COVID MANAGEMENT SYSTEM

IT615 – Database Management System

"Data is a tool for enhancing intuition"

Group ID: 33

Nishant Koradia(202118009)

Dhairya Lakhani(202118012)

Kandarp Parmar(202118027)

Vidhi Shah(202118037)

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1. Scope of the Database

This project involves the proper details of covid services at different pin codes:

Like: Laboratories, Hospitals according to individual's budget, beds availability, doctors, nurses and other staff members, medication of patients.

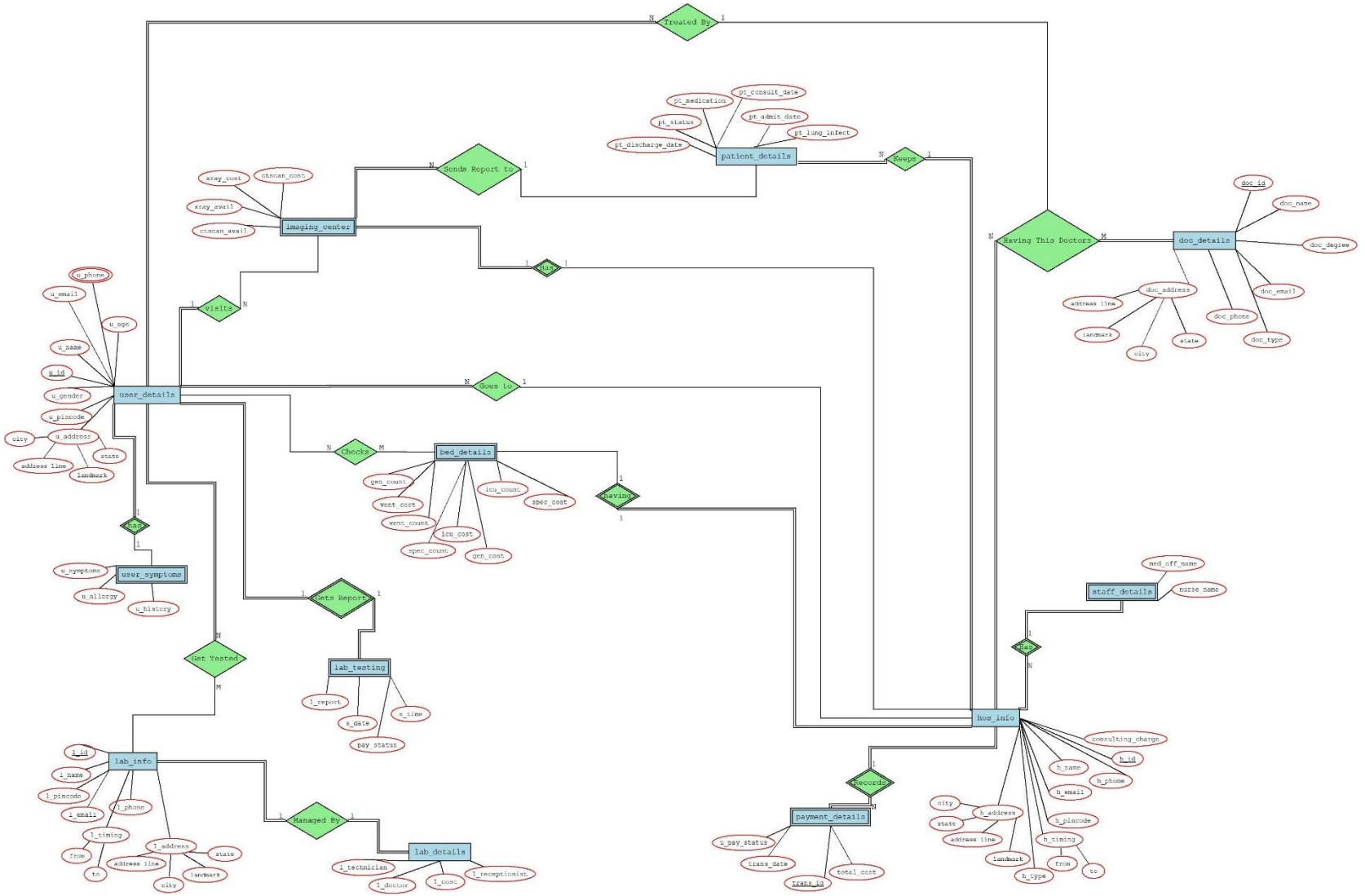
2. Description

For the last two years, the entire world is experiencing the desolation and devastation of the deadly virus named COVID-19 (SARS – CoV 2) which has affected more than 200 countries and millions of people. During this period doctors and other staff members were the frontline warriors helping people to recover from this deadly virus. As cases started increasing, it led to major mismanagement due to which infection increased, following to death of hundreds.

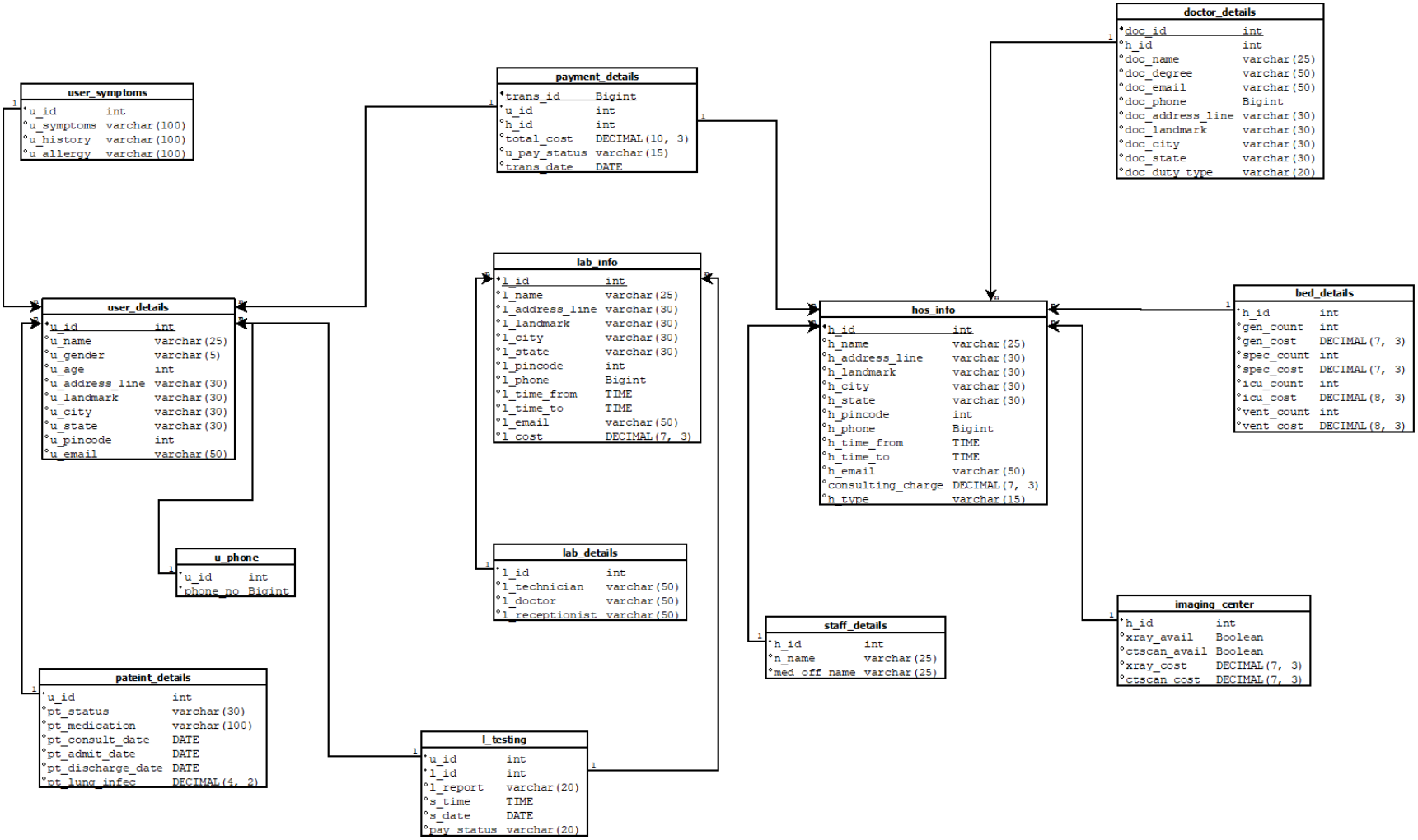
Taking that into consideration our project is focused on the management of this situation by allowing an individual to get all the information related to treatment according to their pin codes. This project can directly come into action with the first step itself. If the User is getting any symptoms of covid then he/she can consult a doctor nearest to him/her in the area. If symptoms are considerable then a Consulting doctor can prescribe for getting tested. So, the user can search for the laboratory in that area. After getting tested if the user gets a report positive then he can again consult the doctor for asking to be home quarantined or getting admitted to a hospital.

If the user is suggested for getting admitted to a hospital, then the user can search for the hospital nearby his/her location according to the budget by looking at the average cost of a hospital and availability of beds for treatment. Users can also get to know the various information about doctors, nurses, and other staff members who are treating in that hospital in different shifts. Users can also get to know the medication which will be provided by the hospital. When the user gets cured then after his/her discharging process the availability of beds can be updated which can be helpful for other users.

3. Entity Relationship Diagram



4. Relational Schema



5. Functional Dependencies

1) user_details (This table is in 2NF form)

(u_id, u_name, u_gender, u_age, u_address_line , u_state, u_city, u_landmark, u_pincode , u_email)

{u_id} -> u_name

{u_id} -> u_gender

{u_id} -> u_age

{u_id} -> u_address_line

{u_id} -> u_city

{u_id} -> u_state

{u_id} -> u_pincode

{u_id} -> u_email

{u_pincode} -> u_city

{u_pincode} -> u_state

Normalization to 3NF and BCNF:-

u_pincode is not unique, thus it is in 2NF form. So to convert it to BCNF u_id and u_pincode will be together declared as a super key which will uniquely identify user city and user state.

{u_id} -> u_name

{u_id} -> u_gender

{u_id} -> u_age

{u_id} -> u_address_line

{u_id} -> u_city

{u_id} -> u_state

{u_id} -> u_pincode

{u_id} -> u_email

{ u_id ,u_pincode} -> u_city

{ u_id ,u_pincode} -> u_state

PRIMARY KEY:- {u_id}

FOREIGN KEY:- None

PRIME ATTRIBUTE:- u_id, u_pincode

NON–PRIME ATTRIBUTE:- u_name, u_gender, u_age, u_address_line , u_state, u_city, u_landmark, u_email

2) user_symptoms (This table is in 3NF and BCNF form)

(u_id , u_symptoms , u_history , u_allergy)

{u_id} -> u_symptoms

{u_id} -> u_history

{u_id} -> u_allergy

PRIMARY KEY:- None

FOREIGN KEY:- {u_id}

PRIME ATTRIBUTE:- u_id

NON–PRIME ATTRIBUTE: u_symptoms , u_history , u_allergy

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

3) u_phone (This table is in 3NF and BCNF form)

(u_id, phone_no)

{u_id} -> phone_no

PRIMARY KEY:- None

FOREIGN KEY:- {u_id}

PRIME ATTRIBUTE:- u_id

NON–PRIME ATTRIBUTE:- phone_no

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

4) lab_info (This table is in2NF form)

l_id, l_name , l_address_line , l_state, l_city, l_landmark , l_pincode , l_phone , l_timing , l_email , l_cost

{l_id} -> l_name

{l_id} -> l_address_line

{l_id} -> l_state

{l_id} -> l_city

{l_id} -> l_landmark

{l_id} -> l_pincode

{l_id} -> l_phone

{l_id} -> l_timing

{l_id} -> l_email

{l_id} -> l_cost

{l_pincode} -> l_city

{l_pincode} -> l_state

Normalization to 3NF and BCNF:-

l_pincode is not unique, thus it is in 2NF form. So to convert it to BCNF l_id and l_pincode will be together declared as a super key which will uniquely identify lab city and lab state.

{l_id} -> l_name

{l_id} -> l_address_line

{l_id} -> l_state

{l_id} -> l_city

{l_id} -> l_landmark

{l_id} -> l_pincode

{l_id} -> l_phone

{l_id} -> l_timing

{l_id} -> l_email

{l_id} -> l_cost

{ l_id , l_pincode} -> l_city

{ l_id , l_pincode} -> l_state

PRIMARY KEY:- {l_id}

FOREIGN KEY:- None

PRIME ATTRIBUTE:- l_id, l_pincode

NON–PRIME ATTRIBUTE:- l_name , l_address_line , l_state, l_city, l_landmark, l_phone , l_timing , l_email , l_cost

5) lab_details (This table is in 3NF and BCNF form)

(l_id, l_technician , l_doctor , l_receptionist)

{l_id} -> l_technician

{l_id} -> l_doctor

{l_id} -> l_receptionist

PRIMARY KEY:- None

FOREIGN KEY:- {l_id}

PRIME ATTRIBUTE:- l_id

NON–PRIME ATTRIBUTE:- l_technician , l_doctor , l_receptionist

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

6) lab_testing (This table is in 3NF and BCNF form)

(l_id , u_id , l_report , s_time , s_date , pay_status)

{ l_id , u_id } -> l_report

{ l_id , u_id } -> s_time

{ l_id , u_id } -> s_date

{ l_id , u_id } -> pay_status

PRIMARY KEY:- None

FOREIGN KEY:- { l_id , u_id }

PRIME ATTRIBUTE:- l_id , u_id

NON–PRIME ATTRIBUTE:- l_report , s_time , s_date , pay_status

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

7) hos_info (This table is 2NF form)

(h_id, h_name , h_address_line, h_landmark , h_city, h_state, h_pincode , h_phone , h_timing , h_email , consulting_charge , h_type)

{h_id} -> h_name

{h_id} -> h_address_line

{h_id} ->h_landmark

{h_id} -> h_city

{h_id} -> h_state

{h_id} -> h_pincode

{h_id} -> h_phone

{h_id} -> h_timing

{h_id} -> h_email

{h_id} -> consulting_charge

{h_id} -> h_type

{h_pincode} -> h_city

{h_pincode} -> h_state

Normalization to 3NF and BCNF:-

h_pincode is not unique, thus it is in 2NF form. So to convert it to BCNF h_id and h_pincode will be together declared as a super key which will uniquely identify hospital city and hospital state.

{h_id} -> h_name

{h_id} -> h_address_line

{h_id} ->h_landmark

{h_id} -> h_city

{h_id} -> h_state

{h_id} -> h_pincode

{h_id} -> h_phone

{h_id} -> h_timing

{h_id} -> h_email

{h_id} -> consulting_charge

{h_id} -> h_type

{ h_id , h_pincode} -> h_city

{ h_id , h_pincode} -> h_state

PRIMARY KEY:- {h_id}

FOREIGN KEY:- None

PRIME ATTRIBUTE:- h_id, h_pincode

NON–PRIME ATTRIBUTE:- h_name , h_address_line, h_landmark , h_city, h_state, h_phone , h_timing , h_email , consulting_charge , h_type

8) doc_details (This table is in 3NF and BCNF form)

(h_id , doc_id , doc_name , doc_degree , doc_email , doc_phone , doc_address_line ,doc_city , doc_state, doc_landmark , doc_type)

{ h_id , doc_id} -> doc_name

{ h_id , doc_id} -> doc_degree

{ h_id , doc_id} -> doc_email

{ h_id , doc_id} -> doc_phone

{ h_id , doc_id} -> doc_address

{ h_id , doc_id} -> doc_city

{ h_id , doc_id} -> doc_state

{ h_id , doc_id} -> doc_landmark

{ h_id , doc_id} -> doc_type

PRIMARY KEY:- {doc_id}

FOREIGN KEY:- {h_id}

PRIME ATTRIBUTE:- h_id ,doc_id

NON–PRIME ATTRIBUTE:- doc_name , doc_degree , doc_email , doc_phone , doc_address_line ,doc_city , doc_state, doc_landmark , doc_type

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

9) patient_details (This table is in 3NF and BCNF form)

(u_id , pt_status , pt_medication , pt_consultdate , pt_admitdate , pt_dischargedate , pt_lung_infec)

{u_id} -> pt_status

{u_id} -> pt_medication

{u_id} -> pt_consultdate

{u_id} -> pt_admitdate

{u_id} -> pt_dischargedate

{u_id} -> pt_lung_infec

PRIMARY KEY:- None

FOREIGN KEY:- {u_id}

PRIME ATTRIBUTE:- u_id

NON–PRIME ATTRIBUTE:- pt_status , pt_medication , pt_consultdate , pt_admitdate , pt_dischargedate , pt_lung_infec

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

10) staff_details (This table is in 3NF and BCNF form)

(h_id , n_name , med_off_name)

{h_id} -> n_name

{h_id} -> med_off_name

PRIMARY KEY:- None

FOREIGN KEY:- {h_id}

PRIME ATTRIBUTE:- h_id

NON–PRIME ATTRIBUTE:- n_name , med_off_name

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

11) bed_details (This table is in 3NF and BCNF form)

(h_id , gen_count , gen_cost , spec_count , spec_cost, icu_count , icu_cost , vent_count , vent_cost)

{h_id} -> gen_count

{h_id} -> gen_cost

{h_id} -> spec_count

{h_id} -> spec_cost

{h_id} -> icu_count

{h_id} -> icu_cost

{h_id} -> vent_count

{h_id} -> vent_cost

PRIMARY KEY:- None

FOREIGN KEY:- {h_id}

PRIME ATTRIBUTE:- h_id

NON–PRIME ATTRIBUTE:- gen_count , gen_cost , spec_count , spec_cost, icu_count , icu_cost , vent_count , vent_cost

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

12) payment_details (This table is in 3NF and BCNF form)

(u_id, h_id , total_cost , upay_status ,trans_id , trans_date)

{trans_id} -> u_id

{trans_id} -> h_id

{trans_id} -> total_cost

{trans_id} -> upay_status

{trans_id} -> trans_date

PRIMARY KEY:- {trans_id}

FOREIGN KEY:- {u_id,h_id}

PRIME ATTRIBUTE:- trans_id

NON–PRIME ATTRIBUTE:- total_cost , upay_status , trans_date, h_id , u_id

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

13) imaging_centre (This table is in 3NF and BCNF form)

(h_id , xray_avail , ctscan_avail , xray_cost , ctscan_cost)

{h_id} -> xray_avail

{h_id} -> ctscan_avail

{h_id} -> xray_cost

{h_id} -> ctscan_cost

PRIMARY KEY:- None

FOREIGN KEY:- {h_id}

PRIME ATTRIBUTE:- h_id

NON–PRIME ATTRIBUTE:- xray_avail , ctscan_avail , xray_cost , ctscan_cost

Reason:-

A relation is in third normal form and BCNF, as there is no transitive dependency for non-prime attributes as well as it is in second normal form.

6. DDL Script

```
create schema covid_management;
set search_path to covid_management;

CREATE TABLE user_details (
u_id INT PRIMARY KEY,
u_name VARCHAR(25) NOT NULL,
u_gender VARCHAR(5) NOT NULL,
u_age INT NOT NULL,
u_address_line VARCHAR(30) NOT NULL,
u_landmark VARCHAR(30),
u_city VARCHAR(30) NOT NULL,
u_state VARCHAR(30) NOT NULL,
u_pincode INT NOT NULL,
u_email VARCHAR(50)
);

CREATE TABLE u_phone (
u_id INT,
phone_no BIGINT NOT NULL,
FOREIGN KEY (u_id) REFERENCES user_details(u_id)
ON DELETE CASCADE ON UPDATE CASCADE
);

CREATE TABLE user_symptoms (
u_id INT ,
u_symptoms varchar(100),
u_history varchar(100),
u_allergy varchar(100),
Foreign key (u_id) references user_details(u_id) on delete cascade on update cascade
```

```
);

CREATE TABLE lab_info (
l_id INT PRIMARY KEY,
l_name VARCHAR(25) NOT NULL,
l_address_line VARCHAR(30) NOT NULL,
l_landmark VARCHAR(30),
l_city VARCHAR(30) NOT NULL,
l_state VARCHAR(30) NOT NULL,
l_pincode INT NOT NULL,
l_phone BIGINT NOT NULL,
l_time_from TIME,
l_time_to TIME,
l_email VARCHAR(50) NOT NULL,
l_cost DECIMAL(7,3) NOT NULL
);

CREATE TABLE lab_details (
l_id INT ,
l_technician varchar(50) Not null,
l_doctor varchar(50) not null,
l_receptionist varchar(50) not null,
Foreign key (l_id) references lab_info(l_id) on delete cascade on update cascade
);

CREATE TABLE l_testing (
u_id INT,
l_id int,
l_report varchar(20) Not null,
s_time time not null,
s_date date not null,
```

```
pay_status varchar(20) not null,
Foreign key (l_id) references lab_info(l_id) on delete cascade on update cascade,
Foreign key (u_id) references user_details(u_id) on delete cascade on update cascade
);

CREATE TABLE hos_info (
h_id INT PRIMARY KEY,
h_name VARCHAR(25) NOT NULL,
h_address_line VARCHAR(30) NOT NULL,
h_landmark VARCHAR(30),
h_city VARCHAR(30) NOT NULL,
h_state VARCHAR(30) NOT NULL,
h_pincode INT NOT NULL,
h_phone BIGINT NOT NULL,
h_time_from TIME,
h_time_to TIME,
h_email VARCHAR(50) NOT NULL,
consulting_charge DECIMAL(7,3) NOT NULL,
h_type VARCHAR(15) NOT NULL
);

CREATE TABLE patient_details (
u_id INT,
pt_status VARCHAR(30) NOT NULL,
pt_medication varchar(100) Not null,
pt_consult_date DATE not null,
pt_admit_date date,
pt_discharge_date DATE,
pt_lung_infec DECIMAL(4,2),
Foreign key (u_id) references user_details(u_id) on delete cascade on update cascade
);
```

```
CREATE TABLE doctor_details (
doc_id INT PRIMARY KEY,
h_id int,
doc_name varchar(25) Not null,
doc_degree varchar(50) not null,
doc_email varchar(50) not null,
doc_phone BIGINT not null,
doc_address_line varchar(30) not null,
doc_landmark varchar(30),
doc_city varchar(30) not null,
doc_state varchar(30) not null,
doc_duty_type varchar(20) not null,
Foreign key (h_id) references hos_info(h_id) on delete cascade on update cascade
);

CREATE TABLE bed_details (
h_id int,
gen_count int Not null,
gen_cost decimal(7,3) not null,
spec_count int not null,
spec_cost decimal(7,3) not null,
icu_count int Not null,
icu_cost decimal(8,3) not null,
vent_count int Not null,
vent_cost decimal(8,3) not null,
Foreign key (h_id) references hos_info(h_id) on delete cascade on update cascade
);

CREATE TABLE imaging_center (
h_id int,
```

```
xray_avail BOOLEAN Not null,
ctscan_avail BOOLEAN not null,
xray_cost decimal(7,3) not null,
ctscan_cost decimal(7,3) not null,
Foreign key (h_id) references hos_info(h_id) on delete cascade on update cascade
);

CREATE TABLE staff_details (
h_id int,
n_name varchar(25) not null,
med_off_name varchar(25) not null,
Foreign key (h_id) references hos_info(h_id) on delete cascade on update cascade
);

CREATE TABLE payment_details (
u_id int,
h_id int,
total_cost Decimal(10, 3) not null,
u_pay_status varchar(15) not null,
trans_id BIGINT PRIMARY KEY,
trans_date DATE not null,
Foreign key (h_id) references hos_info(h_id) on delete cascade on update cascade,
Foreign key (u_id) references user_details(u_id) on delete cascade on update cascade
);
```

7. DML Script

```
INSERT INTO user_details
(u_id,u_name,u_gender,u_age,u_address_line,u_landmark,u_city,u_state,u_pincode,u_email)

VALUES (1,'Nishant','M',25,'Satyam Flats,Naroda','Galaxy
Cinema','Ahmedabad','Gujarat',382330,'nisk01@gmail.com'),

(2,'Vidhi','F',21,'166, Sector
27','Anandnagar','Gandhinagar','Gujarat',382028,'vidhi09@gmail.com'),

(3,'Dhairya','M',33,'Flora Appartments, Navrangpura','Near Police
Station','Ahmedabad','Gujarat',382335,'dl11@gmail.com'),

(4,'Kandarp','M',40,'27/B Akota','','Vadodara','Gujarat',382122,'kp102@gmail.com'),

(5,'Bhumi','F',43,'Shivam Plots, Gulbai Tekra','Post
Office','Ahmedabad','Gujarat',382340,'bhumii67@gmail.com');


INSERT INTO u_phone(u_id,phone_no)

VALUES (1,9658742310),

(1,9106822019),

(2,7846201365),

(3,9648751203),

(4,7845120036),

(5,9632012478);


INSERT INTO user_symptoms (u_id,u_symptoms,u_history,u_allergy)

VALUES (1,'Coughing,Headache','Diabetes',''),

(2,'Fever,SoreThroat','',''),

(3,'Coughing,Fever','','ibuprofen antibiotic'),

(4,'Headache,Chest Pain','BP',''),

(5,'Chest Pain,SoreThroat','Cholesterol','');


Insert into lab_info(l_id, l_name, l_address_line, l_landmark, l_city, l_state, l_pincode, l_phone,
l_time_from, l_time_to, l_email, l_cost)
```

values (101, 'Freberg', 'Bhagabhai ni vadi', 'Civil', 'Ahmedabad', 'Gujarat', 382310, 9876545678, '08:00:00', '21:00:00', 'freberg@gmail.com', 2000);

Insert into lab_info(l_id, l_name, l_address_line, l_landmark, l_city, l_state, l_pincode, l_phone, l_time_from, l_time_to, l_email, l_cost)

values (103, 'Neuberg','vijaybhai ni vadi', 'Gosai land', 'Udaipur', 'Rajasthan', '376514', '8765432107', '09:00:00', '20:00:00', 'neuberg@gmail.com', '1000');

Insert into lab_info(l_id, l_name, l_address_line, l_landmark, l_city, l_state, l_pincode, l_phone, l_time_from, l_time_to, l_email, l_cost)

values (102, 'Supratech', 'Bhaveshbhai ni vadi', 'Navrangpura', 'Ahmedabad', 'Gujarat', '382350', '9876543210', '09:00:00', '20:00:00', 'supratech@gmail.com', '1500');

Insert into lab_info(l_id, l_name, l_address_line, l_landmark, l_city, l_state, l_pincode, l_phone, l_time_from, l_time_to, l_email, l_cost)

values (104, 'Greencross', 'Kavi nanalal marg', 'Ravjinagar', 'Ahmedabad', 'Gujarat', '382360', '9876543213', '07:00:00', '22:00:00', 'greencross@gmail.com', '2000');

Insert into lab_info(l_id, l_name, l_address_line, l_landmark, l_city, l_state, l_pincode, l_phone, l_time_from, l_time_to, l_email, l_cost)

values (105, 'Sarkari Lab', 'Nobal nagar society', 'Naroda', 'Ahmedabad', 'Gujarat', '382330', '9876576543', '10:00:00', '17:00:00', 'sarkarilab@gmail.com', '500');

INSERT INTO patient_details
(u_id,pt_status,pt_medication,pt_consult_date,pt_admit_date,pt_discharge_date,pt_lung_infec)

VALUES

(1,'Home Quarantine','steroids,favipiravir','01-08-2021',NULL,NULL,16),

(3,'Admitted','ivermectin,steroids','2021-07-27','2021-08-01','2021-08-15',55),

(4,'Admitted','favipiravir,steroids','2021-03-12','2021-03-15','2021-03-29',57),

(5,'Admitted','Remdesivir,favipiravir','2021-05-25','2021-05-27','2021-06-10',50);

Insert into hos_info(h_id, h_name, h_address_line, h_landmark, h_city, h_state, h_pincode, h_phone, h_time_from, h_time_to, h_email, consulting_charge, h_type)

values (1001, 'AIIMS', '116/A LalBahadur marg', 'Vidhansabha', 'Ahmedabad', 'Gujarat', '382330', '9876789878', '00:00:00', '24:00:00', 'AIIMS@gmail.com', '2000' , 'Private');

Insert into hos_info(h_id, h_name, h_address_line, h_landmark, h_city, h_state, h_pincode, h_phone, h_time_from, h_time_to, h_email, consulting_charge, h_type)

values (1003, 'Nishant Hospital', '132/B Apex', 'Gulbai Tekra', 'Ahmedabad', 'Gujarat', '382340', '789669027', '00:00:00', '24:00:00', 'nishos@gmail.com', '1500' , 'Private');

Insert into hos_info(h_id, h_name, h_address_line, h_landmark, h_city, h_state, h_pincode, h_phone, h_time_from, h_time_to, h_email, consulting_charge, h_type)

values (1002, 'Civil', '116/A Chakabhai no road', 'Judges Bungla' ,'Udaipur', 'Rajasthan', '376514', '8765432104', '08:00:00', '20:00:00', 'civil@gmail.com', '1200', 'Government');

Insert into hos_info(h_id, h_name, h_address_line, h_landmark, h_city, h_state, h_pincode, h_phone, h_time_from, h_time_to, h_email, consulting_charge, h_type)

values (1004, 'Zydus', 'S.G.Highway', 'Satellite' ,'Ahmedabad', 'Gujarat', '376515', '78452309631', '07:00:00', '24:00:00', 'zydus01@gmail.com', '1400', 'Private');

Insert into hos_info(h_id, h_name, h_address_line, h_landmark, h_city, h_state, h_pincode, h_phone, h_time_from, h_time_to, h_email, consulting_charge, h_type)

values (1005, 'Sal Hospital', '120 Naranpura', 'Near Police Station' ,'Ahmedabad', 'Gujarat', '376590', '9874520013', '08:00:00', '20:00:00', 'sal01@gmail.com', '2000', 'Private');

Insert into staff_details(h_id, n_name, med_off_name)

values (1001, 'Archana Singh', 'Dr. John Simons');

Insert into staff_details(h_id, n_name, med_off_name)

values (1002, 'Pritha Thakkar', 'Dr. Prakash Javdekar');

Insert into staff_details(h_id, n_name, med_off_name)

values (1003, 'Vidhi Shah', 'Dr. Dhaval Boriwala');

Insert into staff_details(h_id, n_name, med_off_name)

values (1004, 'Dhruti Soneji', 'Dr. Suresh Patel');

Insert into staff_details(h_id, n_name, med_off_name)

values (1005, 'Vaishali Patel', 'Dr. Gyanendra Singh');

Insert into lab_details(l_id, l_technician, l_doctor, l_receptionist)

values (101,'Manav Desai','Dr. Ravi Shastri','Swati Parmar'),

(102,'Priya Singh','Dr. Aditi Jaiswal','Sameer Gandhi'),

(103,'Abhishek Jha','Dr. Jainam Shah','Riya Patel'),

(104, 'Jenil Doshi', 'Dr. Vikas Sharma', 'Jhanvi Boriwala'),

(105, 'Vishal Vasoya', 'Dr. Kashish Kothari', 'Nidhi Sadhwani');

```
Insert into l_testing(u_id,l_id,l_report,s_time,s_date,pay_status)

values (1,102,'Positive','12:01:00','2021-07-29','Received'),

(2,103,'Negative','10:10:03','2021-09-04','Received'),

 (5,101,'Positive','11:15:18','2021-05-22','Pending'),

(3, 104, 'Positive','15:50:45', '2021-07-25', 'Received'),

(4, 105, 'Positive', '14:38:45', '2021-05-24', 'Pending');


Insert into doctor_details(doc_id, h_id, doc_name,
doc_degree,doc_email,doc_phone,doc_address_line,doc_landmark,doc_city,doc_state,doc_duty
_type)

values (301, 1001, 'Dr. Faizal Daruwala', 'MS Ortho', 'faizal@gmail.com', 6543223456, '112/B
Anandnagar', 'hemant store', 'Ahmedabad', 'Gujarat', 'Covid Duty');

Insert into doctor_details(doc_id, h_id, doc_name,
doc_degree,doc_email,doc_phone,doc_address_line,doc_landmark,doc_city,doc_state,doc_duty
_type)

values (302, 1002,'Dr. K.L.Kain', 'MS Physician', 'klkain12@gmail.com', 7460315602,'03/C
Shantipura', 'Near DMart', 'Ahmedabad', 'Gujarat', 'Counsulting');

Insert into doctor_details(doc_id, h_id, doc_name,
doc_degree,doc_email,doc_phone,doc_address_line,doc_landmark,doc_city,doc_state,doc_duty
_type)

values (303, 1003,'Dr.R.K.Mehta', 'MS Physician', 'rrs2@gmail.com', 9874560303,'19/A
Sindhubhavan Road', 'Near Ashok Vatika', 'Ahmedabad', 'Gujarat', 'Covid Duty');

Insert into doctor_details(doc_id, h_id, doc_name,
doc_degree,doc_email,doc_phone,doc_address_line,doc_landmark,doc_city,doc_state,doc_duty
_type)

values (304, 1004,'Dr.Sameer Shah', 'MS Physician', 'fgh2@gmail.com', 9856936320,'199 CG Road',
'Near Vartika Park', 'Ahmedabad', 'Gujarat', 'Covid Duty');

Insert into doctor_details(doc_id, h_id, doc_name,
doc_degree,doc_email,doc_phone,doc_address_line,doc_landmark,doc_city,doc_state,doc_duty
_type)

values (305, 1005,'Dr.Mihir Mehta', 'MS Ortho', 'tyu2@gmail.com', 7458992036,'260 ambavadi',
'New school road', 'Ahmedabad', 'Gujarat', 'Covid Duty');
```

```
INSERT INTO
bed_details(h_id,gen_count,gen_cost,spec_count,spec_cost,icu_count,icu_cost,vent_count,vent
_cost)

VALUES (1001,5,'500',3,'1000',1,'1500',2,'2000'),

(1002,3,'300',2,'600',1,'900',3,'1200'),

(1003,5,'1000',4,'2000',5,'3500',1,'5000'),

(1004,6,'2000',5,'4000',3,'6000',1,'9000'),

(1005,4,'1500',10,'2700',5,'4000',4,'7000');


INSERT INTO imaging_center(h_id,xray_avail,ctscan_avail,xray_cost,ctscan_cost)

VALUES (1002,'TRUE','TRUE','500','6000'),

(1001,'TRUE','FALSE','700','00'),

(1003,'TRUE','TRUE','1000','6000'),

(1004,'TRUE', 'FALSE', '800', '00'),

(1005, 'FALSE', 'FALSE', '00', '00');



INSERT INTO payment_details(u_id,h_id,total_cost,u_pay_status,trans_id,trans_date)

VALUES (3,1002,'24567.67','Credit Card',1456203985632,'2021-08-15'),

(4,1001,'34523.56','Debit Card',1025889402113,'2021-03-29'),

(5,1003,'40000','Cash',7485966958320,'2021-06-10');
```

8. Queries

Q1:) List hospital name and contact number having lowest total cost among all the private hospitals.

SELECT h_name,h_phone,SUM(total_cost) FROM hos_info NATURAL JOIN payment_details WHERE h_type='Private' GROUP BY h_name,h_phone,total_cost ORDER BY total_cost asc LIMIT 1;

$$h\_name,h\_phone,total\_cost\,F_{h\_name,h\_phone,SUM(total\_cost)}(\sigma \text{ ORDER BY total\_cost asc LIMIT } 1)(\sigma \text{ h\_type='Private'} (hos\_info \bowtie payment\_details)))$$

Data Output | Explain | Messages | Notifications

	h_name character varying (25)	h_phone bigint	sum numeric
1	AIIMS	9876789878	34523.560

Q2:) List user's ID, name, history of those who are admitted in the hospital after being tested positive and has medical history.

SELECT user_details.u_id,u_name,u_history,pt_status FROM user_symptoms NATURAL JOIN patient_details NATURAL JOIN user_details WHERE pt_status='Admitted' AND u_history <> '';

$$\prod_{user\_details.u\_id,u\_name,u\_history,pt\_status} (\sigma \text{ pt\_status='Admitted' AND u\_history <> ''} (user\_symptoms \bowtie patient\_details \bowtie user\_details))$$

Data Output | Explain | Messages | Notifications

	u_id integer	u_name character varying (25)	u_history character varying (100)	pt_status character varying (30)
1	4	Kandarp	BP	Admitted
2	5	Bhumi	Cholesterol	Admitted

Q3:) List user's ID, Name, status, medication,doctor name of those who are admitted after being tested positive.

SELECT u_id,u_name,pt_status,pt_medication,h_name,doc_name FROM patient_details NATURAL JOIN user_details NATURAL JOIN payment_details NATURAL JOIN hos_info NATURAL JOIN doctor_details;

$$\prod_{u\_id,u\_name,pt\_status,pt\_medication,h\_name,doc\_name} (patient\_details \bowtie user\_details \bowtie payment\_details \bowtie hos\_info \bowtie doctor\_details)$$

Data Output | Explain | Messages | Notifications

	u_id integer	u_name character varying (25)	pt_status character varying (30)	pt_medication character varying (100)	h_name character varying (25)	doc_name character varying (25)
1	3	Dhairya	Admitted	ivermectin,steroids	Civil	Dr. K.L.Kain
2	4	Kandarp	Admitted	favipiravir,steroids	AIIMS	Dr. Faizal Daruwala
3	5	Bhumi	Admitted	Remdesivir,favipiravir	Nishant Hospital	Dr.R.K.Mehta

Q4) List all laboratory name, ID(103) and staff details(Receptionist, doctor and Technician) who are working in it.

SELECT li.l_id,l_name,l_technician,l_doctor,l_receptionist FROM lab_info AS li INNER JOIN lab_details AS ld ON li.l_id=ld.l_id WHERE li.l_id='103';

$$\prod_{li.l\_id,l\_name,l\_technician,l\_doctor,l\_receptionist}(\sigma_{li.l\_id='103'}(lab\_info\ li \bowtie_{li.l\_id=ld.l\_id} lab\_details\ ld))$$

Data Output | Explain | Messages | Notifications

	l_id integer	l_name character varying (25)	l_technician character varying (50)	l_doctor character varying (50)	l_receptionist character varying (50)
1	103	Neuberg	Abhishek Jha	Dr. Jainam Shah	Riya Patel

Q5) List user ID, user name, lab ID, lab name and cost of those users whose payment status is pending.

SELECT u_id,u_name,l_id,l_name,pay_status,l_cost FROM user_details NATURAL JOIN l_testing NATURAL JOIN lab_info WHERE pay_status='Pending';

$$\prod_{u\_id,u\_name,l\_id,l\_name,pay\_status,l\_cost}(\sigma_{pay\_status='Pending'} (user\_details \bowtie l\_testing \bowtie lab\_info))$$

Data Output | Explain | Messages | Notifications

	u_id integer	u_name character varying (25)	l_id integer	l_name character varying (25)	pay_status character varying (20)	l_cost numeric (7,3)
1	5	Bhumi	101	Freberg	Pending	2000.000
2	4	Kandarp	105	Sarkari Lab	Pending	500.000

Q6) List hospital ID, name, address, pincode, city, phone, email, type of those who are located in pincode='382330'

SELECT h_id, h_name, h_address_line,h_city,h_pincode,h_phone,h_type FROM hos_info WHERE h_pincode=382330;

$$\prod_{h\_id,h\_name,h\_address\_line,h\_city,h\_pincode,h\_phone,h\_type}(\sigma_{h\_pincode=382330}(hos\_info))$$

Data Output | Explain | Messages | Notifications

	h_id [PK] integer	h_name character varying (25)	h_address_line character varying (30)	h_city character varying (30)	h_pincode integer	h_phone bigint	h_type character varying (15)
1	1001	AIIMS	116/A LalBahadur marg	Ahmedabad	382330	9876789878	Private

Q7) Form a report by retrieving patient Id, medication, patient admit and discharge date, hospital, doctor, staff, and medical officer attending that patient with total cost.

SELECT user_details.u_id, pt_medication, pt_admit_date, pt_discharge_date, h_name, doc_name, n_name, med_off_name, total_cost FROM patient_details NATURAL JOIN user_details INNER JOIN payment_details ON user_details.u_id=payment_details.u_id NATURAL JOIN hos_info NATURAL JOIN staff_details NATURAL JOIN doctor_details;

$$\prod_{user\_details.u\_id,pt\_medication,pt\_admit\_date,pt\_discharge\_date,h\_name,doc\_name,n\_name,med\_off\_name,total\_cost}(patient\_details \bowtie user\_details \bowtie payment\_details \bowtie_{user\_details.u\_id=payment\_details.u\_id} hos\_info \bowtie staff\_details \bowtie doctor\_details)$$

Data Output | Explain | Messages | Notifications

	u_id integer	pt_medication character varying (100)	pt_admit_date date	pt_discharge_date date	h_name character varying (25)	doc_name character varying (25)	n_name character varying (25)	med_off_name character varying (25)	total_cost numeric (10,3)
1	3	ivermectin,steroids	2021-08-01	2021-08-15	Civil	Dr. K.L.Kain	Pritha Thakkar	Dr. Prakash Javdekar	24567.670
2	4	favipiravir,steroids	2021-03-15	2021-03-29	AIIMS	Dr. Faizal Daruwala	Archana Singh	Dr. John Simons	34523.560
3	5	Remdesivir,favipiravir	2021-05-27	2021-06-10	Nishant Hospital	Dr.R.K.Mehta	Vidhi Shah	Dr. Dhaval Boriwala	40000.000

Q8) List doctor Id, name, degree and duty type of MS Physician doctors assigned for Covid Duty only.

SELECT DISTINCT doc_id, doc_name, doc_degree, doc_duty_type FROM doctor_details WHERE doc_degree='MS Physician' EXCEPT SELECT doc_id, doc_name, doc_degree, doc_duty_type FROM doctor_details WHERE doc_duty_type='Counsulting';

$$(\prod_{doc\_id,doc\_name,doc\_degree,doc\_duty\_type}(\sigma_{doc\_degree='MS\ Physician'}(doctor\_details))) - (\prod_{doc\_id,doc\_name,doc\_degree,doc\_duty\_type}(\sigma_{doc\_duty\_type='Counsulting'}(doctor\_details)))$$

Data Output | Explain | Messages | Notifications

	doc_id integer	doc_name character varying (25)	doc_degree character varying (50)	doc_duty_type character varying (20)
1	304	Dr.Sameer Shah	MS Physician	Covid Duty
2	303	Dr.R.K.Mehta	MS Physician	Covid Duty

Q9) List ID and name of patient who availed both xray and ctscan from Government hospitals.

SELECT u_id, u_name FROM user_details NATURAL JOIN payment_details NATURAL JOIN hos_info NATURAL JOIN imaging_center WHERE xray_avail='true' AND ctscan_avail='true' INTERSECT SELECT u_id, u_name FROM user_details NATURAL JOIN payment_details NATURAL JOIN hos_info WHERE h_type='Government';

$$(\prod_{u\_id,u\_name}(\sigma_{xray\_avail='true'\ AND\ ctscan\_avail='true'}(user\_details \bowtie payment\_details \bowtie hos\_info \bowtie imaging\_center))) \cap (\prod_{u\_id,u\_name}(\sigma_{h\_type='Government'}(user\_details \bowtie payment\_details \bowtie hos\_info)))$$

Data Output | Explain | Messages | N

	u_id integer	u_name character varying (25)
1	3	Dhairya

Q10) List hospital name, type of hospital, contact number of those having one the facility, that is, xray or ctscan.

SELECT h_name, h_type, h_phone, xray_avail, ctscan_avail FROM hos_info NATURAL JOIN imaging_center WHERE xray_avail='true' UNION SELECT h_name, h_type, h_phone, xray_avail, ctscan_avail FROM hos_info NATURAL JOIN imaging_center WHERE ctscan_avail='true';

$$(\prod_{h\_name,h\_type,h\_phone,xray\_avail,ctscan\_avail} (\sigma_{xray\_avail='true'} (hos\_info \bowtie imaging\_center))) \cup (\prod_{h\_name,h\_type,h\_phone,xray\_avail,ctscan\_avail} (\sigma_{ctscan\_avail='true'} (hos\_info \bowtie imaging\_center)))$$

Data Output | Explain | Messages | Notifications

	h_name character varying (25)	h_type character varying (15)	h_phone bigint	xray_avail boolean	ctscan_avail boolean
1	Zydus	Private	78452309631	true	false
2	Nishant Hospital	Private	789669027	true	true
3	AIIMS	Private	9876789878	true	false
4	Civil	Government	8765432104	true	true

Q11) List ID, name of patient who is suffering from any allergy and recovered from Covid. Also display patient medication, admit date and discharge date for the same.

SELECT patient_details.u_id, u_name, u_allergy, pt_medication, pt_admit_date, pt_discharge_date FROM user_details NATURAL JOIN user_symptoms INNER JOIN patient_details ON user_details.u_id=patient_details.u_id WHERE u_allergy IS NOT NULL AND u_allergy <> '';

$$(\prod_{patient\_details.u\_id,u\_name,u\_allergy,pt\_medication,pt\_admit\_date,pt\_discharge\_date} (\sigma_{u\_allergy\ IS\ NOT\ NULL\ AND\ u\_allergy <> ''} (user\_details \bowtie user\_symptoms \bowtie_{user\_details.u\_id=patient\_details.u\_id} patient\_details)))$$

Data Output | Explain | Messages | Notifications

	u_id integer	u_name character varying (25)	u_allergy character varying (100)	pt_medication character varying (100)	pt_admit_date date	pt_discharge_date date
1	3	Dhairya	ibuprofen antibiotic	ivermectin,steroids	2021-08-01	2021-08-15

Q12) List of the patients that are tested positive and have lung infection more than 25% in order to get admitted to the hospital.

```
SELECT u_id, u_name, l_id, l_name, l_report, s_time, s_date, pt_lung_infec FROM patient_details NATURAL JOIN user_details NATURAL JOIN l_testing NATURAL JOIN lab_info WHERE l_report='Positive' AND pt_lung_infec>25;
```

$$\prod_{u\_id,u\_name,l\_id,l\_name,l\_report,s\_time,s\_date,pt\_lung\_infec} (\sigma_{l\_report='Positive' \text{ AND } pt\_lung\_infec>25} (patient\_details \bowtie user\_details \bowtie l\_testing \bowtie lab\_info))$$

Data Output | Explain | Messages | Notifications

	u_id integer	u_name character varying (25)	l_id integer	l_name character varying (25)	l_report character varying (20)	s_time time without time zone	s_date date	pt_lung_infec numeric (4,2)
1	3	Dhairya	104	Greencross	Positive	15:50:45	2021-07-25	55.00
2	4	Kandarp	105	Sarkari Lab	Positive	14:38:45	2021-05-24	57.00
3	5	Bhumi	101	Freberg	Positive	11:15:18	2021-05-22	50.00

Q13) List total count of patients tested positive out of total users having symptoms before testing for Covid.

```
SELECT (SELECT COUNT(u_symptoms) FROM user_symptoms) AS user_symptom, (SELECT COUNT(l_report) FROM l_testing WHERE l_report='Positive') AS tested_positive;
```

$$\prod((\rho_{user\_symptoms} (F_{COUNT(u\_symptoms)} (user\_symptoms))) (\rho_{tested\_positive} F_{COUNT(l\_report)} (\sigma_{l\_report='Positive'} (l\_testing))))$$

Data Output | Explain | Messages | N

	user_symptom bigint	tested_positive bigint
1	5	4

Q14) List the details of hospitals having Cost of an X-ray between 400 to 900 and a CT scan cost also between 4000 to 7000.

SELECT h_id, h_name, h_phone, h_pincode, h_city FROM hos_info WHERE EXISTS (SELECT xray_cost, ctscan_cost FROM imaging_center WHERE hos_info.h_id = imaging_center.h_id AND xray_cost BETWEEN 400 AND 900 AND ctscan_cost BETWEEN 4000 AND 7000);

$$\prod_{h\_id,h\_name,h\_phone,h\_pincode,h\_city}(\sigma_{EXISTS}(\prod_{xray\_cost,ctscan\_cost}(\sigma_{hos\_info.h\_id=imaging\_center.h\_id\ AND\ xray\_cost\ BETWEEN\ 400\ AND\ 900\ AND\ ctscam\_cost\ BETWEEN\ 4000\ AND\ 7000}(imaging\_center))))$$

Data Output | Explain | Messages | Notifications

	h_id [PK] integer	h_name character varying (25)	h_phone bigint	h_pincode integer	h_city character varying (30)
1	1002	Civil	8765432104	376514	Udaipur

Q15) List laboratory details of those which are in Ahmedabad city showing values in ascending order in terms of cost.

SELECT l_id, l_cost, l_name, l_address_line, l_landmark, l_city, l_pincode, l_phone, l_email FROM lab_info GROUP BY l_cost,l_id HAVING l_city='Ahmedabad' ORDER BY l_cost ASC;

$$_{l\_cost,l\_id}F_{l\_id,\ l\_cost,\ l\_name,\ l\_address\_line,\ l\_landmark,\ l\_city,\ l\_pincode,\ l\_phone,\ l\_email}\ (\sigma_{HAVING\ l\_city\ =\ "Ahmedabad"\ ORDER\ BY\ l\_cost,\ l\_id,\ lab\_info})(lab\_info)$$

Data Output | Explain | Messages | Notifications

	l_id [PK] integer	l_cost numeric (7,3)	l_name character varying (25)	l_address_line character varying (30)	l_landmark character varying (30)	l_city character varying (30)	l_pincode integer	l_phone bigint	l_email character varying (50)
1	105	500.000	Sarkari Lab	Nobal nagar society	Naroda	Ahmedabad	382330	9876576543	sarkarilab@gmail.com
2	102	1500.000	Supratech	Bhaveshbhai ni vadi	Navrangpura	Ahmedabad	382350	9876543210	supratech@gmail.com
3	101	2000.000	Freberg	Bhagabhai ni vadi	Civil	Ahmedabad	382310	9876545678	freberg@gmail.com
4	104	2000.000	Greencross	Kavi nanalal marg	Ravjinagar	Ahmedabad	382360	9876543213	greencross@gmail.com

9. Conclusion and Learning

- Taking into consideration all the mentioned details in the description we have created a user-friendly interface for users to easily fulfil their needs and to clarify their doubts. It automates numerous daily operations and enables streamlined functioning to desist mismanagement.

- Through this project, we got to know that how different entities should be connected for the easy functioning of the whole system. We are providing the facility to the users for easy searching of the laboratory in their areas if they get any of the symptoms.

- Details of hospitals available in their area, beds available in that hospitals, and also details of the doctors who are working there are provided to the user for better information. Medications of the hospital and also the approximate cost of treatment are easily known to the user. Records of the patient's history, allergies, and transactions are safeguarded with the hospital for further references.

- We have created this system as a great opportunity to establish a distinct, efficient, and fast-delivering healthcare model. Implementation of this covid management system is sharing an easy way to store all the kinds of records, provide coordination and user communication, improve day-to-day operations, and clarification of doubts. This project covers the needs of the users, doctors, and hospital authorities by simplifying their interactions.

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