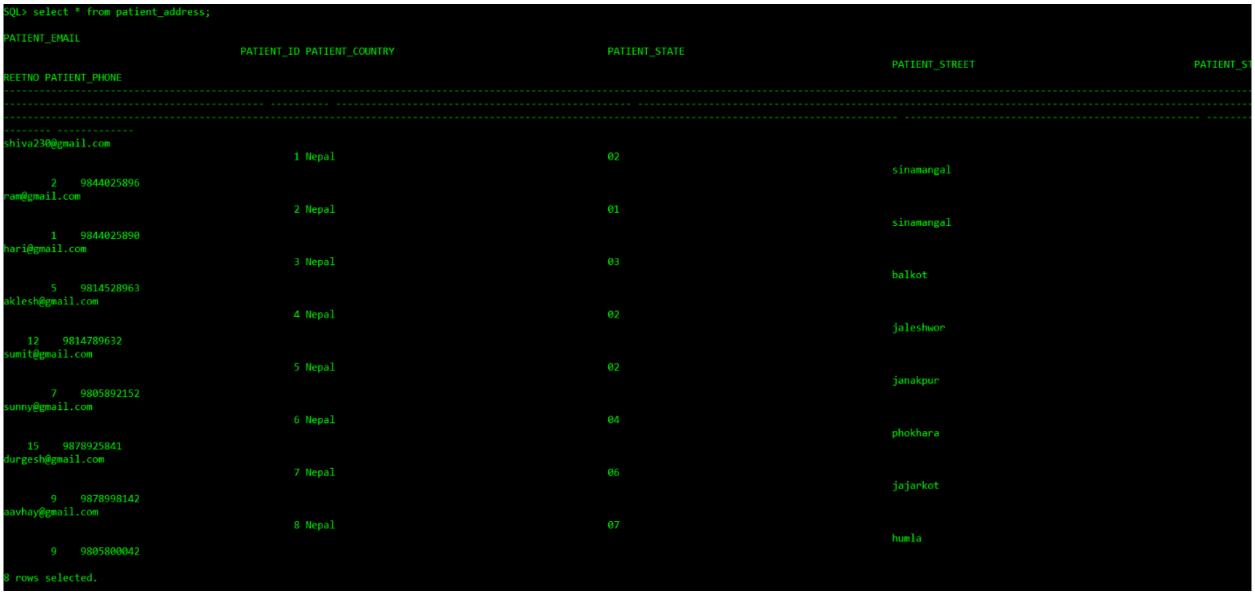
```
SQL> select * from staffs;

 STAFFS_ID STAFFS_NAME
                                                   STAFFS_TYPE
                                                                                         STAFFS_CATOGORIES
                                                                                                                                 PATIENT_TYPE
---------- ------------------------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------- ----------------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------------- --------------------------------------------------
------------------------------------------------------------------------------------------------------------------------------------------------------ -
-------------------------------------------------------------------------------------------------------------------------------------------------
         1 Mukesh Chaurasiya
                                                          Doctor
                                                                                                  Certified
                                                                                                                                        No

         2 Hemant Yadav
                                                          Assistant
                                                                                                  Certified
                                                                                                                                        yes

         3 sita singh
                                                          nurse
                                                                                                  certified
                                                                                                                                        yes

         4 Rani kashap
                                                          nurse
                                                                                                  uncertified
                                                                                                                                        yes

         5 Angad Thakur
                                                          doctor
                                                                                                  certified
                                                                                                                                        no

         6 Preti Thakur
                                                          nurse
                                                                                                  certified
                                                                                                                                        no

         7 Aakash Singh
                                                          assistant
                                                                                                  uncertified
                                                                                                                                        no

         8 Om Parkash
                                                          Doctor
                                                                                                  uncertified
                                                                                                                                        yes

         9 Bhawanajha
                                                          assistant
                                                                                                  certified
                                                                                                                                        no

9 rows selected.
```

Figure 21: data in staffs table



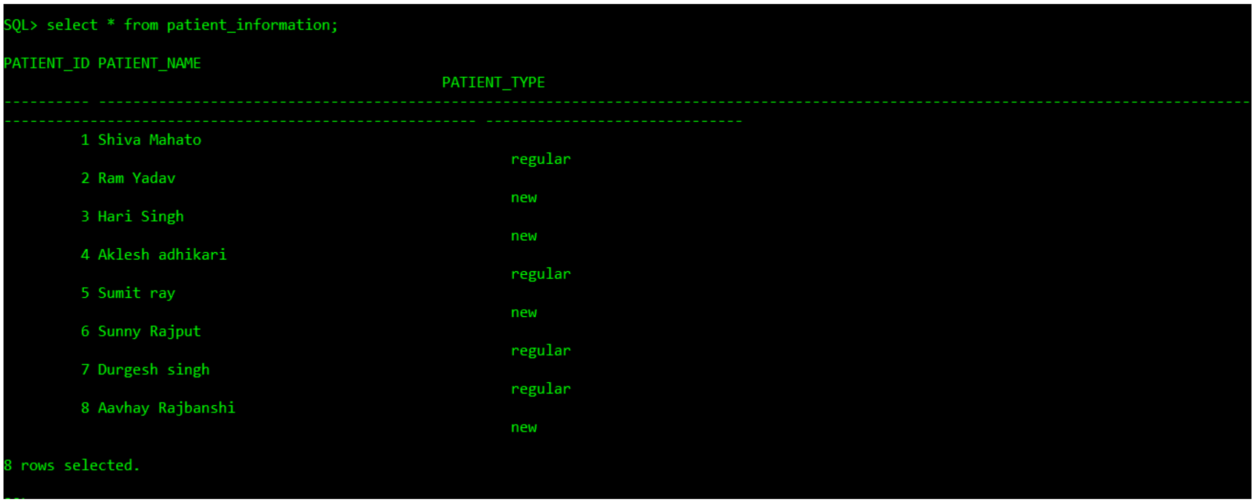
```
SQL> select * from patient;

PATIENT_ID  STAFFS_ID
---------- ----------
         1          1
         3          9
         8          5
         5          7
         3          3
         2          6
         4          7
         6          8
         2          5
         8          9

10 rows selected.
```

Figure 22: data in patients table



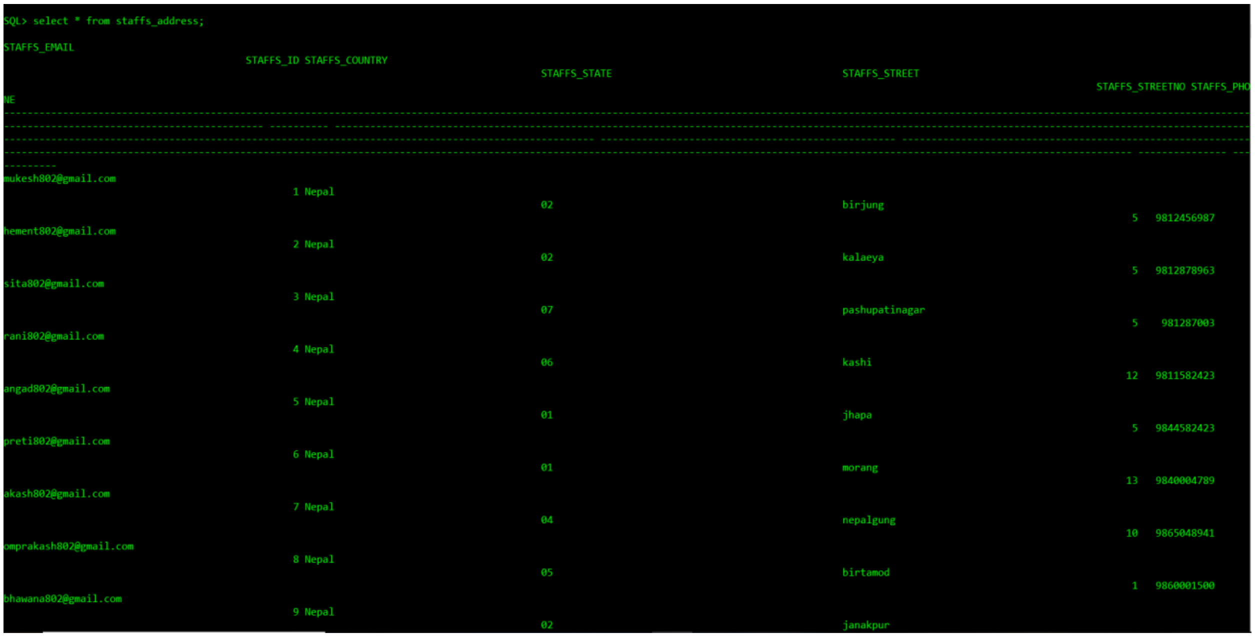
```
SQL> select * from patient_address;

PATIENT_EMAIL
                                        PATIENT_ID PATIENT_COUNTRY                                              PATIENT_STATE
                                                                                                                                                      PATIENT_STREET                                     PATIENT_ST

REETNO PATIENT_PHONE
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------- ---------- -------------------------------------------------- ------------------------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------------------------------------------------------------------- -------------------------------------------------- -------
-------- -------------
shiva230@gmail.com
                                                 1 Nepal                                                02
                                                                                                                                                      sinamangal

        2    9844025896
ram@gmail.com
                                                 2 Nepal                                                01
                                                                                                                                                      sinamangal

        1    9844025890
hari@gmail.com
                                                 3 Nepal                                                03
                                                                                                                                                      balkot

        5    9814528963
aklesh@gmail.com
                                                 4 Nepal                                                02
                                                                                                                                                      jaleshwor

    12    9814789632
sumit@gmail.com
                                                 5 Nepal                                                02
                                                                                                                                                      janakpur

        7    9805892152
sunny@gmail.com
                                                 6 Nepal                                                04
                                                                                                                                                      phokhara

    15    9878925841
durgesh@gmail.com
                                                 7 Nepal                                                06
                                                                                                                                                      jajarkot

        9    9878998142
aavhay@gmail.com
                                                 8 Nepal                                                07
                                                                                                                                                      humla

        9    9805800042

8 rows selected.
```

Figure 23: data in patient_address table



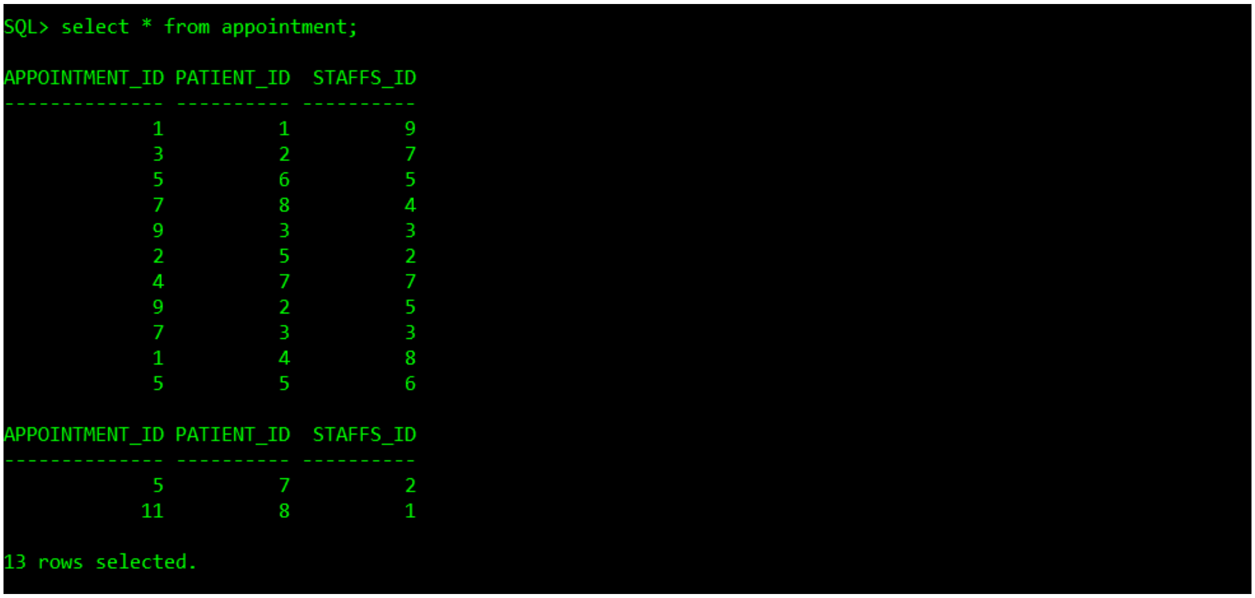
```
SQL> select * from patient_information;

PATIENT_ID PATIENT_NAME
                                                   PATIENT_TYPE
---------- ------------------------------------------------------------------------------------------------------------------------------------
------------------------------------------------------- ------------------------------
         1 Shiva Mahato
                                                           regular
         2 Ram Yadav
                                                           new
         3 Hari Singh
                                                           new
         4 Aklesh adhikari
                                                           regular
         5 Sumit ray
                                                           new
         6 Sunny Rajput
                                                           regular
         7 Durgesh singh
                                                           regular
         8 Aavhay Rajbanshi
                                                           new

8 rows selected.
```

Figure 24: data in patient_information table



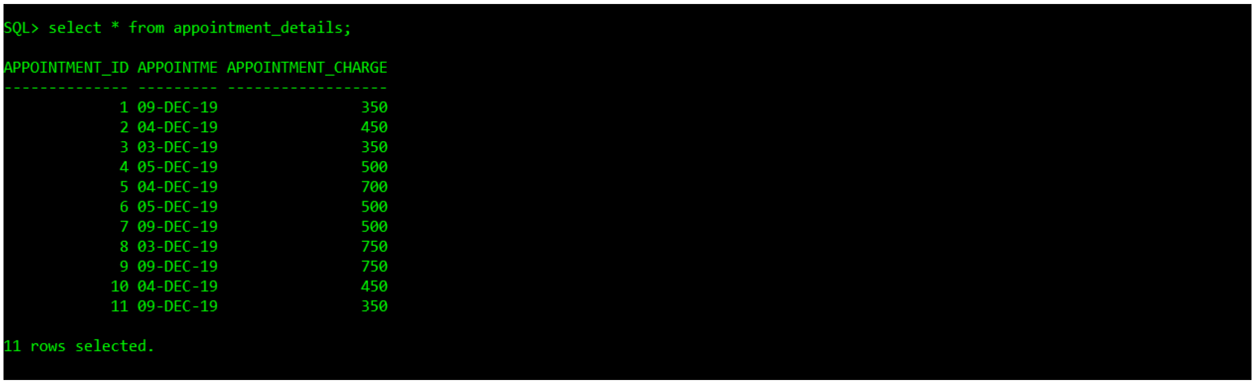
```
SQL> select * from staffs_address;

STAFFS_EMAIL
                                         STAFFS_ID STAFFS_COUNTRY
                                                                                  STAFFS_STATE                                        STAFFS_STREET
                                                                                                                                                                          STAFFS_STREETNO STAFFS_PHO
NE
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------- ---------- ---------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------- -------------------------------------------------- --------------------------------------------------
------------------------------------------------------------------------------------------------------------------------------------------------------------------------ --------------- ---
---------
mukesh802@gmail.com
                                                 1 Nepal
                                                                                  02                                                  birjung
                                                                                                                                                                                        5  9812456987
hement802@gmail.com
                                                 2 Nepal
                                                                                  02                                                  kalaeya
                                                                                                                                                                                        5  9812878963
sita802@gmail.com
                                                 3 Nepal
                                                                                  07                                                  pashupatinagar
                                                                                                                                                                                        5   981287003
rani802@gmail.com
                                                 4 Nepal
                                                                                  06                                                  kashi
                                                                                                                                                                                       12  9811582423
angad802@gmail.com
                                                 5 Nepal
                                                                                  01                                                  jhapa
                                                                                                                                                                                        5  9844582423
preti802@gmail.com
                                                 6 Nepal
                                                                                  01                                                  morang
                                                                                                                                                                                       13  9840004789
akash802@gmail.com
                                                 7 Nepal
                                                                                  04                                                  nepalgung
                                                                                                                                                                                       10  9865048941
omprakash802@gmail.com
                                                 8 Nepal
                                                                                  05                                                  birtamod
                                                                                                                                                                                        1  9860001500
bhawana802@gmail.com
                                                 9 Nepal
                                                                                  02                                                  janakpur
```

Figure 25: data in staff_address table



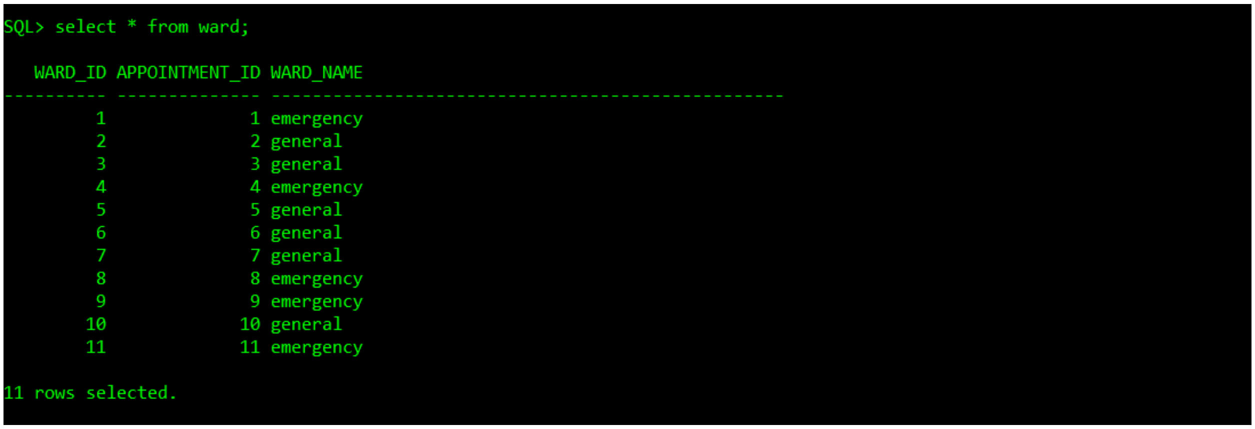
```
SQL> select * from appointment;

APPOINTMENT_ID PATIENT_ID  STAFFS_ID
-------------- ---------- ----------
             1          1          9
             3          2          7
             5          6          5
             7          8          4
             9          3          3
             2          5          2
             4          7          7
             9          2          5
             7          3          3
             1          4          8
             5          5          6

APPOINTMENT_ID PATIENT_ID  STAFFS_ID
-------------- ---------- ----------
             5          7          2
            11          8          1

13 rows selected.
```

Figure 26: data in appointment table



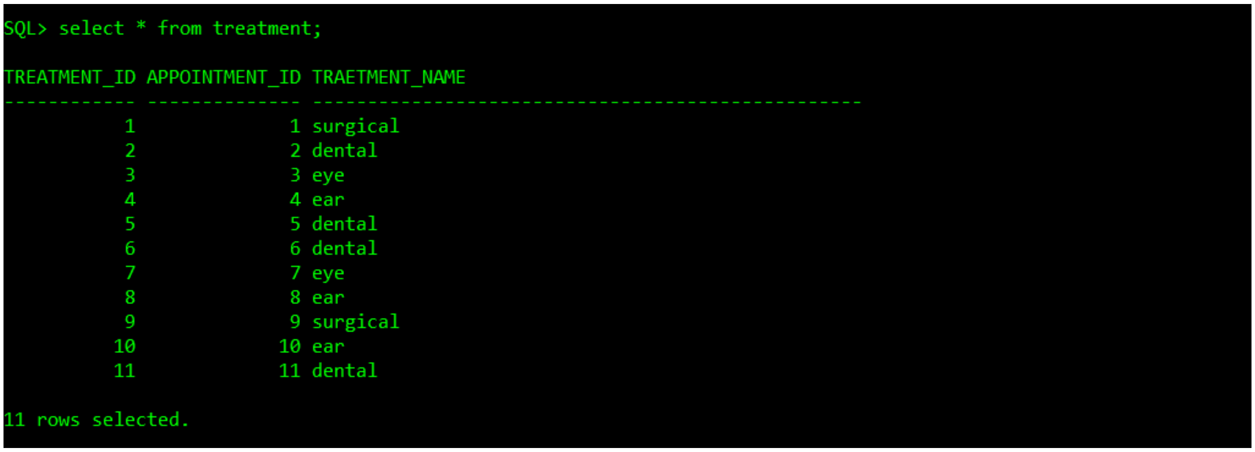
```
SQL> select * from appointment_details;

APPOINTMENT_ID APPOINTME APPOINTMENT_CHARGE
-------------- --------- ------------------
             1 09-DEC-19                350
             2 04-DEC-19                450
             3 03-DEC-19                350
             4 05-DEC-19                500
             5 04-DEC-19                700
             6 05-DEC-19                500
             7 09-DEC-19                500
             8 03-DEC-19                750
             9 09-DEC-19                750
            10 04-DEC-19                450
            11 09-DEC-19                350

11 rows selected.
```

Figure 27: data in appointment_deatils table



```
SQL> select * from ward;

   WARD_ID APPOINTMENT_ID WARD_NAME
---------- -------------- --------------------------------------------------
         1              1 emergency
         2              2 general
         3              3 general
         4              4 emergency
         5              5 general
         6              6 general
         7              7 general
         8              8 emergency
         9              9 emergency
        10             10 general
        11             11 emergency

11 rows selected.
```

Figure 28: data in ward table



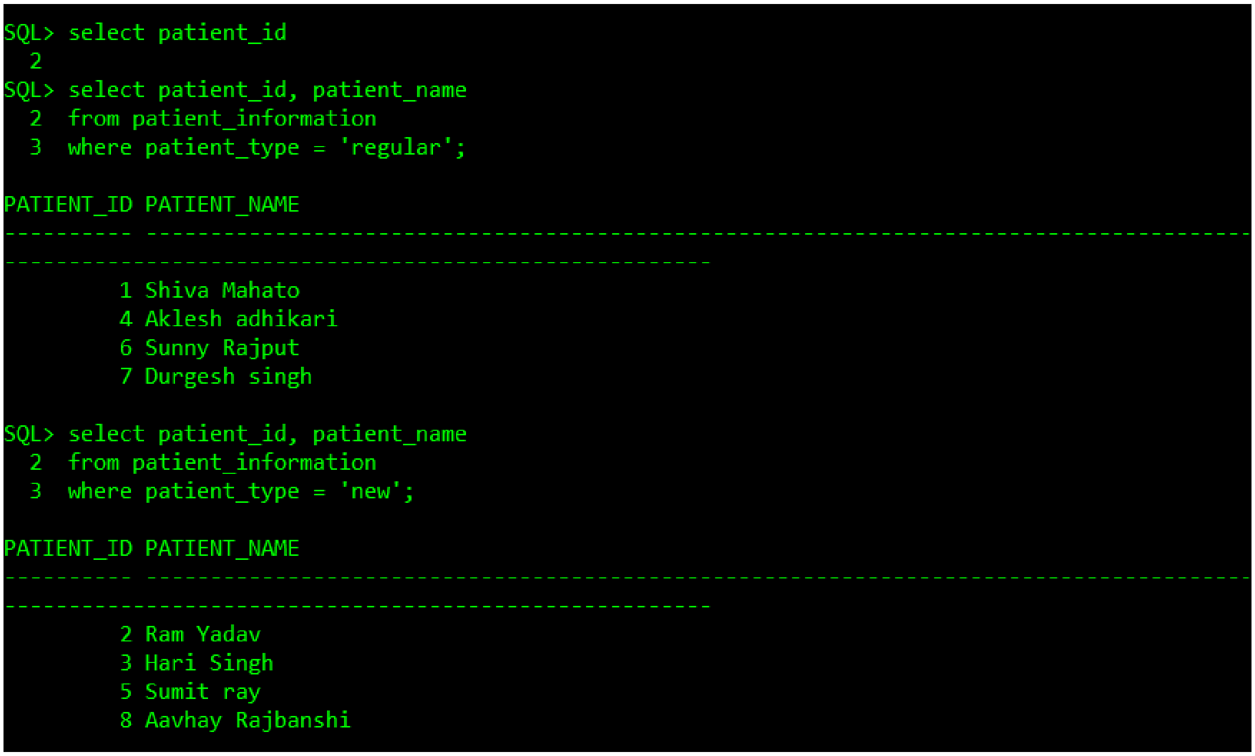
```
SQL> select * from treatment;

TREATMENT_ID APPOINTMENT_ID TRAETMENT_NAME
------------ -------------- --------------------------------------------------
           1              1 surgical
           2              2 dental
           3              3 eye
           4              4 ear
           5              5 dental
           6              6 dental
           7              7 eye
           8              8 ear
           9              9 surgical
          10             10 ear
          11             11 dental

11 rows selected.
```

Figure 29: data in treatment table

4. Database Querying

4.1. Information Queries

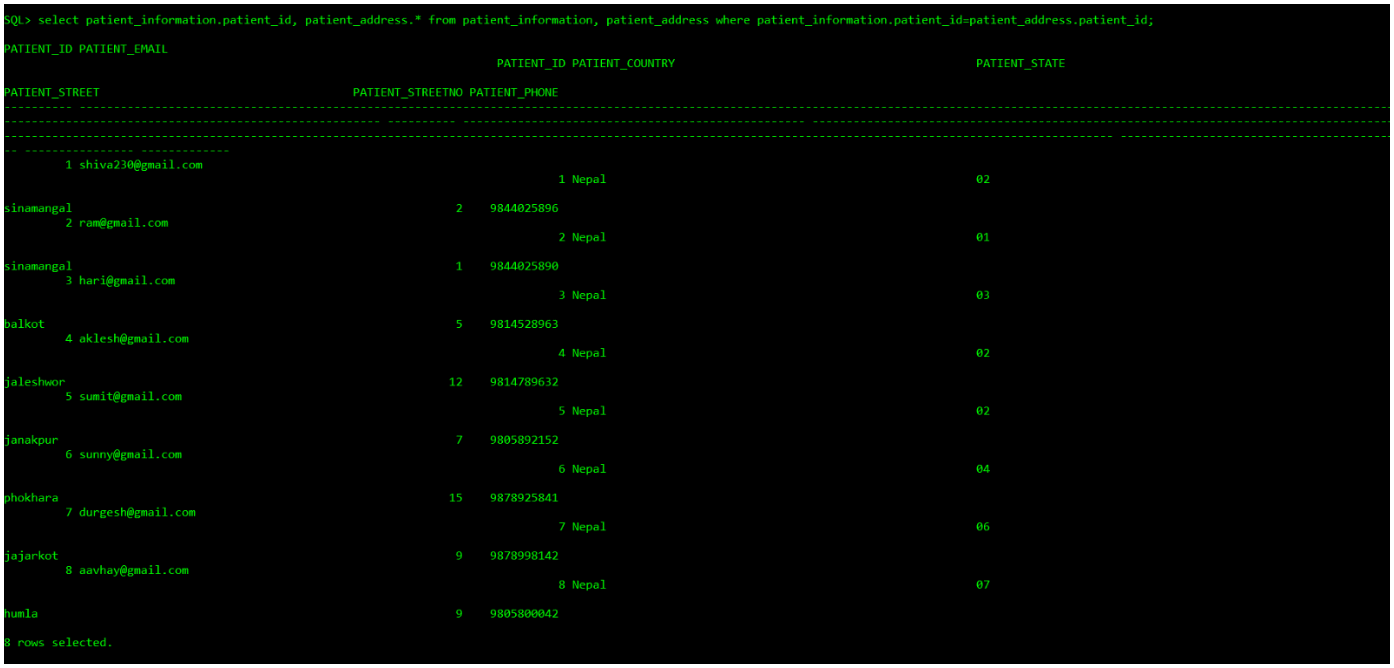
4.1.1. List all patients, regular and new



```
SQL> select patient_id
  2
SQL> select patient_id, patient_name
  2  from patient_information
  3  where patient_type = 'regular';

PATIENT_ID PATIENT_NAME
---------- --------------------------------------------------------------------------------------
-------------------------------------------------------
         1 Shiva Mahato
         4 Aklesh adhikari
         6 Sunny Rajput
         7 Durgesh singh

SQL> select patient_id, patient_name
  2  from patient_information
  3  where patient_type = 'new';

PATIENT_ID PATIENT_NAME
---------- --------------------------------------------------------------------------------------
-------------------------------------------------------
         2 Ram Yadav
         3 Hari Singh
         5 Sumit ray
         8 Aavhay Rajbanshi
```

Figure 30: list of new and regular patients

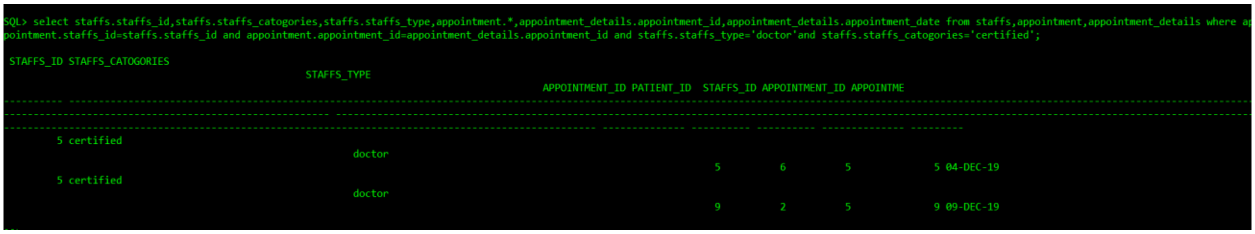
4.1.2. List all patients with their address.



```
SQL> select patient_information.patient_id, patient_address.* from patient_information, patient_address where patient_information.patient_id=patient_address.patient_id;

PATIENT_ID PATIENT_EMAIL
                                                                      PATIENT_ID PATIENT_COUNTRY                                                   PATIENT_STATE

PATIENT_STREET                                   PATIENT_STREETNO PATIENT_PHONE
---------- ------------------------------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------- ---------- ------------------------------------------------ ---------------------------------------------
---------------------------------------------------------------------------------------------------------------------------------------------------- ------------
-- ---------------- -------------
         1 shiva230@gmail.com
                                                                               1 Nepal                                                             02

sinamangal                                                      2    9844025896
         2 ram@gmail.com
                                                                               2 Nepal                                                             01

sinamangal                                                      1    9844025890
         3 hari@gmail.com
                                                                               3 Nepal                                                             03

balkot                                                          5    9814528963
         4 aklesh@gmail.com
                                                                               4 Nepal                                                             02

jaleshwor                                                      12    9814789632
         5 sumit@gmail.com
                                                                               5 Nepal                                                             02

janakpur                                                        7    9805892152
         6 sunny@gmail.com
                                                                               6 Nepal                                                             04

phokhara                                                       15    9878925841
         7 durgesh@gmail.com
                                                                               7 Nepal                                                             06

jajarkot                                                        9    9878998142
         8 aavhay@gmail.com
                                                                               8 Nepal                                                             07

humla                                                           9    9805800042

8 rows selected.
```

Figure 31: list of patients with their address

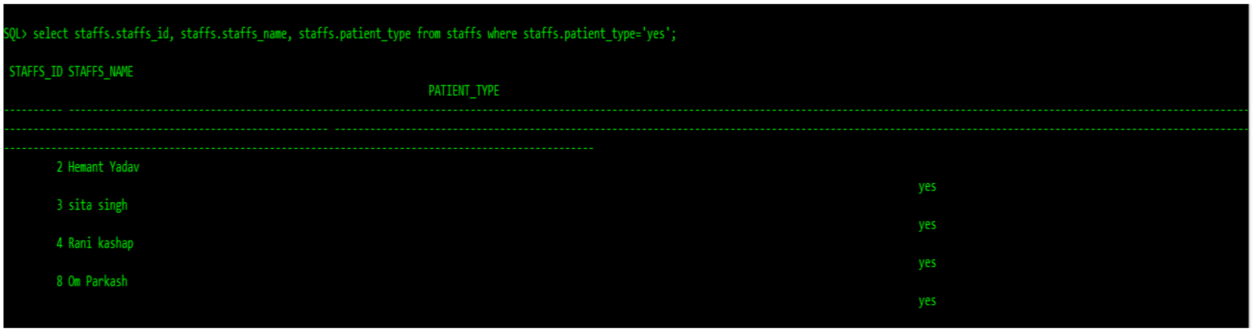
4.1.3. For a given certified doctor, find all the appointments he/she have conducted and the amount he/she got for conducting the appointment.



```
SQL> select staffs.staffs_id,staffs.staffs_catogories,staffs.staffs_type,appointment.*,appointment_details.appointment_id,appointment_details.appointment_date from staffs,appointment,appointment_details where ap
pointment.staffs_id=staffs.staffs_id and appointment.appointment_id=appointment_details.appointment_id and staffs.staffs_type='doctor'and staffs.staffs_catogories='certified';

 STAFFS_ID STAFFS_CATOGORIES
                                             STAFFS_TYPE
                                                                                 APPOINTMENT_ID PATIENT_ID  STAFFS_ID APPOINTMENT_ID APPOINTME
---------- --------------------------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------- ------------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------ ------------- ---------- ---------- -------------- ---------
         5 certified
                                                  doctor
                                                                                              5          6          5              5 04-DEC-19
         5 certified
                                                  doctor
                                                                                              9          2          5              9 09-DEC-19
```

Figure 32: list of certified doctor with their appointment charge

4.1.4. List all staffs that are also a patient.

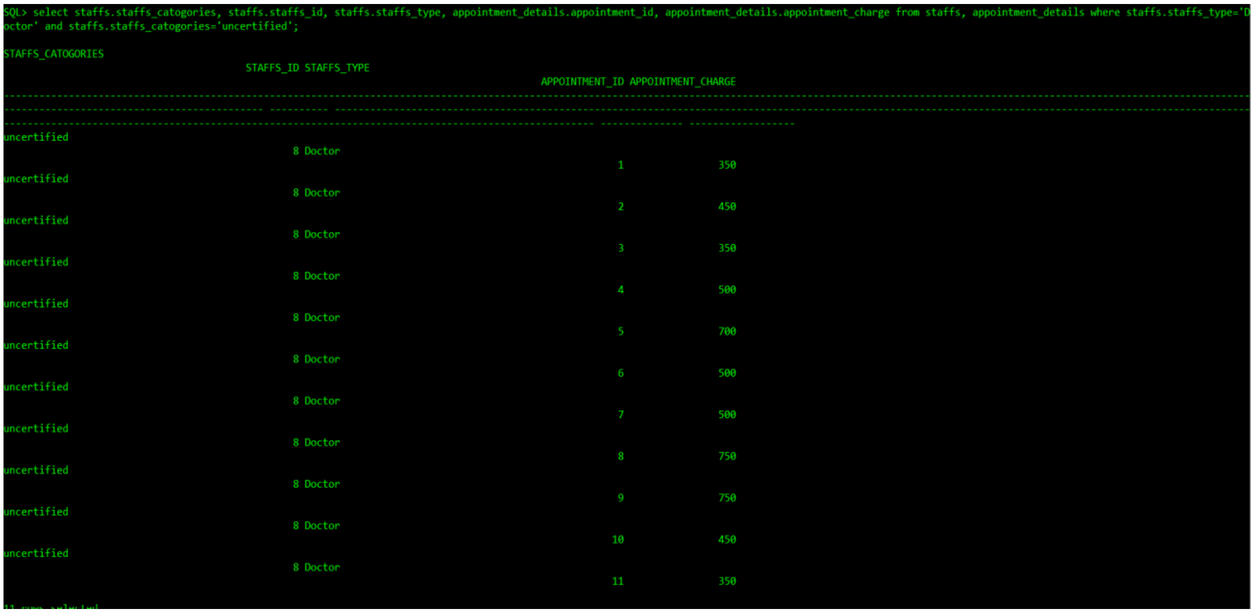


```
SQL> select staffs.staffs_id, staffs.staffs_name, staffs.patient_type from staffs where staffs.patient_type='yes';

 STAFFS_ID STAFFS_NAME
                                                            PATIENT_TYPE
--------- ------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------- ---------------------------------------------------------------------------
------------------------------------------------------------------------------------------
        2 Hemant Yadav
                                                                                                                          yes
        3 sita singh
                                                                                                                          yes
        4 Rani kashap
                                                                                                                          yes
        8 Om Parkash
                                                                                                                          yes
```

Figure 33: list of staffs who are also patient

4.2. Transaction Queries

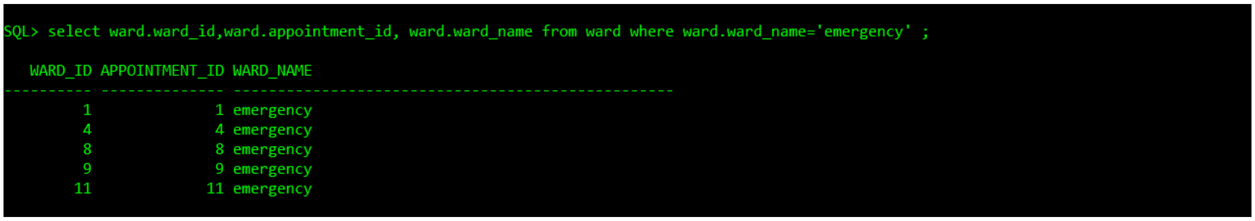
4.2.1. List all uncertified doctors who have been attended an appointment for a treatment and the amount he/she have paid.



```
SQL> select staffs.staffs_catogories, staffs.staffs_id, staffs.staffs_type, appointment_details.appointment_id, appointment_details.appointment_charge from staffs, appointment_details where staffs.staffs_type='D
octor' and staffs.staffs_catogories='uncertified';

STAFFS_CATOGORIES
                                   STAFFS_ID STAFFS_TYPE
                                                                            APPOINTMENT_ID APPOINTMENT_CHARGE
------------------------------------------------------------------------------------------------------------------------
---------------------------------------- ---------- ----------------------------------------------------------------------
------------------------------------------------------------------------------------------ ------------- -----------------
uncertified
                                           8 Doctor
                                                                                         1              350
uncertified
                                           8 Doctor
                                                                                         2              450
uncertified
                                           8 Doctor
                                                                                         3              350
uncertified
                                           8 Doctor
                                                                                         4              500
uncertified
                                           8 Doctor
                                                                                         5              700
uncertified
                                           8 Doctor
                                                                                         6              500
uncertified
                                           8 Doctor
                                                                                         7              500
uncertified
                                           8 Doctor
                                                                                         8              750
uncertified
                                           8 Doctor
                                                                                         9              750
uncertified
                                           8 Doctor
                                                                                        10              450
uncertified
                                           8 Doctor
                                                                                        11              350

11 rows selected.
```

Figure 34: list of uncertified doctor who attended appointment with their appointment charge

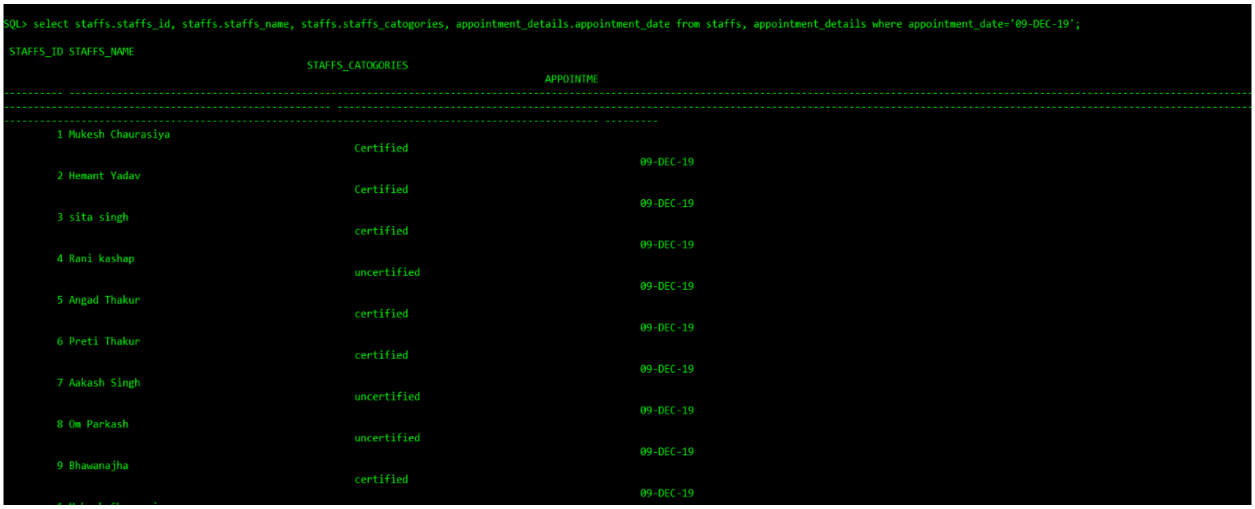
4.2.2. List the appointments that have been conducted in an emergency ward.



```
SQL> select ward.ward_id,ward.appointment_id, ward.ward_name from ward where ward.ward_name='emergency' ;

   WARD_ID APPOINTMENT_ID WARD_NAME
---------- -------------- --------------------------------------------------
         1              1 emergency
         4              4 emergency
         8              8 emergency
         9              9 emergency
        11             11 emergency
```

Figure 35: list of appointment conducted in emergency ward

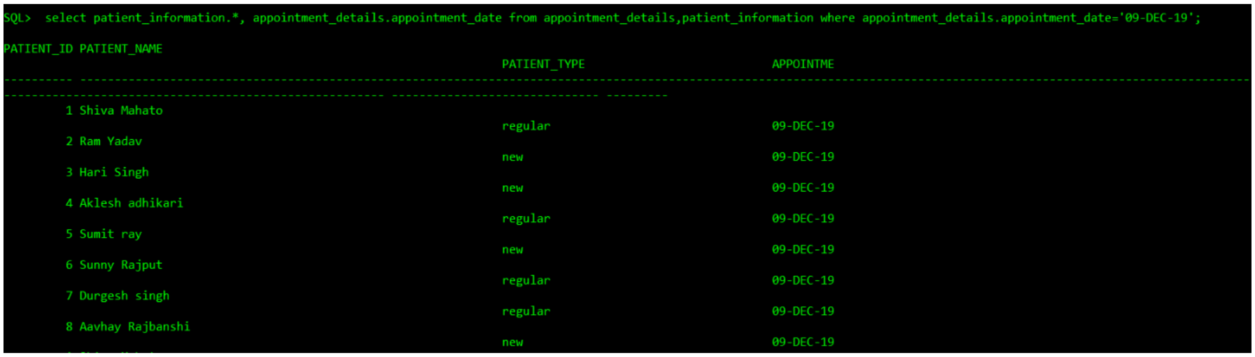
4.2.3. List all staffs (certified and uncertified) who have conducted or will conduct an appointment on a given date.



```
SQL> select staffs.staffs_id, staffs.staffs_name, staffs.staffs_catogories, appointment_details.appointment_date from staffs, appointment_details where appointment_date='09-DEC-19';

 STAFFS_ID STAFFS_NAME
                                                    STAFFS_CATOGORIES
                                                                                          APPOINTME
---------- ----------------------------------------------------------------------------------------------------
-------------------------------------------------- ----------------------------------------------------------
-------------------------------------------------------------------------------------------- ---------
         1 Mukesh Chaurasiya
                                                            Certified
                                                                                                 09-DEC-19

         2 Hemant Yadav
                                                            Certified
                                                                                                 09-DEC-19

         3 sita singh
                                                            certified
                                                                                                 09-DEC-19

         4 Rani kashap
                                                            uncertified
                                                                                                 09-DEC-19

         5 Angad Thakur
                                                            certified
                                                                                                 09-DEC-19

         6 Preti Thakur
                                                            certified
                                                                                                 09-DEC-19

         7 Aakash Singh
                                                            uncertified
                                                                                                 09-DEC-19

         8 Om Parkash
                                                            uncertified
                                                                                                 09-DEC-19

         9 Bhawanajha
                                                            certified
                                                                                                 09-DEC-19
```

Figure 36: list of staffs who will/have conduct appointment on the given date

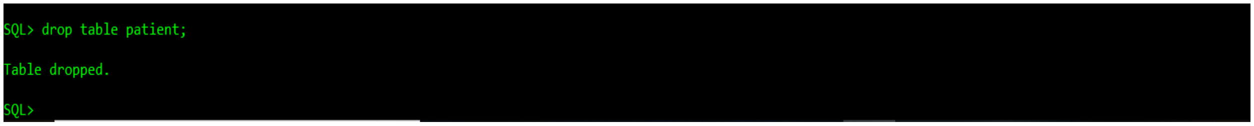
4.2.4. List all patients booked for an appointment on a given date.



```
SQL>  select patient_information.*, appointment_details.appointment_date from appointment_details,patient_information where appointment_details.appointment_date='09-DEC-19';

PATIENT_ID PATIENT_NAME
                                                                         PATIENT_TYPE                          APPOINTME
---------- ------------------------------------------------------------------------------------------------------------------------------------------------------------------------
------------------------------------------------------- ------------------------------ ---------
         1 Shiva Mahato
                                                                         regular                               09-DEC-19
         2 Ram Yadav
                                                                         new                                   09-DEC-19
         3 Hari Singh
                                                                         new                                   09-DEC-19
         4 Aklesh adhikari
                                                                         regular                               09-DEC-19
         5 Sumit ray
                                                                         new                                   09-DEC-19
         6 Sunny Rajput
                                                                         regular                               09-DEC-19
         7 Durgesh singh
                                                                         regular                               09-DEC-19
         8 Aavhay Rajbanshi
                                                                         new                                   09-DEC-19
```

Figure 37: list of all patient booked for an appointment on a given date

4.3. Drop table:



```
SQL> drop table patient;

Table dropped.

SQL>
```

Figure 38: figure of dropping patient table

5. Critical Evaluation

5.1. Learning Experience

As normalization is very tough to do, I have very little knowledge about normalization terms like partial dependency and transitive dependency. At first I consort with teacher and then friends. By getting knowledge about partial and transitive dependency, I started our coursework. At first we list data in UNF either data are repeated or not then we remove data repetition in 1NF like address is removed in above normalization, then we see partial dependency in the data list. If partial dependency are present then we remove partial dependency. Then we see transitive dependency. By scenario of our coursework which is about to store patient information. Here we know how the system works with database. Here all assumption and business ruled are fixed before any patient visit. By doing this coursework, we get more confidence to do hard and complex queries, table joining knowledge etc. But due to the continuous research, solution were raised. Several websites and YouTube channels were preferred for the solution. While doing in this coursework, the ability of doing research was gained and sound knowledge of normalisation was acquired.

5.2. Critical assessment of coursework

As the most aim and objective of this coursework is to get knowledge about normalization. We have to create knowledge about normalization from UNF to 3NF. As database is very important module, which will run till this module year, and help in different module subject like software engineering and programming.

The knowledge and skill gained from database module will be very helpful in future career. In today world, data is increasing day by day in every field. To store it systematically database is important. Thus, this module is important for our future career.

6. Bibliography:

Bibliography

Shah, N. (2005). In *Database System Using Oracle (A simplified Guide to SQL and PL/SQL)* (p. 26). Asoke K. Ghose, PHI Learning private Limited, New Delhi.