Work Integrated Learning Programmes BITS Pilani Pilani | Dubai | Goa | Hyderabad

DATABASE DESIGN AND APPLICATIONS

(SSZG518)

ASSIGNMENT-1
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CONTENTS

1. Unique Application Idea

2. Brief Description Of Application
    a. About the users.
    b. Benefits
    c. Functions and Features
    d. Number Of Users

3. ER Diagram Of Application

4. ER Model to Relational Model Conversion

5. Normalization of Relational Model to 3NF

6. SQL Queries

7. Design Indices

Application Idea:

As there has been a rapid worldwide spread of SARS COVID-19 or commonly known as novel corona virus which has caught the world off-guard, and the crisis has already been declared as global in nature by the WHO.

Although we know that the infection is new to us, spreading rapidly throughout the globe but the harsh truth is that the officials or the policy makers are fighting blindly as especially in a large country like India with over 139 crores of population and heavily geographically dense areas like Delhi, keeping the accurate count and the exact spread of virus or the exact count of active cases (especially considering asymptomatic patients) is a cumbersome task to be performed.

But as every other problem this problem also has a solution, a naïve solution which can provide the exact number of active cases, recovered cases, deaths caused by using a web-based application with a centralized database using cloud and network stack “SARS_COV_2 Tracker”.

The motive is to have a centralized database to track and verify the data on the spread of the virus keeping the details like patients, relationship with patients, identifying local/ community spread, mapping containment zones as per the number of active cases. This database can then be used for real time monitoring and updates which can provide an overall overview or the birds eye view to the government officials to help them take critical decisions for the betterment of the public and take improvised measures to try to keep the conditions in as much control as possible reducing the overall mortality rate due to infection among the individuals. It will also help the front-line corona warries including Doctors, Nurses and other essential commodities workers in this fight for humanity and to bring together peace in this world eradicating this trouble once and for all throughout the globe and bringing human life on tracks back to normal.

SARS_COV_2 Tracker:

SARS_COV_2 Tracker will be a web-based software application to be made available for cross-platform useability either from an Android, IOS device or even through Desktop that can be used by both government regulatory as well as by the common people. The designed application will be utilizing a central database system running on a server machine remotely, which can be used for real time updates as well as modelling the spreading of infection. This can overall provide a valuable insight to the officials as well as healthcare workers deployed to formulate a strategic plan to make the conditions under control.

This application is an initiative to find a work around in slowing down the fast spread of corona virus(covid-19) as per the issued guidelines of World Health Organisation (WHO) implementing a rapid and severe response against the virus which includes contact tracing, social distancing measures, surge in healthcare infrastructure and tailored communications. Keeping these guidelines in mind SARS_COV_2 Tracker application is designed for helping by:

- Providing updated, accurate and most relevant information via authorized sources
- Accelerating the speed of contact tracing process and identification efforts of the health authorities
- Notifying individuals immediately if they come in close proximity of suspected virus cases.
- Enabling strict vigilance on self-isolated, home-isolated and quarantined families and individuals
- Facilitating relevant Covid-19 testing schedule
- Mapping of Containment zones and high alert areas (red zones)
- Larger action for a global cause at both national as well as international level

Providing all these features without risking any information of the user i.e safeguarding the privacy of individual's data. The use of centralized database assures that the patients data collected by the application is strictly used only for the sole purpose of reducing the spread of the virus. As the contact tracing access will be granted only to the health authorities and will be made sure that personal identity of the users is not revealed to any other third party. Data encryption will also be used to protect sensitive data.

Users of The Application:

The SARS_COV_2 Tracker can be used by:

1. **Healthcare Workers:** For keeping record of all cases either active (for providing them with adequate facilities like oximeters for home isolation individuals) or recovered (to ask for plasma to treat a severe patient).
2. **Member of Public:** Individuals can use the app for contact tracing, avoiding being in contact with active persona or places which are marked red zoned.
3. **Government Official Bodies:** Like ICMR and other official bodies to keep track of statistical data and analysing the potential threats and conditions at national as well as international level.

Benefits of SARS_COV_2 Tracker Application:

The application would be using cloud computing technology and live location data of the user, enabling to quickly identify, trace and issue warning to those individuals who have been in contact with anyone exhibiting covid-19 like symptoms. Not only this the application targets on alerting the user in case of approaching an active case individual or location which comes under red zones where active case patient have visited.

In addition to above the application will also help in monitoring the movements of self-isolated, home-isolated or 14 days quarantined cases. Notifying the Healthcare workers to schedule the compulsory exit RT-PCR test before the end of their isolation period.

Functions and Features Of SARS_COV_2 Tracker Application:

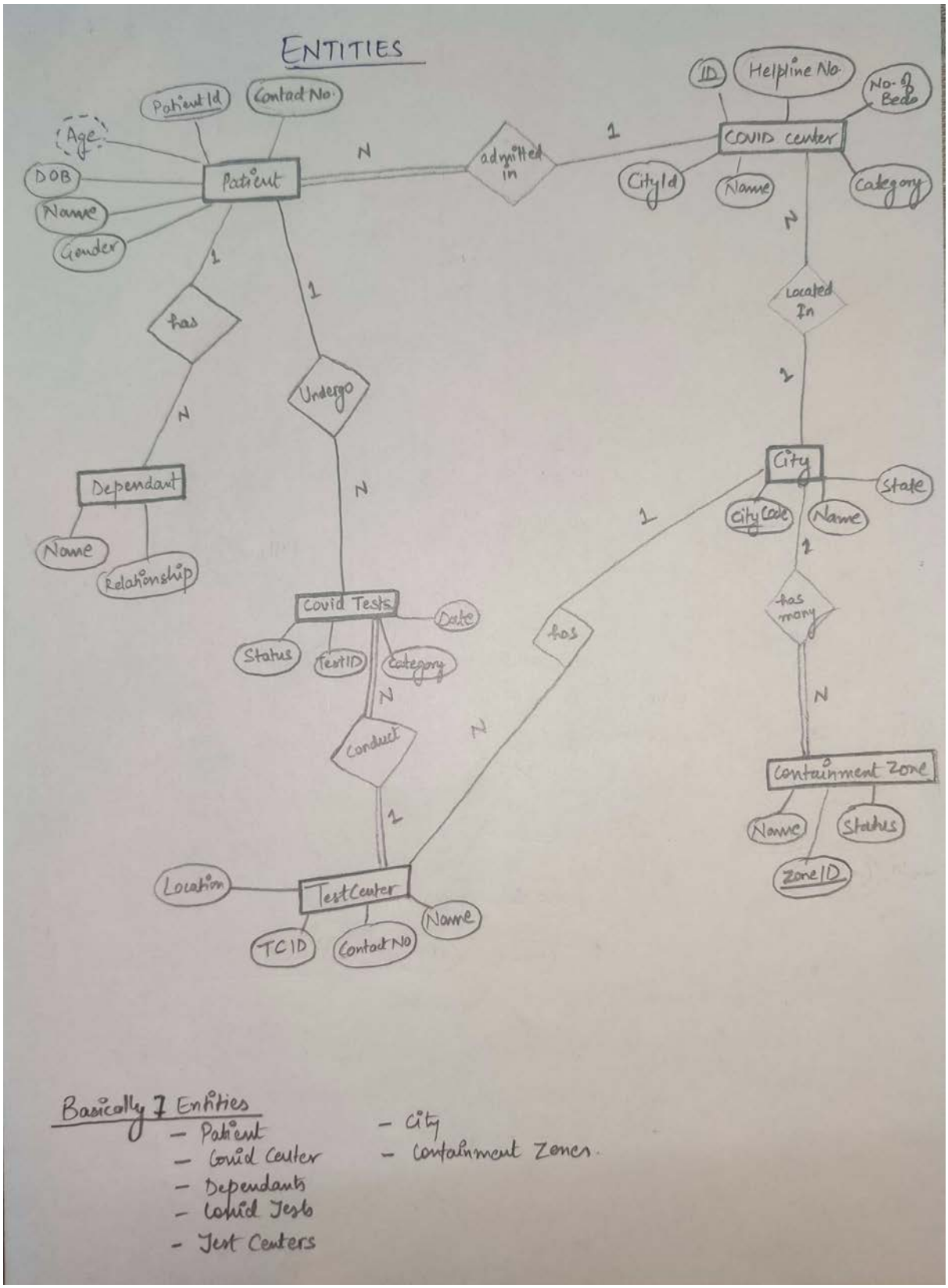
1. **Language Selection:** The app is available in all 23 majorly spoken languages of India.
2. **Unique One Time Registration:** Performed at initial installation using OTP send on both registered mobile number and registered mail ID.
3. **Contact Tracing:** Alerts the user to get tested if they come in proximity of an active corona patient.
4. **Test Schedule/Appointment:** Scheduling the test including both lab as well as home sample collection for user ease and avoiding crowds.
5. **Payments:** Online payments through majorly accepted Master/Visa credit and debit card or via UPI transactions by all merchants (Paytm, PayPal, GPay etc)
6. **Test Results:** Online report generation of RT-PCR test.
7. **Declaration of Isolation:** Self declaration by the individuals for Self-quarantine practices.
8. **Registration for Vaccine:** Registration of the individual or family member for vaccination drives.

9. **Latest Announcements:** Including latest nation wise as well as international statistics on Corona Virus including active cases, recovered cases and morality rate in both tabular and graphical methods.
10. **Emergency Helpline:** Including emergency contact number of nearby responders in case of symptoms like shortness of breadth or severe cases to reduce response time by sharing database of available ICU and Emergency beds of nearby hospitals.

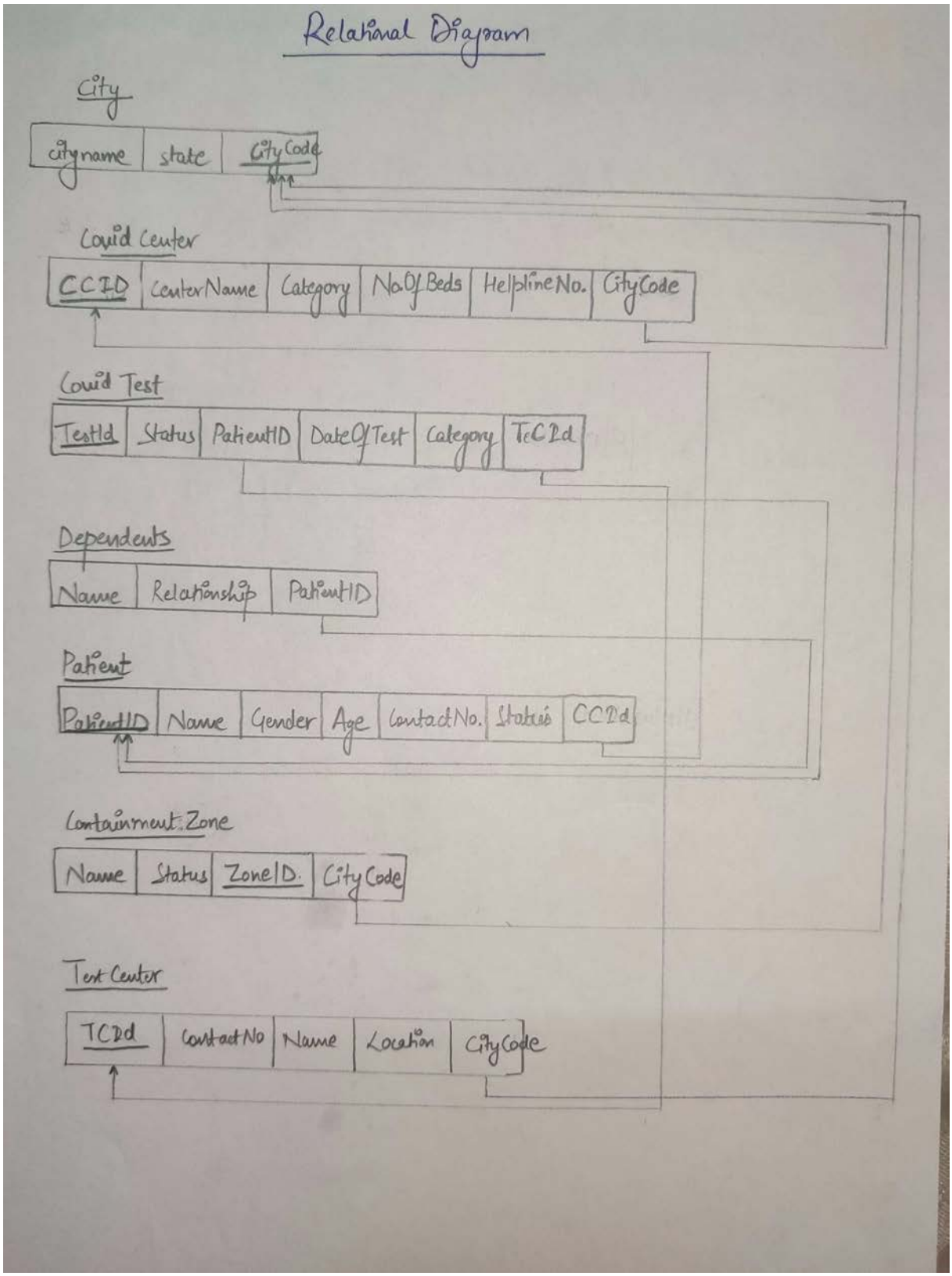
Simultaneous Users of the application:

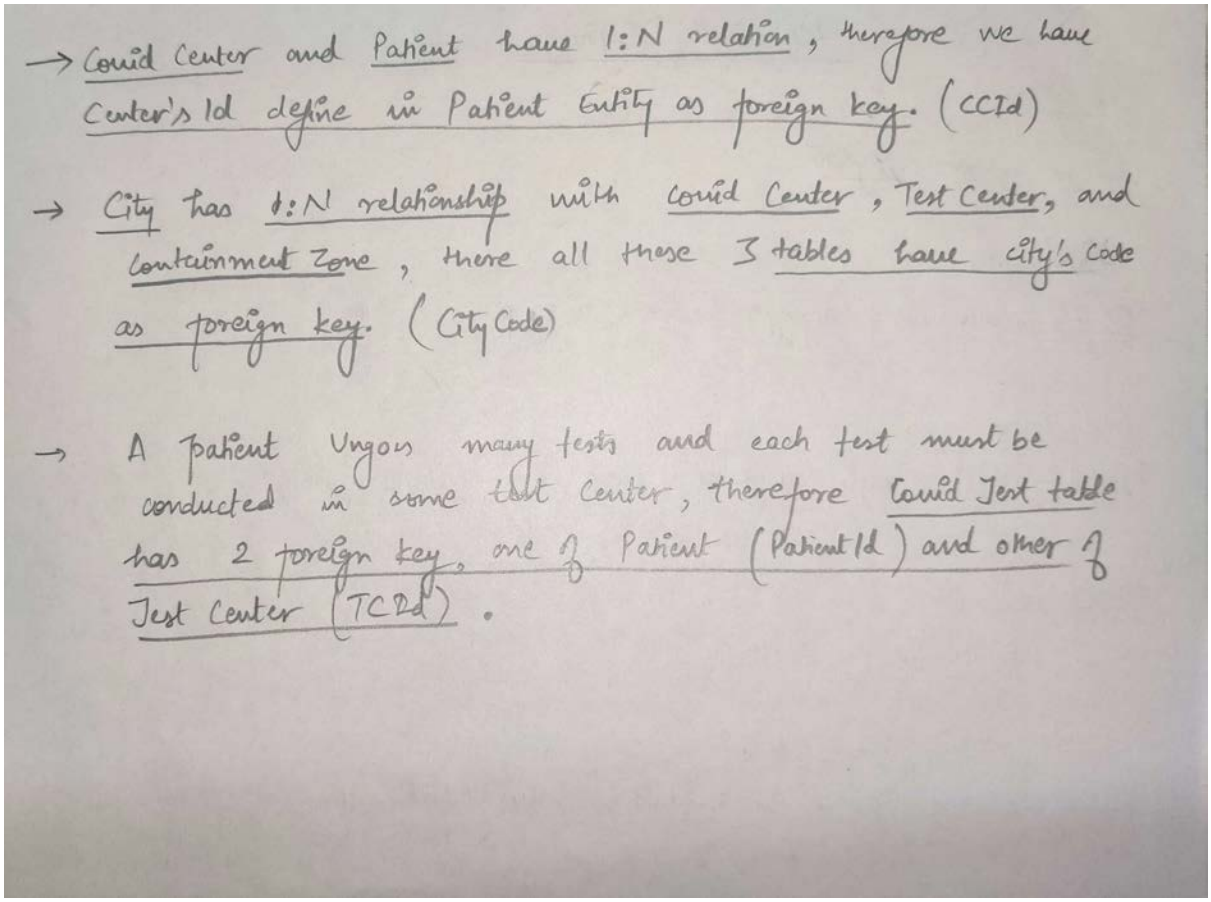
As application is devised on the latest cloud stack hence there is no limit on the number of users. The application can support a great database of users as database is maintained remotely on a cloud server. So, the target would be to connect with each and every individual on the globe.

ER Diagram Of Application:



Relational Diagram Of Application:





→ Covid Center and Patient have 1:N relation, therefore we have Center's Id define in Patient Entity as foreign key. (CCId)

→ City has 1:N relationship with Covid Center, Test Center, and Containment Zone, there all these 3 tables have city's code as foreign key. (City Code)

→ A patient Urgos many tests and each test must be conducted in some test Center, therefore Covid Test table has 2 foreign key, one of Patient (Patient Id) and other of Test Center (TCId).

SQL QUERIES

1. **Insert** queries to insert data in different tables of DB :

   - Insert into CITY (CITYCODE,CITYNAME,STATE) values ('IN_DEL','New Delhi','Delhi');
   - Insert into COVIDCENTER (COVIDCENTERID,CENTERNAME,CATEGORY,NOOFBEDS,HELPLINENO,CITYCODE) values ('IN_DEL_CC1','AIIMS','Dedicated Covid Hospital',null,9125697450,'IN_DEL');
   - Insert into COVIDTEST (TESTID,STATUS,PATIENTID,DATEOFTEST,CATEGORY,TESTCENTERID) values ('IN_DEL_TT1','positive','PID1','15-5-20','severe','IN_DEL_TC1');
   - Insert into DEPENDENTS (NAME,RELATIONSHIP,PATIENT_ID) values ('Nitin','SON','PID9');
   - Insert into PATIENT (PATIENT_ID,NAME,GENDER,AGE,CONTACT,STATE_OF_PATIENT,COVIDCENTERID) values ('PID9','Pradeep','Male',35,8946579123,'Active','IN_GGN_CC1');

2. **Select** query to see and check all the entries inserted in the tables:

   - Select * from CITY

```
1 SELECT * FROM CITY
```

CITYNAME	STATE	CITYCODE
New Delhi	Delhi	IN_DEL
Bangalore	Karnataka	IN_BLR
Noida	Uttar Pradesh	IN_NDA
Gurgaon	Haryana	IN_GGN

- Select * from COVIDCENTER

```
SELECT * FROM COVIDCENTER
```

COVIDCEN...	CENTERNAME	CATEGORY	NOOFBEDS	HELPLINENO	CITYCODE
IN_DEL_CC1	AIIMS	Dedicated Covi...	Null	9125697450	IN_DEL
IN_DEL_CC2	Satyawadi Raja...	COVID care ce...	Null	9712697450	IN_DEL
IN_BLR_CC1	Bowring Medic...	COVID health c...	Null	9745697450	IN_BLR
IN_NDA_CC1	Ganga Ram ho...	Dedicated Covi...	Null	9745697450	IN_NDA

- Select * from COVIDTEST

```
SELECT * FROM COVIDTEST
```

TESTID	STATUS	PATIENTID	DATEOFTEST	CATEGORY	TESTCENTERID
IN_GGN_TT5	positive	PID20	03-10-20	mild	IN_GGN_TC1
IN_DEL_TT7	positive	PID21	04-10-20	severe	IN_DEL_TC1
IN_DEL_TT15	negative	PID22	05-10-20	mild	IN_DEL_TC2
IN_DEL_TT8	positive	PID22	05-10-20	mild	IN_DEL_TC2
IN_GGN_TT6	positive	PID23	06-10-20	mild	IN_GGN_TC1
IN_DEL_TT9	positive	PID24	07-10-20	mild	IN_DEL_TC2
IN_DEL_TT13	negative	PID24	07-10-20	mild	IN_DEL_TC2

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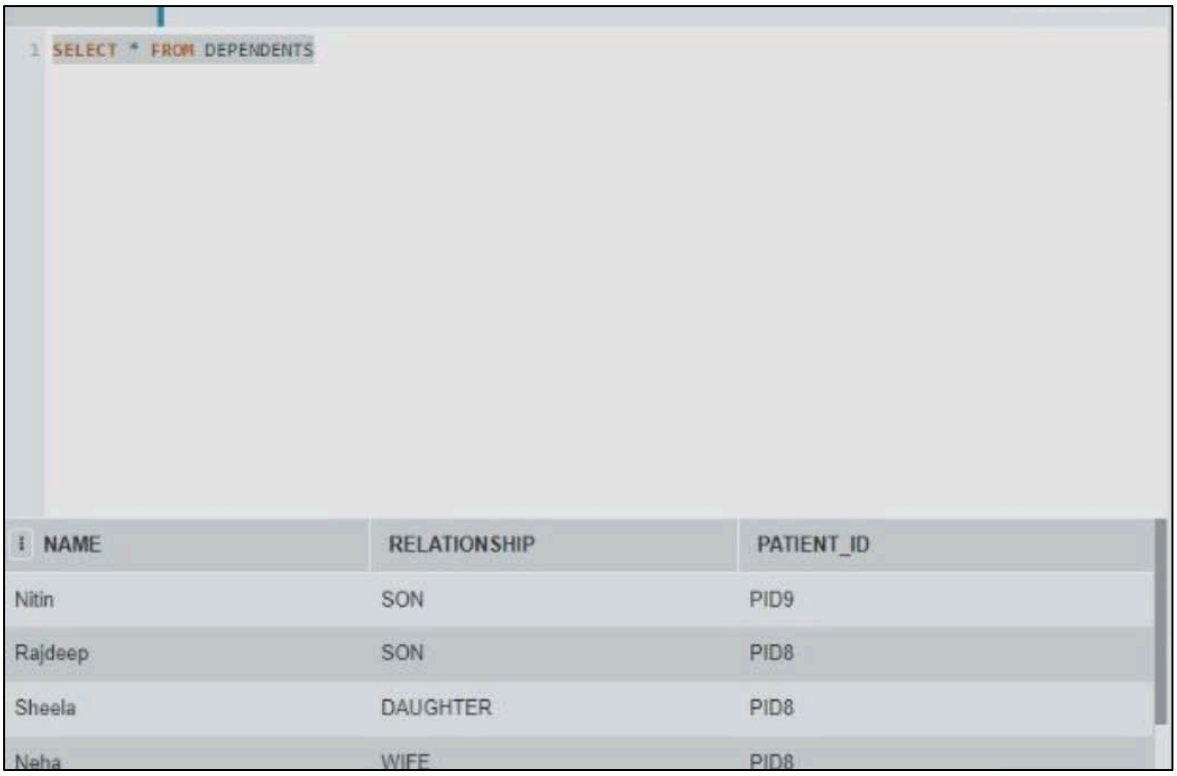
- Select * from DEPENDENTS



3. **COUNT** Total number of patients who have recovered in Delhi since 21 August 2020
   - Select count(1) from patient PT

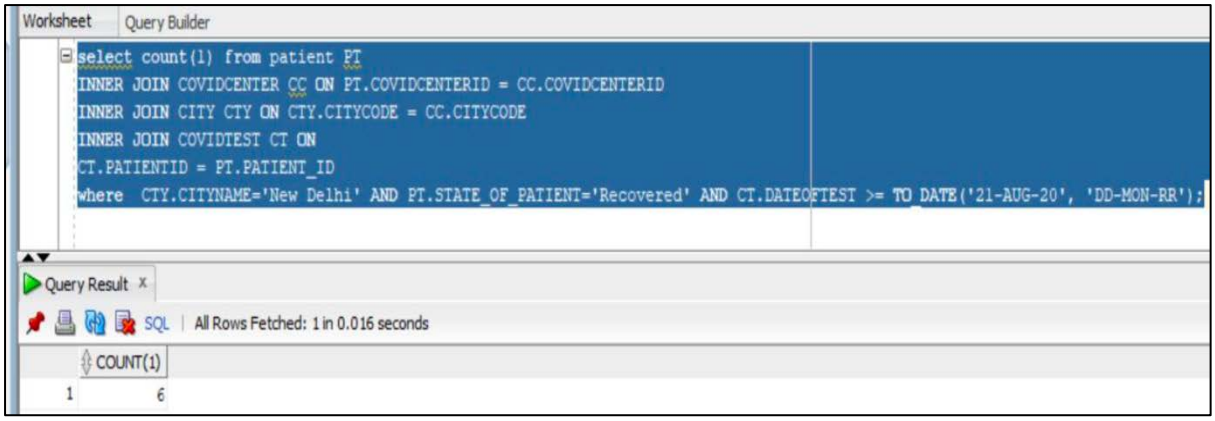
     INNER JOIN COVIDCENTER CC ON PT.COVIDCENTERID = CC.COVIDCENTERID

     INNER JOIN CITY CTY ON CTY.CITYCODE = CC.CITYCODE

     INNER JOIN COVIDTEST CT ON

     CT.PATIENTID = PT.PATIENT_ID

     where CTY.CITYNAME='New Delhi' AND PT.STATE_OF_PATIENT='Recovered' AND CT.DATEOFTEST >= TO_DATE('21-AUG-20', 'DD-MON-RR');

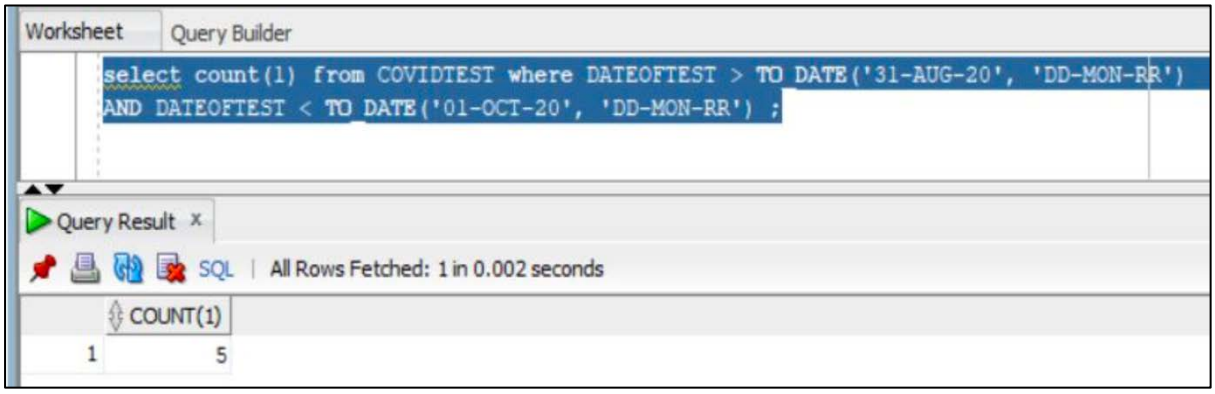


4. Query for Total number of Testing done in the month of September 2020?

   - Select count(1) from COVIDTEST

     where DATEOFTEST > TO_DATE('31-AUG-20', 'DD-MON-RR') AND

     DATEOFTEST < TO_DATE('01-OCT-20', 'DD-MON-RR') ;



5. Query for Total Number of testing done by ‘Lal Path labs’ in delhi in September 2020?

   - Select count(1) from COVIDTEST CT

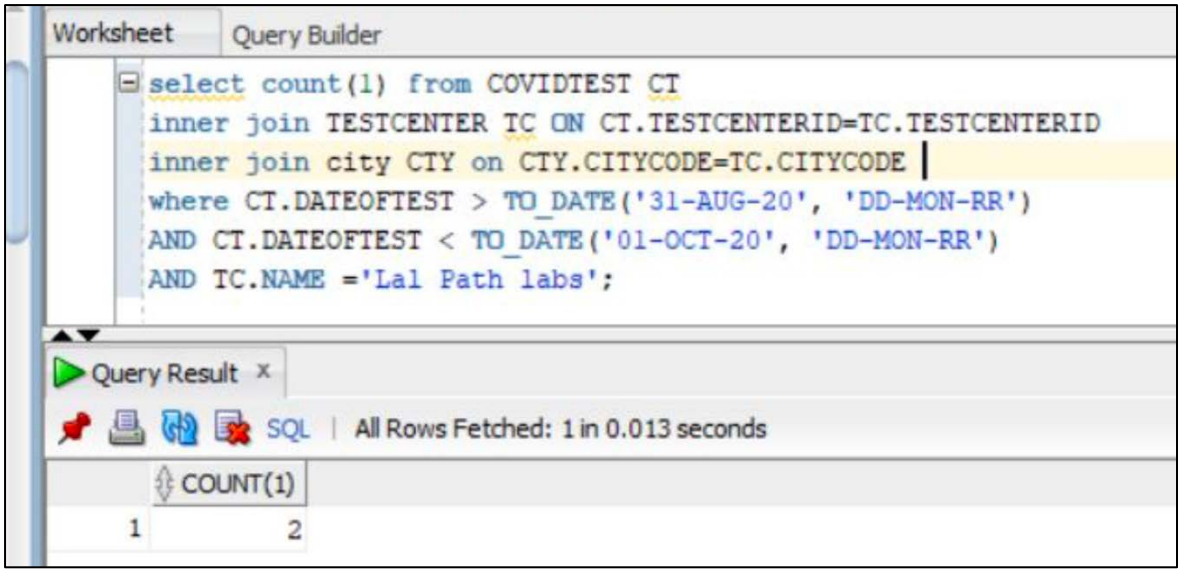
     inner join TESTCENTER TC ON CT.TESTCENTERID = TC.TESTCENTERID

     inner join city CTY on CTY.CITYCODE=TC.CITYCODE

     where CT.DATEOFTEST > TO_DATE('31-AUG-20', 'DD-MON-RR') AND

     CT.DATEOFTEST < TO_DATE('01-OCT-20', 'DD-MON-RR') AND

     TC.NAME ='Lal Path labs';



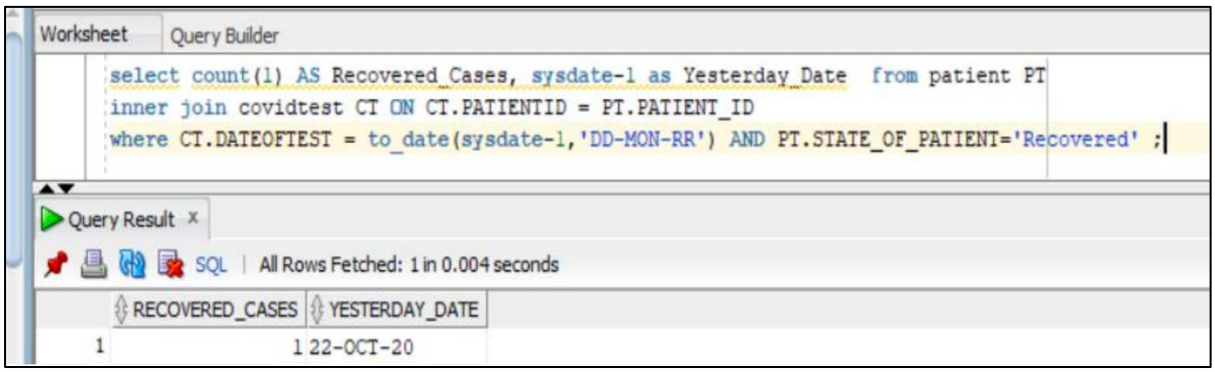
6. Query to check What was the total number of recovered cases yesterday?

   - Select count(1) AS Recovered_Cases, sysdate-1 as Yesterday_Date from patient PT

     inner join covidtest CT ON CT.PATIENTID = PT.PATIENT_ID

     where CT.DATEOFTEST = to_date(sysdate-1,'DD-MON-RR') AND

     PT.STATE_OF_PATIENT='Recovered' ;



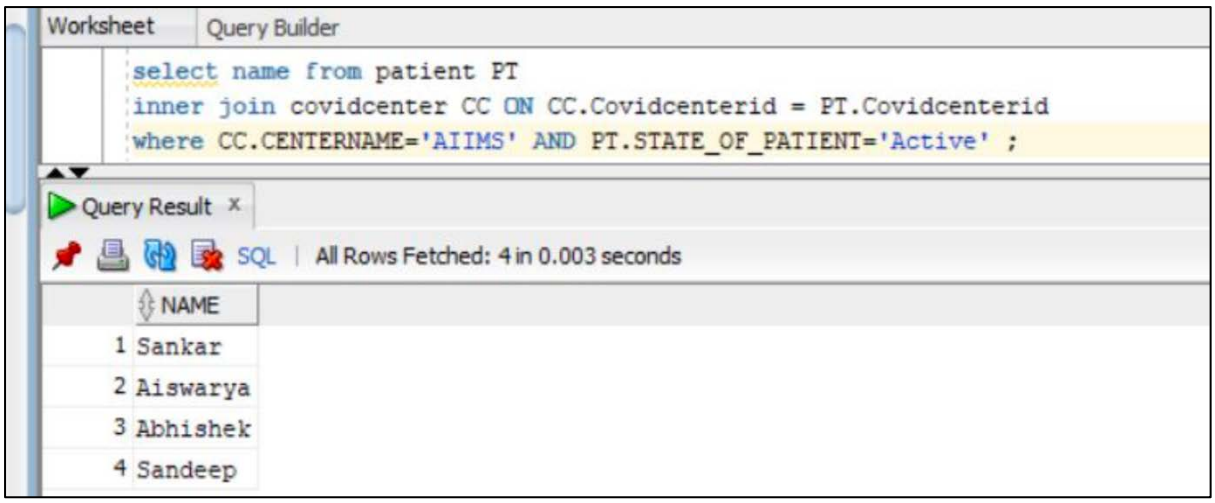
7. Query for List of Patients currently admitted in AIIMS?

   - Select name from patient PT

     inner join covidcenter CC ON CC.Covidcenterid = PT.Covidcenterid

     where CC.CENTERNAME='AIIMS' AND

     PT.STATE_OF_PATIENT='Active' ;

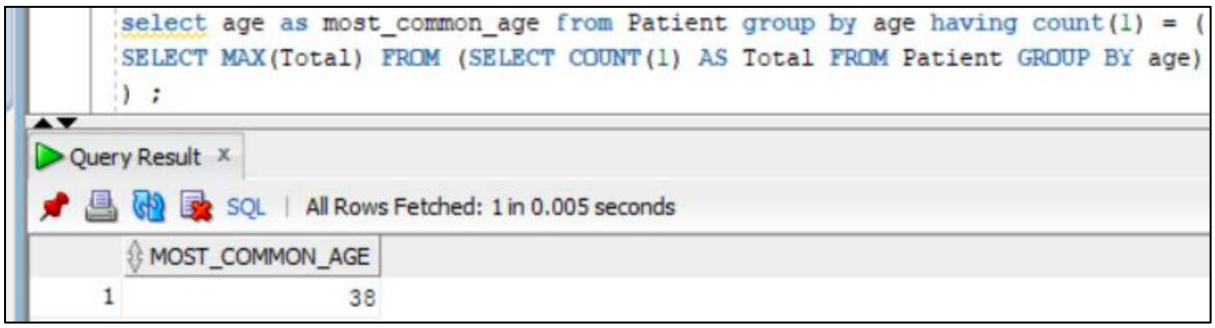


8. Query to calculate Which is the most common age of the covid patient ?

   - Select age as most_common_age from Patient group by age having count(1) =

     (SELECT MAX(Total) FROM

     (SELECT COUNT(1) AS Total FROM Patient GROUP BY age)) ;



9. Query for Total number of Testing Centers in New Delhi?

   - Select count(1) from covidcenter

     inner join city on covidcenter.CITYCODE = city.CITYCODE

     where city.CITYNAME='New Delhi';