Internet Service Provider System

DBMS - IT 214

Team S3_T8

Members (T8):

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Section 1:
Final Version of SRS

A. Introduction

Purpose

The main purpose is to provide access to the Internet to both personal and business customers**.** Our product provides customers with internet access that gives them the ability to work and perform basic technological actions with an uninterrupted connection. Also, by maintaining an efficient database of our users we have solved any management problems and continue to recognize patterns, which help us in understanding our users and their needs better.

Intended Audience and Reading Suggestions

- Developers
- Marketing teams
- Documentation writer
- Database Administrator(DBA)
- Database designers
- System analyst
- Application programmers
- Testers
- Sophisticated Users - They can be engineers, scientists, business analysts, who are familiar with the database and can develop their own database applications according to their requirements.
- End users(General public)

There is no specific order to read and whoever the reader is can proceed and skip to the part they find relevant by referring to the table of contents above.

Product Scope

With billions of internet users and each having their own purpose and needs, the primary goal is to satisfy every user's needs, be it an individual user or corporate user. To meet everyone's needs, the product will offer a variety of Internet plans, accessibility options, and payment features to have a personalized experience. The scope of this project also includes the implementation of the ISP database and to levitate the efficiency of ISP management with respect to various factors like speed, range etc. This product will consider almost all aspects which an ISP app is required to deliver. It will keep count of billing details, variety of plans etc. Several security concerns with the product and database system that arise from a large number of Internet users will also be taken into account. Another goal would be to resolve these issues and maintain user and data confidentiality. Along with these, every user will have access to relevant information.

Description:

- In compliance with supplying our product which is an ISP, we had to make a proper database for it that deals with most of the issues that might arise in our management.
- Design must be able to handle large data uploading loads as well as keep data updating in real-time so that accurate information reaches our company each time a user gets added to the database or is removed from it.
- The notion of an ISP that handles providing proper connections in an efficient manner and dealing with privacy and storage issues with the help of an accurate database.
- The major role of our tech support and development team comes when we deal with the security levels of our database because it's very necessary to keep all the user information private and classified to prevent questionable activities which can alter with the original information causing the system to fail and our company to suffer.
- We, as a company needs to ensure that our product is up to date with the latest technology and provides it to our users at a comparatively affordable rate.
- Having a proper ISP is important in every work environment whether it is a big corporation or a small school. With the advancing technology, it seems impossible to survive nowadays with an unstable broadband network,fiber or any type of network connection even at home.
- Through the interviews we have conducted and observations we have taken note of,we have assessed the following concerns:-
    1. Technical glitches
    2. Security threats
    3. Loss of data and how to recover it.
- In relation to these and keeping them in mind,we have formed a database for our company such that we only keep the information relevant to us in our database and forms since bigger the sea,larger the number of fishes being caught,in explicit terms we have tried to minimize the details we hold of our users so that even in case of a threat,they cannot be targeted.

- We have included several tables and functions in our database to give us a crystal-like clarity on our product and how much people are comfortable with paying for it.
- In order to stay in touch with our existing and potential customers,we have conducted surveys to understand their preferences and disinterests.
- The users of our product include people requiring a stable connection like workplace environments inclusive of big and small corporations,schools and colleges and the general public.
- We have classified our users into two groups,while one group consists of the general public installing our ISP in their homes,the other one includes big business companies and authorities which have installed our product in their office campus.
- One important issue in working with corporations is lack of information,since we are providing a proper connection to an ample number of floors and buildings,we require a well built database for each one which is strong enough to hold all the entries.
- We have tried to make our product as unique as we can by constituting it with high speed,large range and next to no glitches.
- We have added tables to our database specifically for regions that get low connectivity so we can monitor how many users on average have to deal with such issues and come up with solutions to their problems.
- We have taken proper measures to ensure the restoration of data in case of data loss or glitches.
- With these constant modifications, we have tried to deal with maintaining a proper database for our product and its sale.

B. Requirements Collection Phase

Background Reading

- In this section we have tried to collect data from various other Internet Service Providers,big companies like Jio and Airtel have been a source of our knowledge and reading their developments and issues has helped us in formulating an optimal app and database.
- Providing internet services is inclusive of a very large domain of users,whether it be for whatever use. This increases our areas to work on and benefits respectively,which is why it has been important for us to go through this segment.
- To provide our users with an ISP that is satisfactory,we need accurate and real time data,for example:-
    1. How have big corporations like Jio and Airtel dealt with data leaks in the past?.
    2. Back-up and recovery of this data in the database and the process behind it.
    3. Ensuring the users of a “no privacy breach” policy and minimizing our data on their personal records.

4. Making our app more easy-to-use and understandable by providing several,customizable fields in it.

- In a field as competitive as ours,it's important to look up to bigger companies for inspiration and clarity on what/what is not necessary to be a part of our app and database.
- We have tried to avoid most of the issues that could arise within our database,including:-
    1. A proper history of payments and selected plans by the users.
    2. Adding more functions to each table to maximize the benefit and scope.
    3. Making sure that user information is stored under their reference number and at a maximum,their name to prevent us from having to ask for personal details.
- We have understood some of these concepts and modified them in our own way by going through the following articles:-
    1. https://www.trustradius.com/business-internet-service-providers-isps
    2. https://www.trustradius.com/business-internet-service-providers-isps
    3. https://www.jio.com/fiber.html

Interviews

Interview - 1

IT Solutions: Mock Interview Plan & Summary.
System: Internet Service Provider
Project Reference: T8/S3/2021/10

(**Role Play**)
Interviewee: 1) Archana Todkar **Designation**: CEO at Cell tech

Interviewer: 1) Sachin Parekh **Designation**: Developer - ITSolutions
2) Richa Sharma **Designation**: Developer - ITSolutions

Date: 06/10/2021 **Time:** 11:30AM
Duration: 45 minutes **Place:** Google Meet

Purpose of Interview:

This meeting is to identify the issues in the current existing database system of our company and how we plan on resolving them. We plan on coming up with a better model for our database which will be inclusive of all fields.

Agenda:

- Making the database more inclusive and thorough.
- User-specific access.
- Security concerns and backup strategy

Documents to be brought to the interview:

Network plans of our product and its details.
Documents containing important information like reference numbers, product plans, etc. of the users.
Documents containing our security protocols.
Documents containing an outline of our project.

Interview - 2

IT Solutions: Mock Interview Plan & Summary.
System: Internet Service Provider
Project Reference: T8/S3/2021/10
(Roleplay)
Interviewee:1) Sachin Parekh **Designation**: resident of East Santa Cruz (hub of highest data usage)

Interviewer: 1) Richa Sharma **Designation:** Developer-IT Solutions
2) Tvesha Srivastava **Designation:** Developer-IT Solutions

Date: 06/10/2021 **Time**: 5:00PM
Duration: 35 mins **Place**: Google Meet

Purpose of Interview:

This meeting is to highlight difficulties and requirements with the existing ISP that the end-users are using, as well as how we can assist them in resolving these issues.

- Providing easy to understand user interface to people.
- To address issues regarding the range and also the strength of their connectivity inside their household.
- To determine whether or not the individuals in the neighborhood have access to local ISP centers.
- We need to know what users would expect from a new internet service provider.
- Notify customers by sending alerts before their plan expiry and provide a window (for x days) for the renewal of their plan.
- The customer services and technician must be available 24x7.

Agenda:

To understand the issues faced by the current residents of this neighborhood, to ensure that our ISP can resolve them, and to provide the area with a better broadband connection.

Documents to be brought to the interview:

Valid ID Proof , Brochure

Interview - 3

IT Solutions: Mock Interview Plan & Summary.
System: Internet Service Provider
Project Reference: T8/S3/2021/10

(**Role Play**)
Interviewee: 1) Tvesha Srivastava **Designation**: Technical head at STAR Uni

Interviewer: 1) Archana Todkar **Designation**: Developer ITSolutions

2) Richa Sharma **Designation**: Developer ITSolutions

Date: 06/10/2021 **Time:** 10:30AM
Duration: 45 minutes **Place:** Google Meet

Purpose of Interview:

A brief discussion about our ISP and how it provides better range, speed, and connectivity in contrast to our other competitors belonging in the same genre.
We plan to provide STAR Uni with our latest product and the network plan we feel
might be the most optimal for them given their history of usage.

Agenda:

- Providing a memo of our network plans.
- Area restriction
- Registering STAR Uni to the user database by successfully incorporating the broadband connection in their campus.
- Revoke access from inappropriate sites to maintain discipline

Documents to be brought to the interview:

Network plans of our product and its details.
Documents containing our security protocols.
Documents containing an outline of our project.
A brochure of our recent developments.

Combined requirements gathered from the interviews

- User Specific Access - The database needs to be able to configure different access levels and rights based on different users.

- Security - Measures to be taken to avoid security breaches like
  i)Unauthorized access
  ii)Data loss/corruption
  iii)User privacy

- Backup and Recovery - Maintaining backups is essential in case of crash/loss and recovering data is necessary.

- Simple User Interface - Easy to understand and easy to use for every age group.

- Notification alerts - About plan expiration and reminders along with renewal window for next plan.

- Recommendations - According to customers' history of internet plans, we can suggest optimum plans for their respective needs.

- Access Revoke - Restrict specific user privileges.

Questionnaire

Internet Service provider Survey

We would love to hear your thoughts or feedback on how we can improve your experience!

* Required

1. Name *

2. Email

3. Age group *

Mark only one oval.

- 15-18
- 18-30
- 30-50
- 50 or above

4. What are you using currently? *

Mark only one oval.

- Broadband connection
- Cellular network connnection

5. What is your operator circle? *

Mark only one oval.

- Andhra Pradesh & Telangana
- Assam
- Bihar & Jharkhand
- Delhi
- Gujarat
- Hrayana
- Himachal pradesh
- Jammu & Kashmir
- Karnataka
- Kerala &Laksh
- Kolkata
- MP & Chhattisgarh
- Maharashtra & Goa
- Mumbai
- North East
- Odisha
- Punjab
- Rajasthan
- Tamil Nadu
- UP (East)
- UP (West)
- West bengal

6. What is your medium for accessing internet? *

Check all that apply.

- [ ] WiFi
- [ ] Satellite
- [ ] Mobile phone data
- [ ] USB Dongle
- [ ] Optic Fibre
- [ ] Other: _____

7. Which company's Internet service you are using? *

Check all that apply.

- [ ] Jio
- [ ] Airtel
- [ ] BSNL
- [ ] Idea(Vi)
- [ ] Tikona
- [ ] Hathway
- [ ] Other: _____

8. What Network speed you are getting in your circle? *

Check all that apply.

- [ ] 2G
- [ ] 3G
- [ ] 4G

9. How is the Quality of service provided by your ISP? *

Mark only one oval.

- ◯ Excellent
- ◯ Very good
- ◯ Good
- ◯ Fair
- ◯ Poor

10. What do you usually use the internet for? *

Check all that apply.

- [ ] Internet Surfing
- [ ] Streaming videos
- [ ] Downloading Movies, songs and games
- [ ] Social Media
- [ ] Email
- [ ] Online studies
- [ ] Online gaming
- [ ] Other: _____

11. What speed options you prefer? *

Check all that apply.

- [ ] Upto 40 Mbps
- [ ] Upto100 Mbps
- [ ] Upto 200 Mbps
- [ ] Upto 500 Mbps
- [ ] Upto 1 Gbps
- [ ] Other: _____

12. Are there any problems you are facing with your current internet provider? *

Check all that apply.

- [ ] Network issue
- [ ] Coverage issue
- [ ] Speed issue
- [ ] Billing issue

Other: [ ] _____

13. Are you planning to switch from your current Internet service provider? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

14. If yes, what is the reason?

_____

15. Would you like follow ups from your internet provider? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

16. If yes, how frequent follow ups you need?

Mark only one oval.

- ◯ Weekly
- ◯ Monthly
- ◯ Quarterly
- ◯ Yearly

17. Are you getting the services that were advertised ? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

18. Would you please check the speed by going to www.fast.com, wait for few seconds and write it down here?

_____

19. Feedback Type

Mark only one oval.

- ◯ Comments
- ◯ Questions
- ◯ Bug Reports
- ◯ Feature Request

20. Feedback

_____

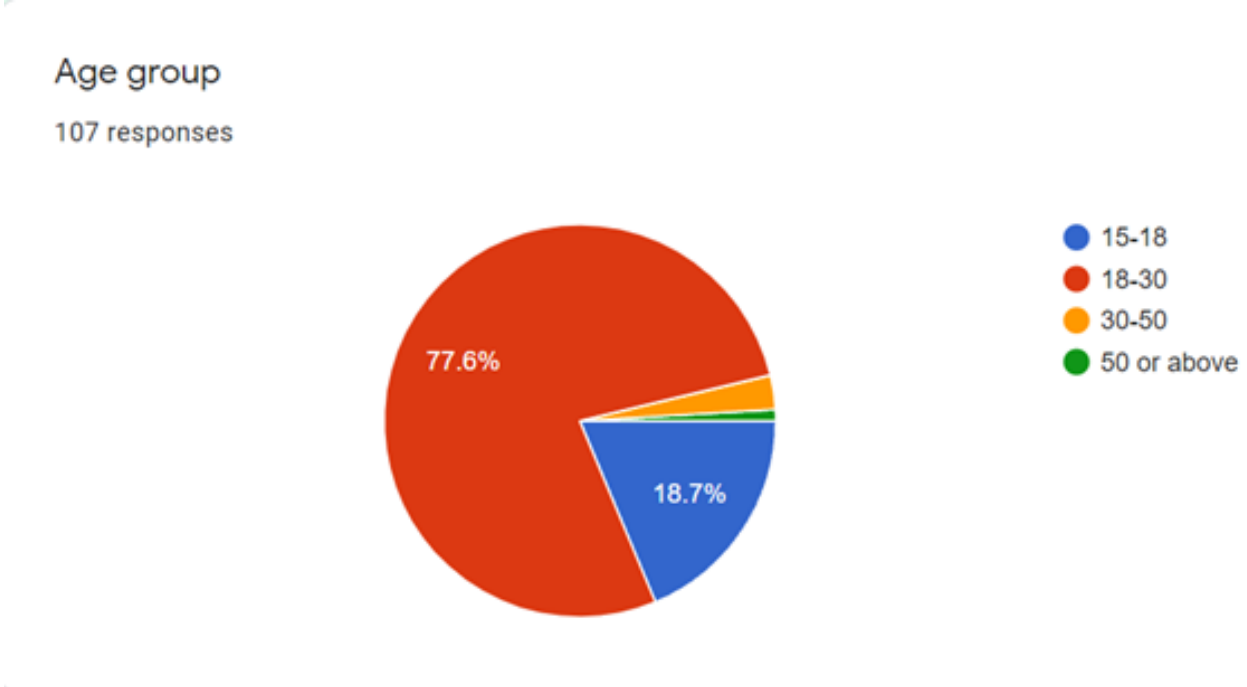
21. Suggestions for improvement

_____

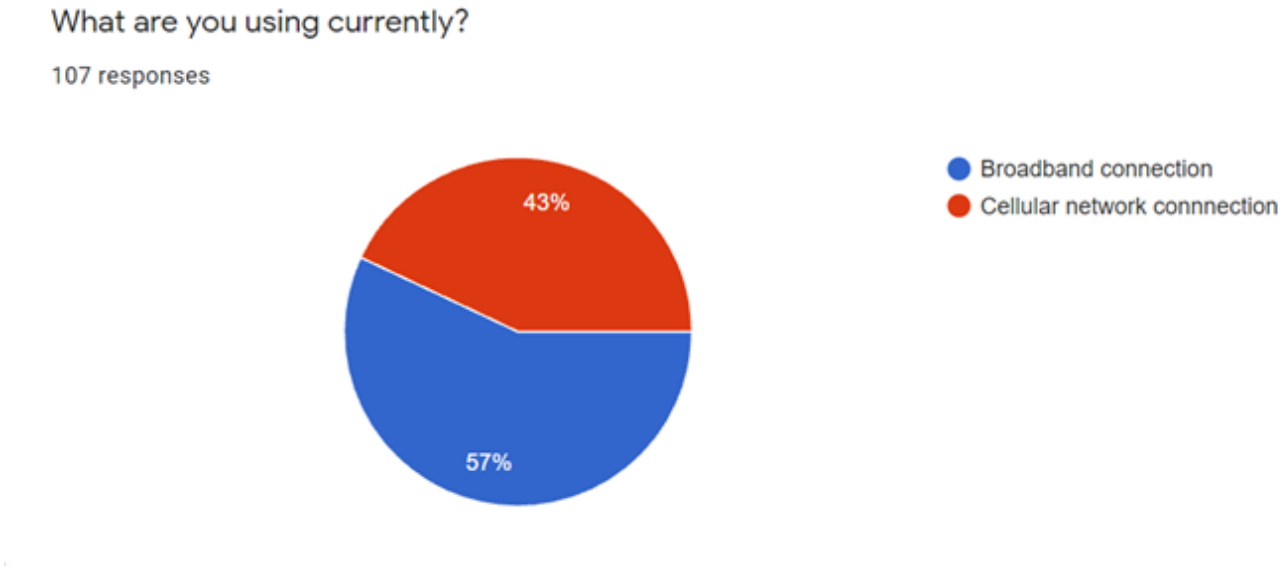
Link to our google form:https://forms.gle/81tgy4KkRzvNrJ9

Summary

According to our statistics, we can see that our major user base belongs to the age group of 18-30.

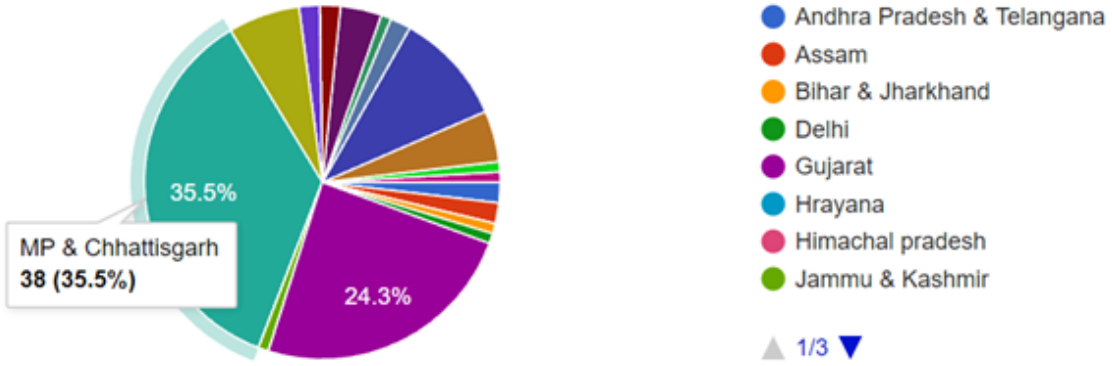


We can see people are relying on both and preferences are insignificant.



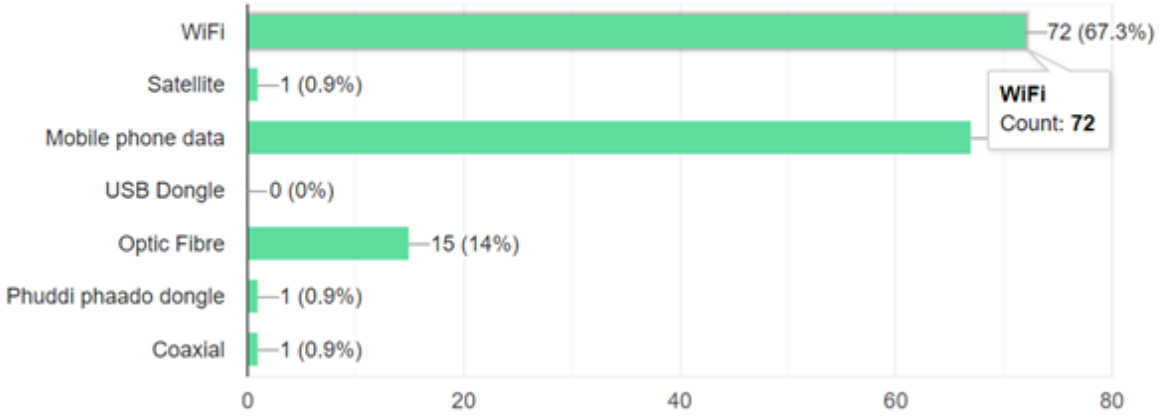
What is your operator circle?

107 responses



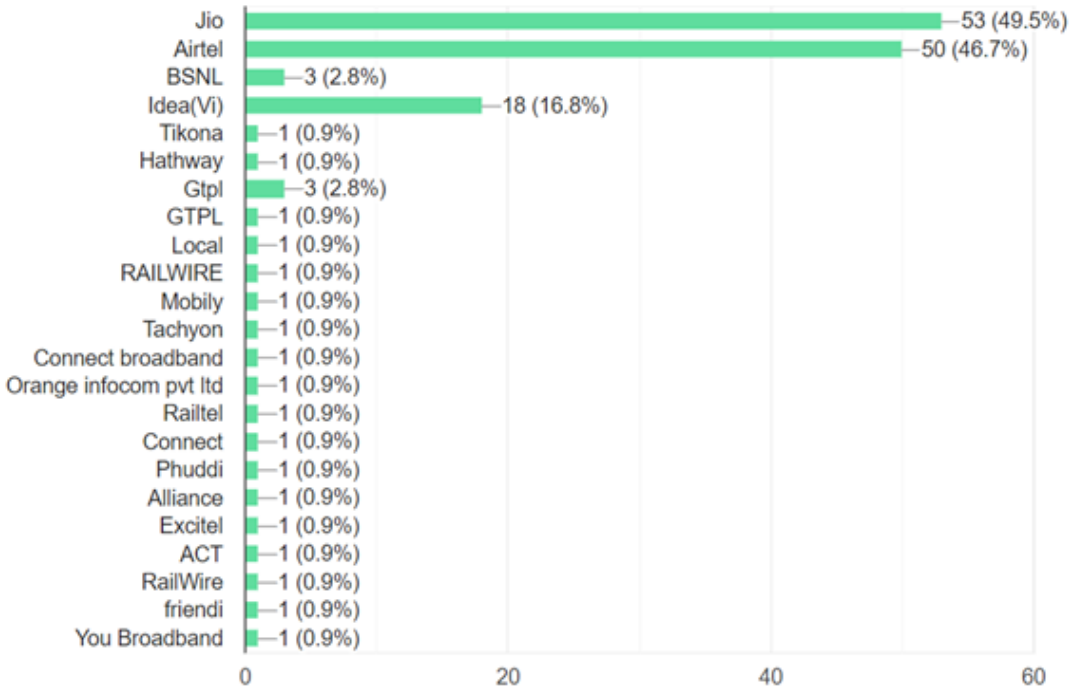
What is your medium for accessing internet?

107 responses



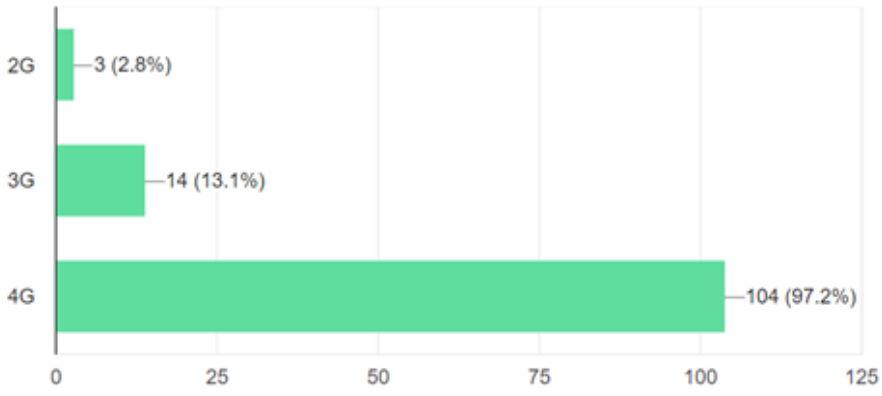
Which company's Internet service you are using?

107 responses



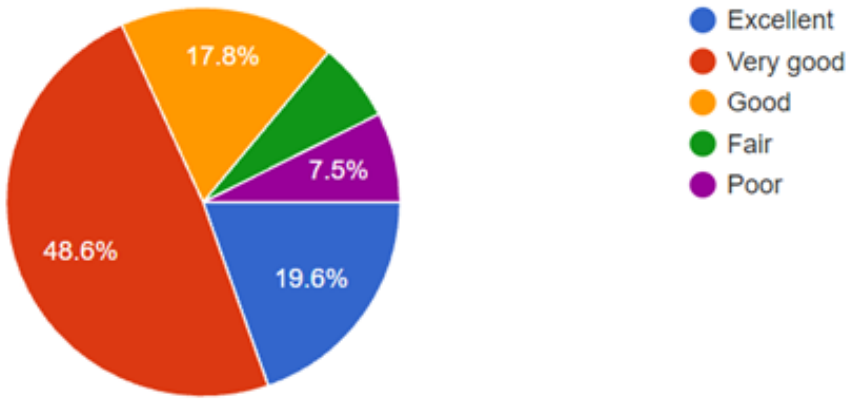
What Network speed you are getting in your circle?

107 responses



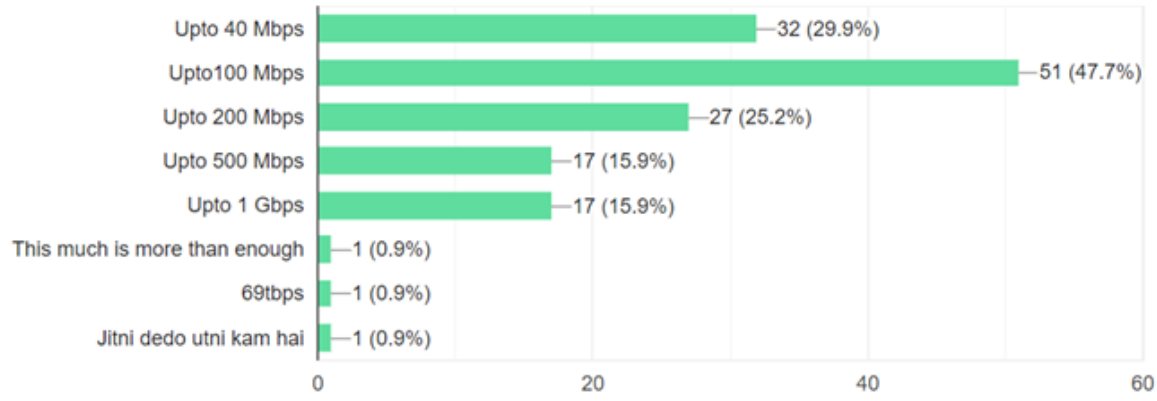
How is the Quality of service provided by your ISP?

107 responses



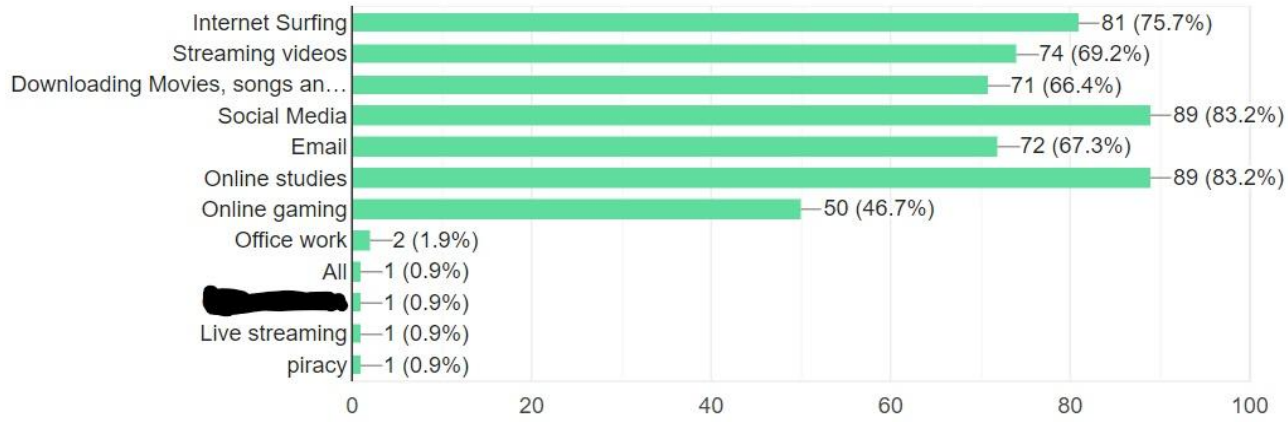
What speed options you prefer?

107 responses



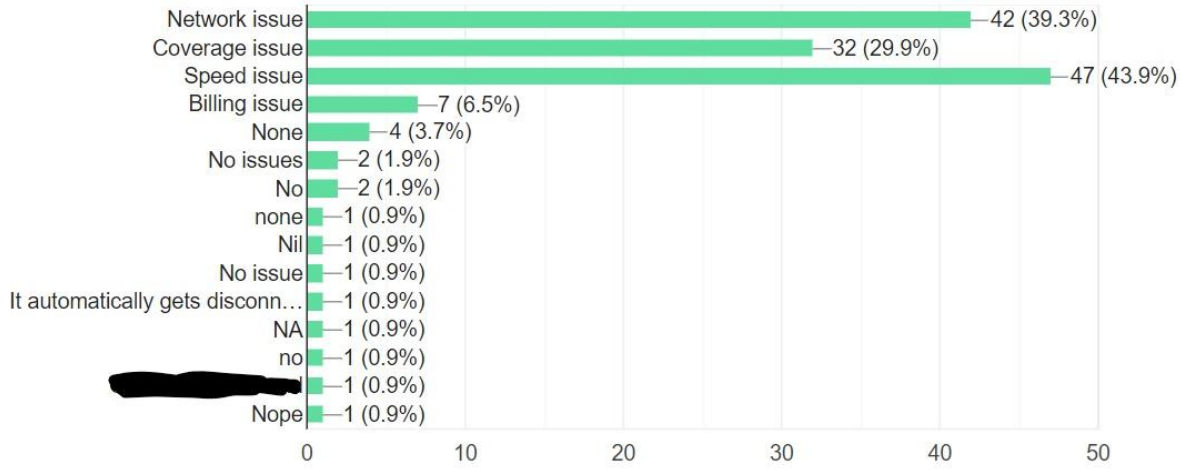
What do you usually use the internet for?

107 responses



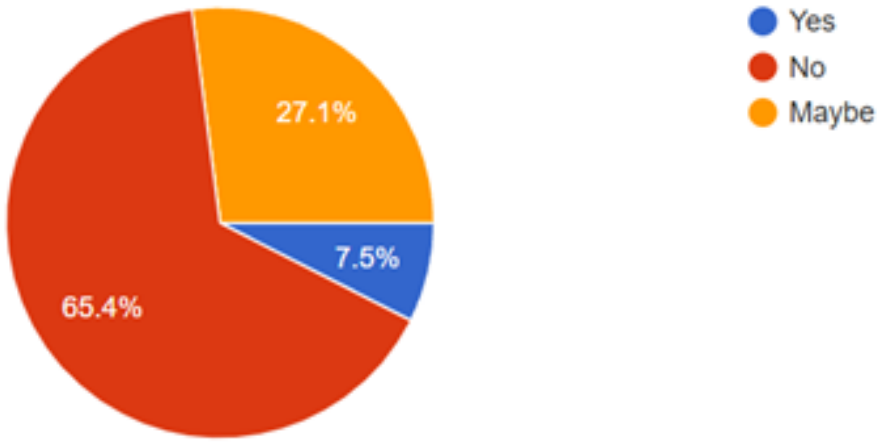
Are there any problems you are facing with your current internet provider?

107 responses



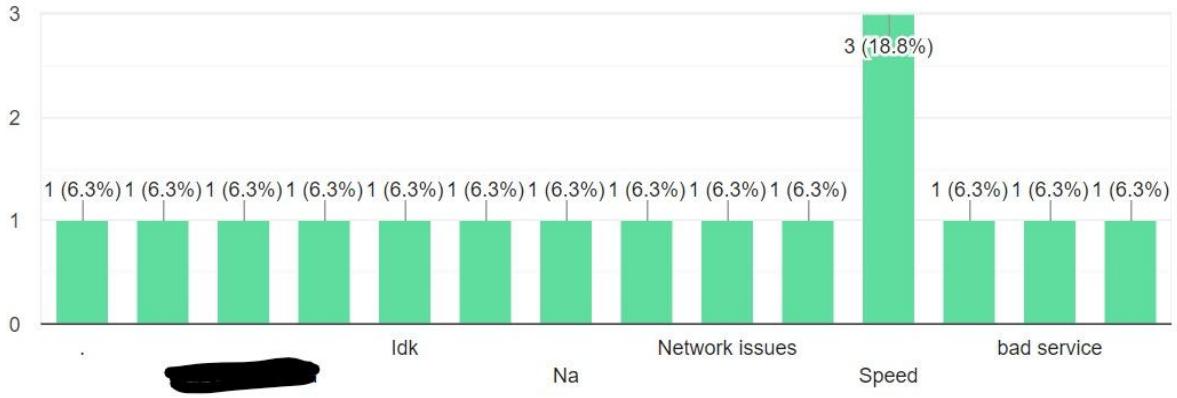
Are you planning to switch from your current Internet service provider?

107 responses



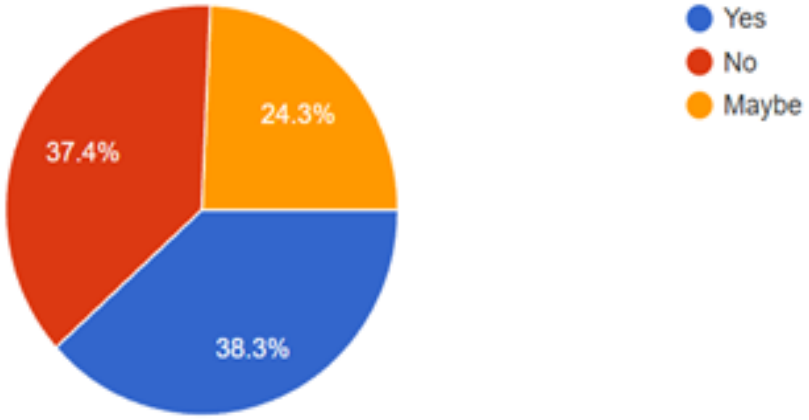
If yes, what is the reason?

16 responses



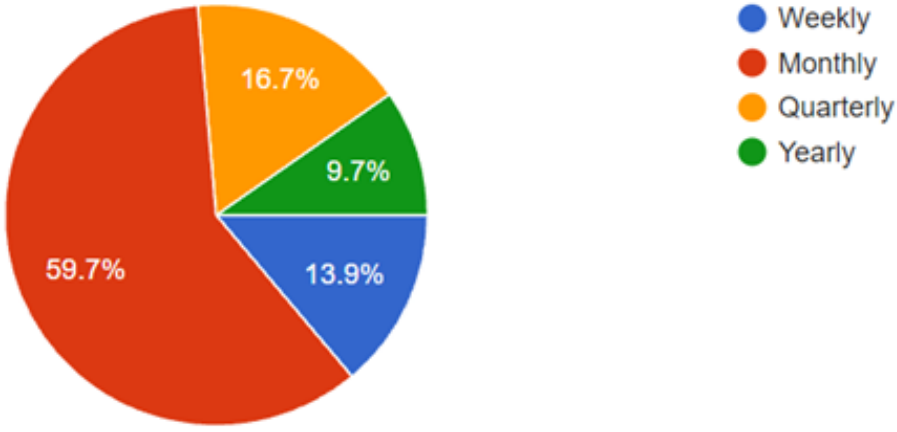
Would you like follow ups from your internet provider?

107 responses



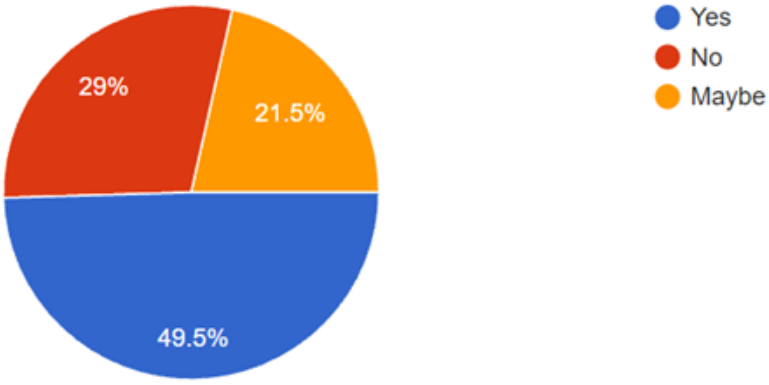
If yes, how frequent follow ups you need?

72 responses



Are you getting the services that were advertised ?

107 responses



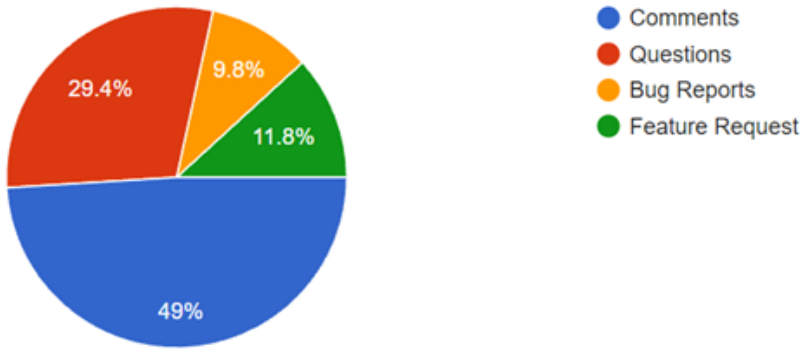
Would you please check the speed by going to www.fast.com, wait for few seconds and write it down here?

71 responses

110 Mbps
31 Mbps
28
7.2 mbps
90 Mbps
6.2 Mbps
4.2mbps
85
1byte

Feedback Type

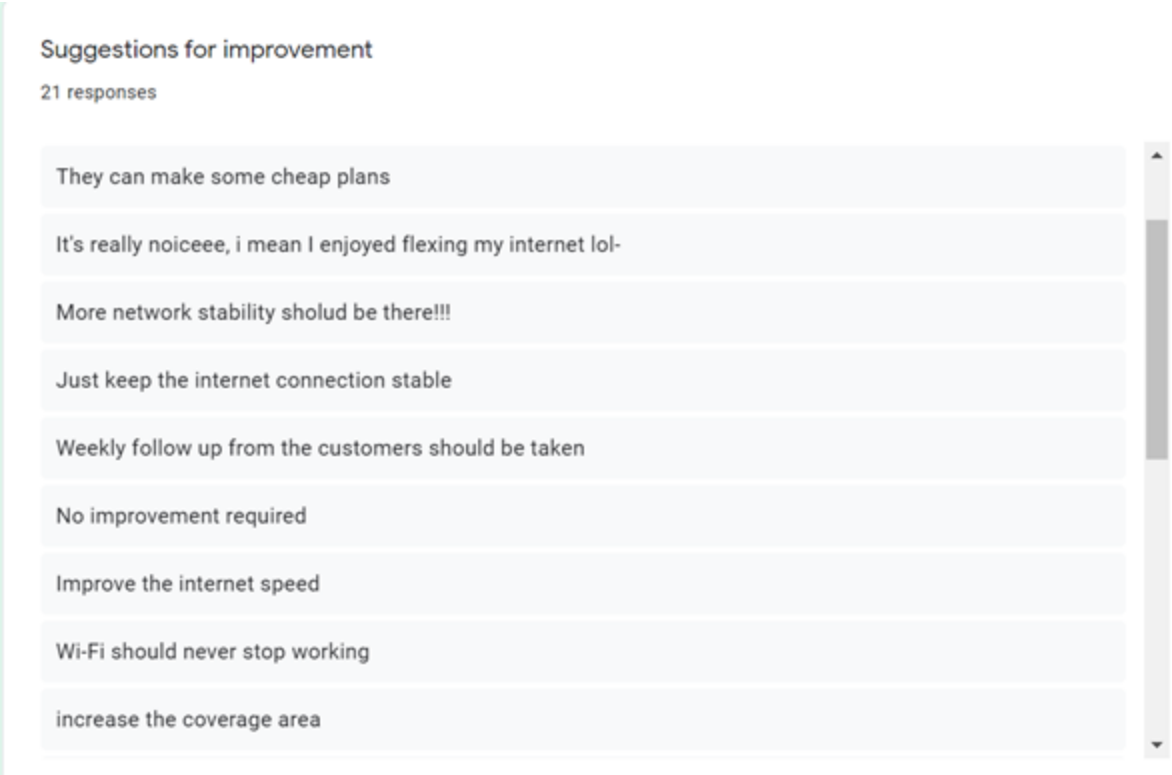
51 responses



Feedback

22 responses

The internet service provided is good but if network is low, good internet makes no sense
It's going good, I just hope it was cheaper and I'd get more network coverage in underdeveloped areas
Idk
I think the services are pretty good as they were promised
Noice
Nothing
My internet is good aur kuch nahi chiye
Poor connection in my area
looking forward for a good Internet coverage



Combined Requirements gathered from the response

- Coverage Speed
- Cheaper Plans
- Monthly follow-ups
- Network stability
- Tracking poor connections

Observations

IT Solutions: Observations

Project Reference: S3/T8/2021/10

(**Role Play**)
Observations by: Archana Todkar (IT Solutions- Company employee)

Date: 07/10/2021 **Time:** 12:00PM

Duration: 45 minutes

Observations:

We have tried to note down our observations sent by our observer on site. We have concluded that though our ISP is working well and faring well with the audience, there still remain some issues. We have tried to list them all out including some rules and regulations that we noticed the company wants to adhere to strictly.

- There are glitches observed when payment is processed.
  In some cases, payments haven't been received once they've been debited from the user's end, and in order to ensure transparency in the payment aspect, working on our software along with suggested collaboration with some payment companies.

- Payment and plan details don't get updated when paying from elsewhere.

- As the technology has grown, we need to make sure from our end that we have used those growing technologies to our best so that our system can be easily used by the users.

- Service availability during lockdown was not upto the mark.

- It is not known to the users when a network outage occurs or how long it will take to resolve that.

- Some people have their own significant dependents who need supervision(kids) and guidance(elderly) by tracking and having access to their data plans as well. So we think this feature should be incorporated in the new systems by which they can have dependant's account access added with one's own login account.

- By adding the above feature they will be able to make changes to current plans, recharges and control the data limits of their dependents.

- Online payments which are done through banks should provide additional benefits to the users.

Combined Requirements gathered from the observations

- Provide frequent updates to solve bugs and glitches.

- Collaboration with companies like paytm, to ensure the update of payment information done from our application.

- Tie Ups with different banks in order to provide extra benefits, when they use their portal for payment.

- More than one user access from one device.

- Child supervision feature for data usage limit.

- Notification alert on registered mobile number regarding outage information.

C. Create Fact-Finding Chart

Objective	Technique	Subject	Time
Variation in speed	Interview, background reading	Resident	35 minutes
To get a brief idea of the network range our ISP providers	Interview, observations	Institutional staff	45 minutes
To investigate occasional internet glitches	Interview, observations	Observer	45 minutes
To establish how organizations want their database to be maintained	Background reading, Interview	Employees	45 minutes
To understand how the payment takes place	Interview	CEO of Cell Tech, Institute	50 minutes
How the process of payment takes place	Interview	Resident	35 minutes

D. List Requirements

1. Simple User Interface - The product should be easy to understand and operate by each and every user.

2. Security - There should be a proper database management system to preserve database integrity , confidentiality and availability.

3. Privacy - All personal information regarding users should be kept confidential to protect them.

4. Backup and Recovery - Establishing a backup and recovery system helps organizations avoid data loss.

5. Frequent Updates - To detect and resolve bugs and introduce new features related to the product.

6. Access Revoke -

7. User Specific Access - Every user class should have different access control according to their given roles, user privileges, and object privileges

8. Multiple user login access -

9. Collaboration with payment companies

10. Collaboration with banks

11. Dependant user supervision

E. User Classes and Characteristics

1. **Technical Team / Administrations**
   These users need full access to the database to create and maintain the system according to their needs and the end-user needs. Some might need to view data while others need to be able to modify the data.

2. **Application users / Customers**
   These users need to know how to use the product or the menu-driven application to perform their desired task regardless of the knowledge of how the system works.

F. Operating Environment

Hardware, software and connectivity requirements

Our database runs on all of the major operating systems like Linux, Windows, etc. But for that, as a prerequisite, PGAdmin must be installed in the system.

External Interface Requirements

1. Our product and the database which is inclusive of all the things related to it has been made such that it is easy to understand, we can access and note all the plans that a user has opted for just by entering their customer ID without disclosure of any personal details.

2. Since it is a huge database, it can run on any laptop or computer with good storage and a minimum of 4GB RAM.

3. Our only software requirements include the installation of PGAdmin since we need it to run the queries and any browser compatible with it.

G. Product Functions

- We have installed a proper database that stores all the information relevant to our product and its users, right from their customer ID to the purchased plan.

- We have made our database such that it is easy to modify the user's purchased plans, delete customer IDs in case of termination of services and add new customer IDs.

- Our function for payment resolution is such that we find it easy to deal with payment issues in case there are any since we can easily track which payments are done, due and pending.

- The database has been built with putting the security of users as our topmost priority and so can only be used and seen by authorized officials.

H. Privileges

1. User data can only be accessed by the user holding that customer ID and he can see his payment status.
2. Most of the details of the user are only related to the plan purchased, payment, and their preferences, eliminating the personal information available on the user since that can cause security threats.
3. The database can only be updated by an official having the unique, required login ID and password.
4. Recovery of data in case of any glitches has already been taken care of by our technical support and development team.
5. We have also attached a function to view which employees of our technical team helped out a user deal with issues when in need to reward them.

I. Assumptions

- Most of our users expect utmost privacy and security since the cybercrime rates have been skyrocketing.

- In case of some confusion, the user might want to rethink his selection of plan details, etc. For that, he might want and expect the company to reach out and resolve their technical issues instead of suggesting newer and more expensive plans.

- In the case of corporations, it is expected from our end that the user has the specific hardware and software to run this application and if not is willing to install it.

J. Business Constraints

Our ISP mostly does not exhibit constraint related limitations when first installed. Over time, as technology, bandwidth-consuming applications, and subscriber expectations mature, constraints are eventually discovered. We and our team have tried to deal with these issues as much as we can and plan on improving them by constantly conducting surveys and understanding the plans other ISPs have used. Based on these observations, we have tried to add more and more competitive schemes in the plans table of our database, all the while constantly monitoring how many users/reference IDS are present in each one.

Another constraint we often suffer from includes issues regarding security, when big corporations like Cell-Tech approach us, their main cause of hesitation is security regarding our database. We have tried to face this problem head-on by taking high-security measures and giving access to the database to only a few certified and trusted employees. In case of any mishap, we will provide assurance of data recovery.

The security management systems we use are governed by legitimate security policies which include all the data security techniques we have for protection from

malicious software,database threats like human error, malware attack, physical damage, liquid damage, hard drive damage, power outages, system thefts, natural disasters and many more.
Lastly, finance has to be discussed between both parties to execute the project.

Section 2:
Noun Analysis

I. Noun (& Verb) Analysis.

Table.1

Extracted Nouns and Verbs from Problem Description

NOUN	VERB
Proper database	Production
Design	Accuracy
Product	Efficiency
User	Privacy
tech support	Security
Information	Classified
Price	Affordability
Usage	Work
Technology	Advancement
Security	Protection
Efficient manner	Properly
Storage issue	Risk
Large data	Space

Development team	Responsibility
Questionable activities	Dangerous
Major role	Duty
Up to date	Punctual
Company	Management
Glitch	Restoration
Uploading load	Speed
Proper connection	Clarity
Updation	Accuracy
Back up	Recovery
Database	Informative
People	Concern
Data loss	Breach
Document	Verification
ISP(big corporations)	Well-built
Payment	Facility
Speed	Fast
Range	Connectivity
Product	Uniqueness
Management	Handling

Crystal like clarity	Transparency
Customers	Reach
Constant modifications	Updates
Workplace environment	Friendly
Table	Represent

Table.2

Accepted Noun & Verbs list

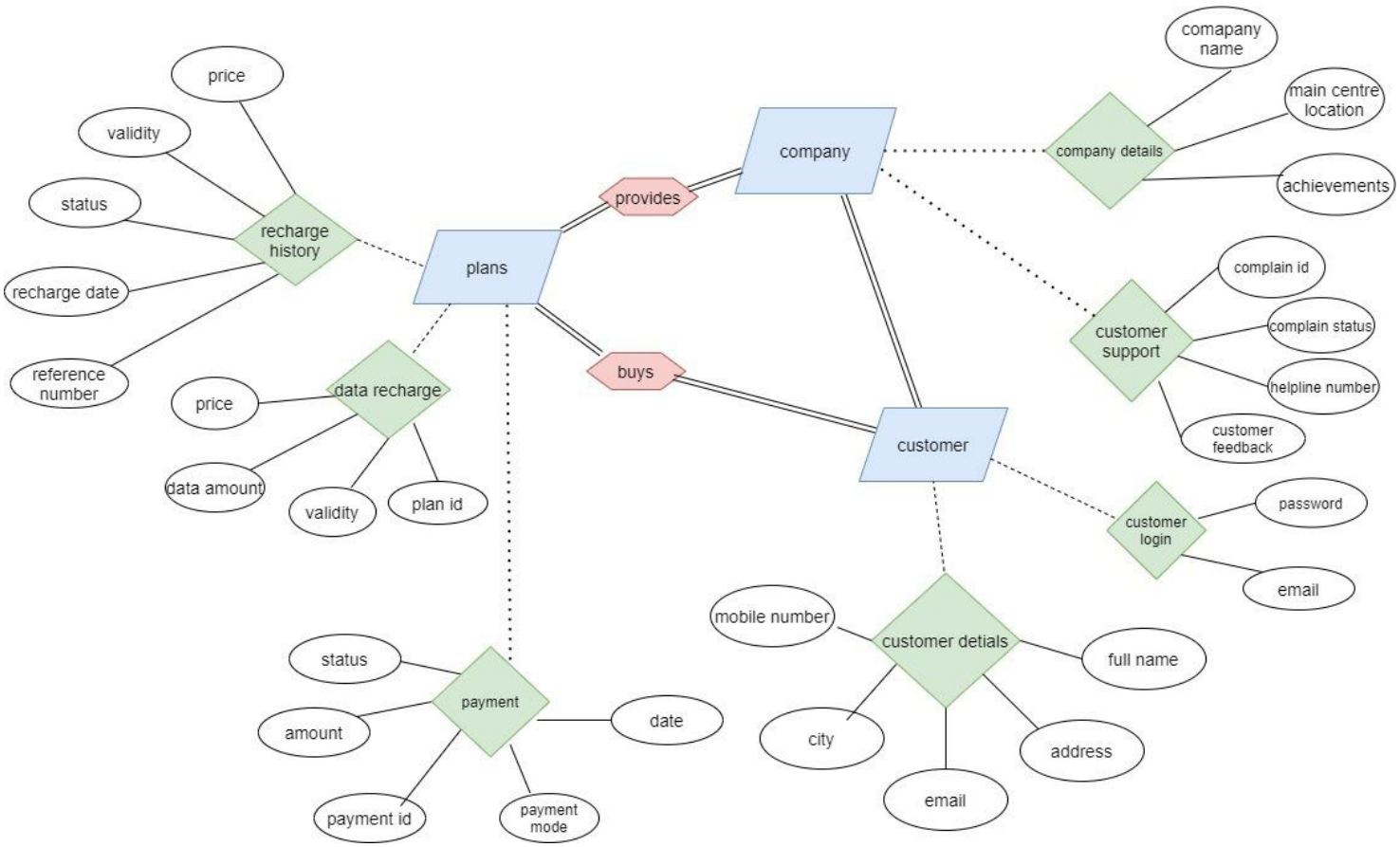
Candidate entity set	**Candidate attribute set**	**Candidate relationship set**
Centre	• State • Pin code • City • Centre_id • Centre_name	Company information
Customer support	• Complaint_id • Complaint status • Helpline number • Customer Feedback	Service help, relationship, complaint resolution, two-way communication

Recharge history	• reach_history_id	Recharge history
Recharge Plans	• reach_plan_id • Data amount • Validity	Recharge plans and offers
Customer	• First Name • Mobile Number • Email • pincode • City • Last Name • Customer_id • Active • state	Customer information
Technician	• Vaccinated • First name • Last name • Employee_id	Service
Payment	• Payment_id • Status • Amount • Date • Payment mode	Payment information

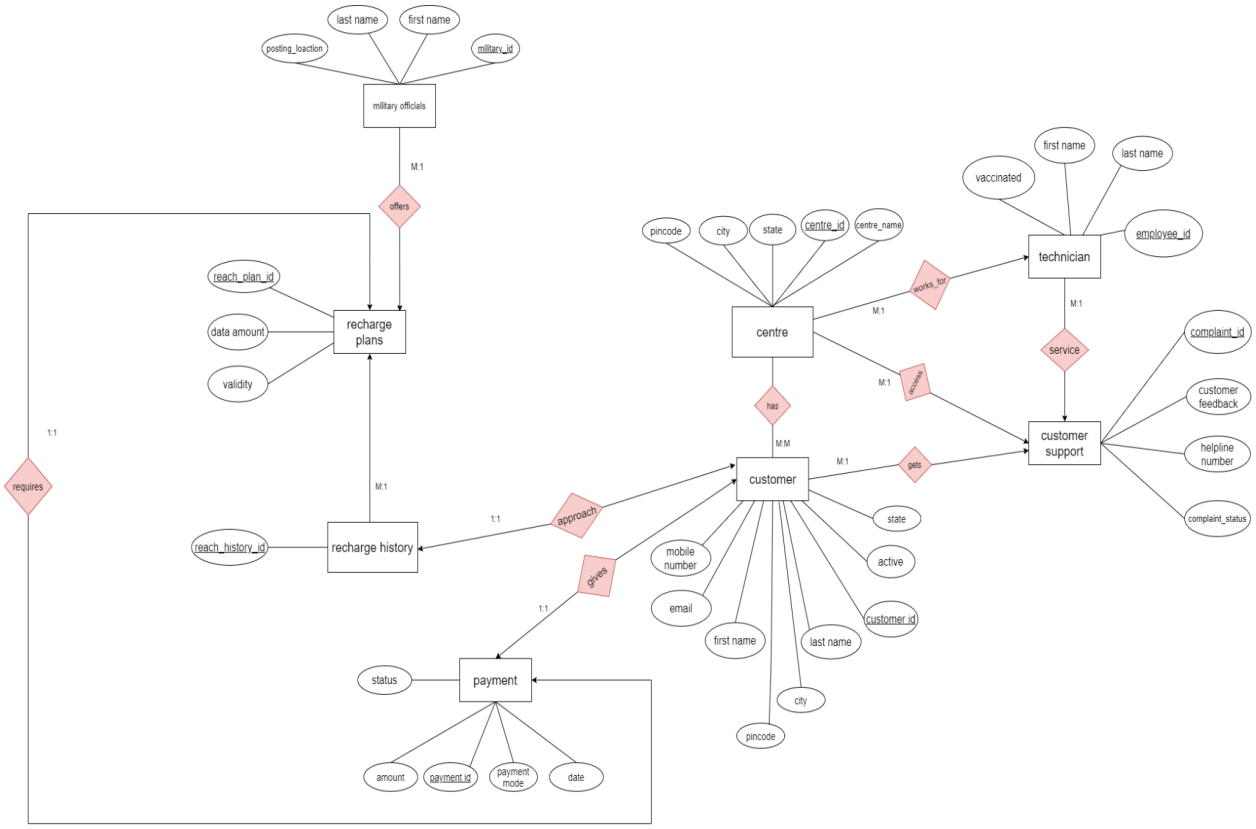
Section3:
ER-Diagrams all versions

II. Develop the ER Diagram (ERD).

Version 1 of ER Diagram



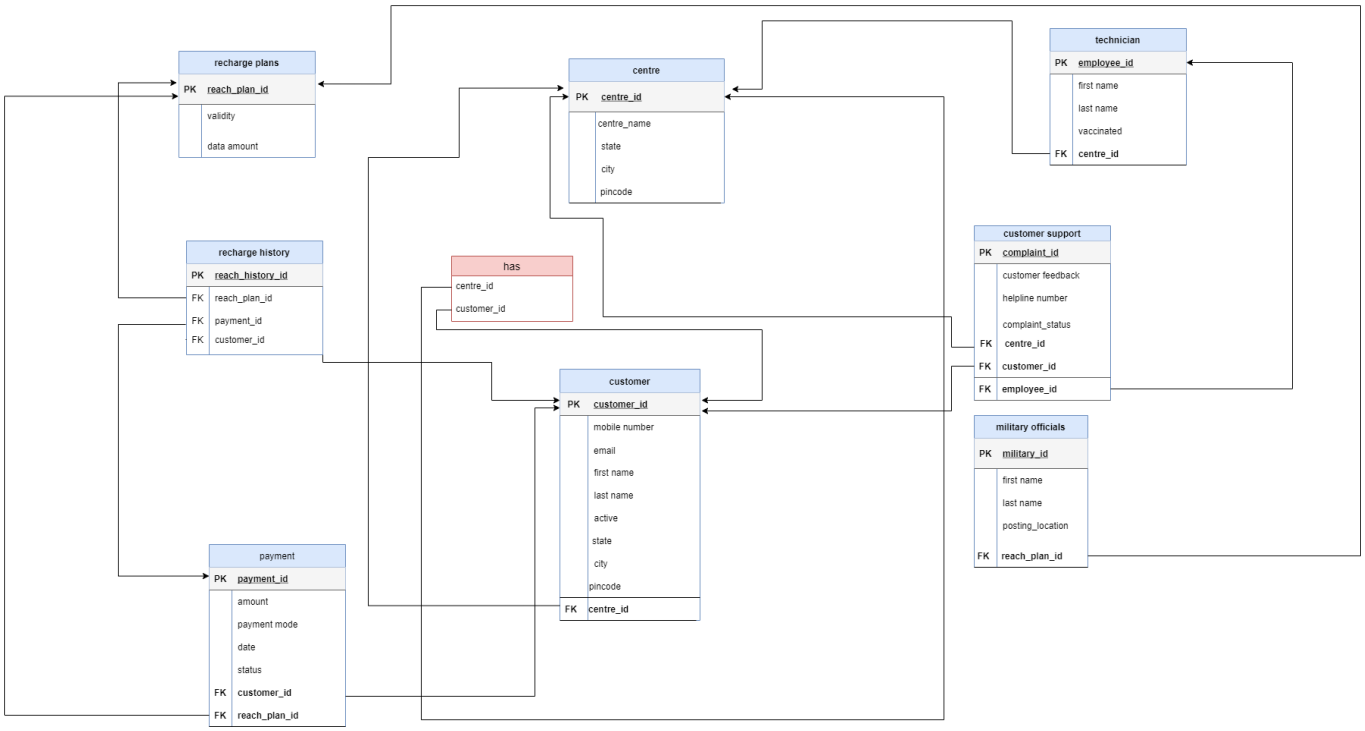
Version 2 of ER Diagram



Section4:
Conversion of Final ER-Diagram to Relational Model

I.) Mapping of ER model to Relational model.

1. With the help of mapping rules discussed in the class, map all the entity and relationship sets to the corresponding relational representation.



2) Write down all the relations with the schema.

1. Recharge plans(**reach_plan_id**, data amount, validity)
   reach_plan_id is the primary key.

2. Recharge_history(**reach_history_id**, reach_plan_id, payment_id,

customer_id)

reach_history_id is the primary key.

reach_plan_id, payment_id, customer_id are the foreign keys.

3. Payment (**payment_id**, amount, payment mode, date, status, reach_plan_id, customer_id)

   payment_id is the primary key.

   reach_plan_id is used as foreign key from recharge plans.

   Customer_id is used as foreign key from customer.

4. Customer (**customer_id**, mobile number, email, first name, last name, active, state, city, Pincode, centre_id)

   customer_id is the primary key.

   centre_id is the foreign key from centre.

5. Customer_support (**complaint_id**, customer_feedback, helpline_number, complaint_status, center_id, customer_id, employee_id)

   complaint_id is the primary key.

   customer_id is the foreign key from customer.

   centre_id is foreign key from centre.

   employee_id is the foreign key from technician.

6. Technician(**employee_id**, centre_id, first name, last name, vaccinated)

   employee_id is the primary key.

   Centre_id is foreign key from centre.

7. Centre(**centre_id,** centre_name, state, city, pin code)

   centre_id is a primary key.

8. Military officials(**military_id,** reach_plan_id, first name, last name , posting location **)**

   military_id is a primary key.

   reach_plan_id is used as a foreign key from recharge_plans.

9. Has(centre_id, customer_id)

Section5:
Normalisation and Schema Refinement

1) List all the Relations & Schemas with all details (Original Design of Database)

All the relations are as follows:

1. Recharge plans(**reach_plan_id**, data amount, validity)
   reach_plan_id is the primary key.

2.Recharge_history(**reach_history_id**, reach_plan_id, payment_id, customer_id)
   reach_history_id is the primary key.
   reach_plan_id, payment_id, customer_id are the foreign keys.

3.Payment (**payment_id**, amount, payment mode, date, status, reach_plan_id , customer_id)
   payment_id is the primary key.
   reach_plan_id is used as foreign key from recharge plans.
   Customer_id is used as foreign key from customer.

4. Customer (**customer_id**, mobile number, email, first name, last name, active, state, city, Pincode, centre_id)
   customer_id is the primary key.
   centre_id is the foreign key from centre.

5. Customer_support (**complaint_id**, customer_feedback, helpline_number, complaint_status, center_id, customer_id, employee_id)

complaint_id is the primary key.
customer_id is the foreign key from customer.
centre_id is foreign key from centre.
employee_id is the foreign key from technician.

6. Technician(**employee_id**, centre_id, first name,
last name, vaccinated)
employee_id is the primary key.
Centre_id is foreign key from centre.

7. Centre(**centre_id,** centre_name, state, city, pin code)
centre_id is a primary key.

8. Military officials(**military_id,** reach_plan_id, first name, last name ,
posting location **)**
military_id is a primary key.
reach_plan_id is used as a foreign key from recharge_plans.

9. Has(centre_id, customer_id)

2) Identify and list all types of dependencies (PK, FK, Functional Dependencies) for each relation

1. Recharge_plans (reach_plan_id, data amount, validity**)**

- (reach_plan_id) -> validity, data_amount

reach_plan_id is considered as price amount of that particular data plan in this table.

2. **Recharge_history(reach_history_id, reach_plan_id, payment_id, customer_id)**

- Primary key: (reach_history_id) -> reach_plan_id
- Foreign key:(reach_plan_id, payment_id,customer_id)

3. **Payment (payment_id, amount, payment mode, date, status , reach_plan_id , customer_id)**

- Primary key:(payment_id) -> amount, payment mode, date, status
- Foreign key:(customer_id, reach_plan_id)

4. Customer (customer_id, mobile number, email, first name, last name, active, state, city, Pincode, centre_id)

- Primary key:(customer_id) ->mobile number, email, first name, last name, active, pincode
- Pincode -> city, state
- Foreign key: (centre_id)

5. Customer_support (complaint_id, customer_feedback, helpline_number, complaint_status, center_id, customer_id, employee_id)

- Primary key:(complaint_id) -> customer_feedback, helpline_number, complaint_status
- Foreign key:(customer_id, center_id, employee_id)

6. Technician(employee_id, centre_id, first name, last name, vaccinated)

- Primary key:(emplyee_id -> vaccinated, first_name, last_name
- Foreign key:(centre_id)

7. Centre(centre_id, centre_name, state, city, pin code)

- Primary key:(centre_id) -> pin_code
- Pincode -> city, state

8. Has (centre_name, Customer_id)

9. Military officials(<u>military_id,</u> reach_plan_id, first name, last name , posting location)

- ➔ Primary key:(military_id) -> first name, last name, posting location
- ➔ Foreign key:(reach_plan_id)

Documentation of normalization & Schema Refinement Process upto 3NF/BCNF: This document should contain:

- **List of redundancies existing for every schema which is part of the database.**

Redundancy

After reviewing all the tables and attributes present in our database, We found address, city and state to be redundant and so we made a separate table named address which will have pincode as PK and city and state.

- **List of update, delete, and insert anomalies for every schema.**

Anomalies

- Insert: For every table, a particular ID is made such that it must be inserted and associated with other attributes in order to insert other values in that particular table.

- Update: update function anomaly does not exist as of now since each value may or may not be updated depending upon the changes either made by our company or our users.

- Delete: If the primary or Foreign key of a particular tuple is deleted then loss of data occurs since all attributes are functionally dependent on the primary key.

First Normal Form

On revisiting the list of attributes and dependencies, we have been able to conclude that our database is 1NF since there are no multi-valued attributes and have atomic values.

Second Normal Form

We have already concluded that our database is in 1NF, we have further observed that all the non-key attributes are dependent on the primary key and hence, no partial dependencies exist. Thus, the entire database is in 2NF.

Third Normal Form

Customer Table:

Here, state and city are dependent on pincode and pincode is dependent on customer_id.

customer_id	mobile number	email	first name	last name	active	city	state	pin code	centre_id
201	3883909049	lisha@centini.org	Lisha	Centini	Yes	Hosapete	Karnataka	925345	475
202	5101617924	arlene_klusman@gmail.com	Arlene	Klusman	Yes	Habra	West Bengal	405252	402
203	1295676492	alease@buemi.com	Alease	Buemi	Yes	Silvassa	Dadara and nagar haveli	733382	403
204	9317467010	louisa@cronauer.com	Louisa	Cronauer	Yes	Thiruvarur	Tamil nadu	272472	419
205	6306162058	angella.cetta@hotmail.com	Angella	Cetta	Yes	Palakkad	Kerala	889609	405
206	3364849934	cgoldammer@cox.net	Cyndy	Goldammer	Yes	Port Blair	Andaman and Nicobar	877368	406
207	6812125351	rosio.cork@gmail.com	Rosio	Cork	Yes	Agartala	Tripura	228327	407
208	6976640502	ckorando@hotmail.com	Celeste	Korando	Yes	Aizwal	Mizoram	735276	408
209	3030568911	twana.felger@felger.org	Twana	Felger	Yes	Bhopal	Madhya Pradesh	257884	409

The non-prime attributes (city and state) transitively depend on super key(customer_id) which violates the rule of third normal form.

Hence we need to move the city and state to the new <address> table, with pincode as a Primary key.

Customer Table:

customer_id	mobile number	email	first name	last name	active	pin code	centre_id
201	3883909049	lisha@centini.org	Lisha	Centini	Yes	925345	475
202	5101617924	arlene_klusman@gmail.com	Arlene	Klusman	Yes	405252	402
203	1295676492	alease@buemi.com	Alease	Buemi	Yes	733382	403
204	9317467010	louisa@cronauer.com	Louisa	Cronauer	Yes	272472	419
205	6306162058	angella.cetta@hotmail.com	Angella	Cetta	Yes	889609	405
206	3364849934	cgoldammer@cox.net	Cyndy	Goldammer	Yes	877368	406
207	6812125351	rosio.cork@gmail.com	Rosio	Cork	Yes	228327	407
208	6976640502	ckorando@hotmail.com	Celeste	Korando	Yes	735276	408
209	3030568911	twana.felger@felger.org	Twana	Felger	Yes	257884	409

Address Table:

pincode	city	state
691792	Hosapete	Karnataka
405252	Habra	West Bengal
733382	Silvassa	Dadara and nagar haveli
615177	Thiruvarur	Tamil nadu
889609	Palakkad	Kerala
877368	Port Blair	Andaman and Nicobar
228327	Agartala	Tripura
735276	Aizwal	Mizoram
257884	Bhopal	Madhya Pradesh

Centre Table:

The same is done for Centre table.

centre_id	centre_name	pincode
401	celltech_Hosapete	691792
402	celltech_Habra	405252
403	celltech_Silvassa	733382
404	celltech_Tiruvarur	615177
405	celltech_Palakkad	889609
406	celltech_Port Blair	877368
407	celltech_Agartala	228327
408	celltech_Aizwal	735276
409	celltech_Bhopal	257884

After decomposing these tables our entire database is in 3NF.

- **Write down final relations with the schema. i.e., R1(A1, A2, A3,... An). Make sure to underline the PK attributes.**

1. Recharge_plans (<u>reach_plan_id</u>, data amount, validity**)**

- (reach_plan_id) -> validity, data_amount

reach_plan_id is considered as the price amount of that particular data plan in this table.

2. Recharge_history (**<u>reach_history_id</u>**, reach_plan_id, payment_id, date, payment_mode, validity, customer_id)

- Primary key: (reach_history_id)
- Foreign key:(reach_plan_id, payment_id,customer_id)

3. Payment (**<u>payment_id</u>**, reach_plan_id, amount, payment mode, date, status, customer_id)

- Primary key:(payment_id) -> amount, payment mode, date, status
- Foreign key:(customer_id,reach_plan_id)

4. Customer (**customer_id**, mobile number , email, first name, last name, active, centre_id, pincode)

- Primary key:(customer_id) -> mobile number , email, first name, last name, active
- Foreign key: centre_id, pincode

5. Address (pin code, city , state**)**

- Primary key:(**pin code**) -> city, state

6. Customer_support (**complaint_id**, customer_id, customer_feedback, helpline_number, complaint_status, center_id, employee_id)

- Primary key:(complaint_id) -> customer_feedback, helpline_number, complaint_status
- Foreign key:(customer_id, center_id, employee_id)

7. Technician (**employee_id**, centre_id, first name, last name , vaccinated)

- Primary key:(emplyee_id -> first name, last name, vaccinated.
- Foreign key:(centre_id,)

8. Centre(**centre_id,** centre_name, pincode)

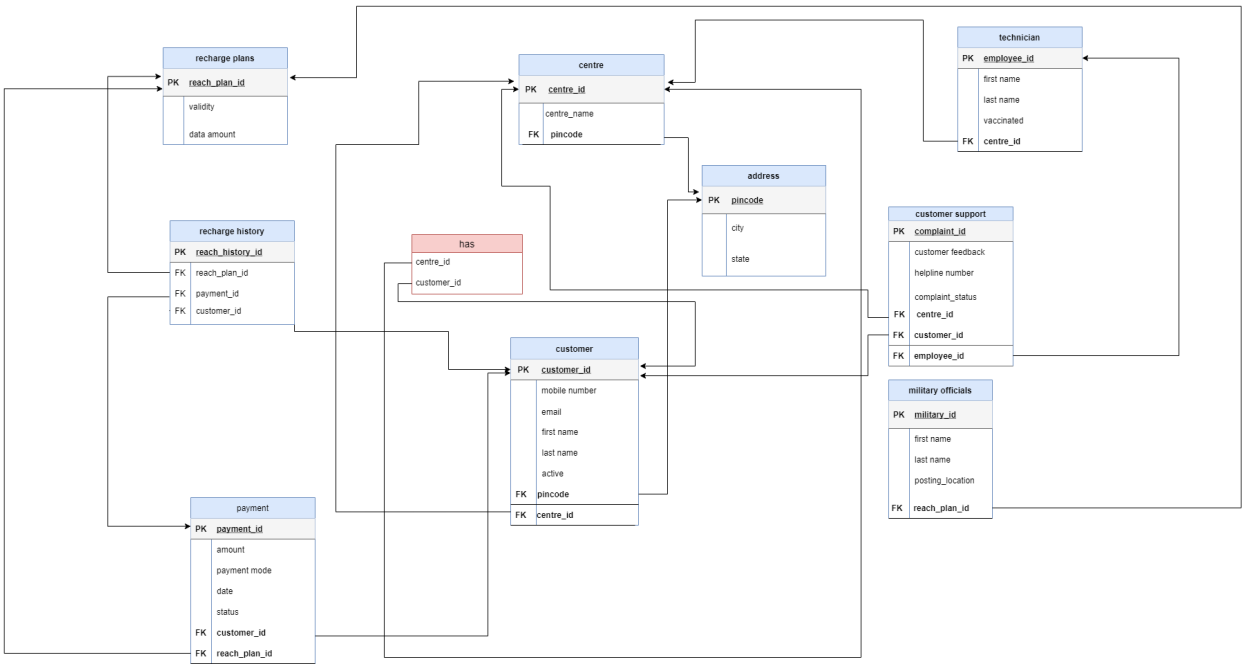
- Primary key:(centre_id) -> centre_name
- Foreign key:(pincode)

10. Has (**centre_id, Customer_id**)

11. Military officials (**military_id,** reach_plan_id, first name, last name , posting location **)**

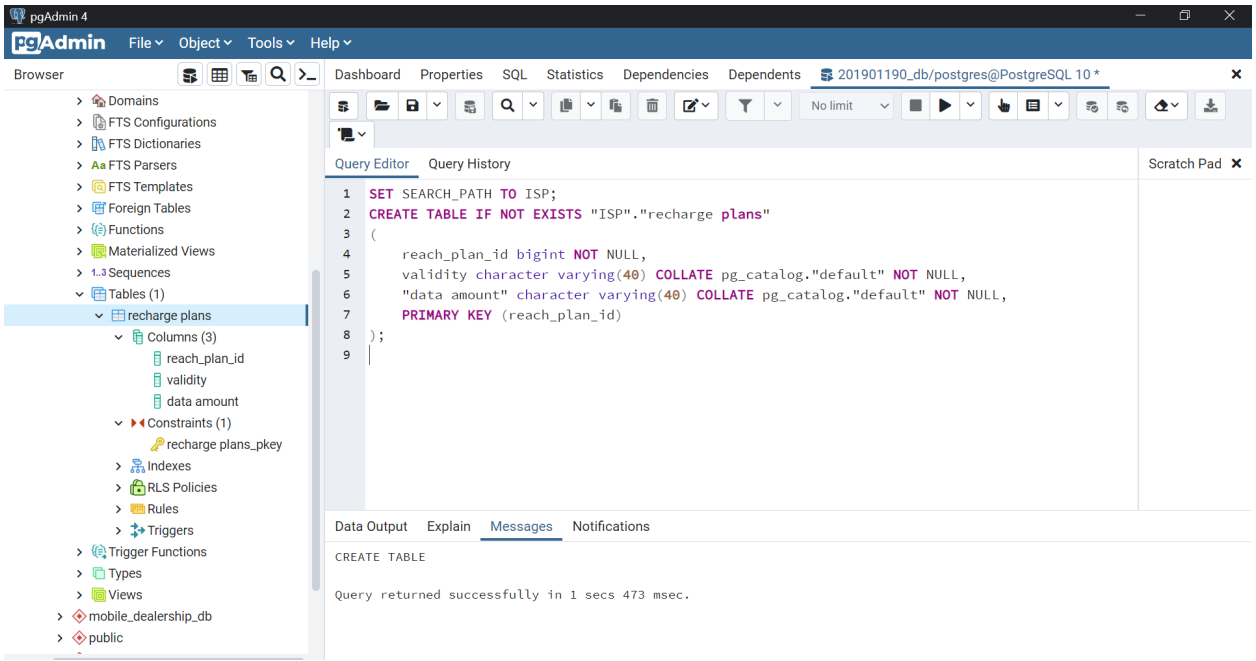
- ➔ Primary key:(military_id) -> first name, last name, posting location
- ➔ Foreign key:(reach_plan_id)

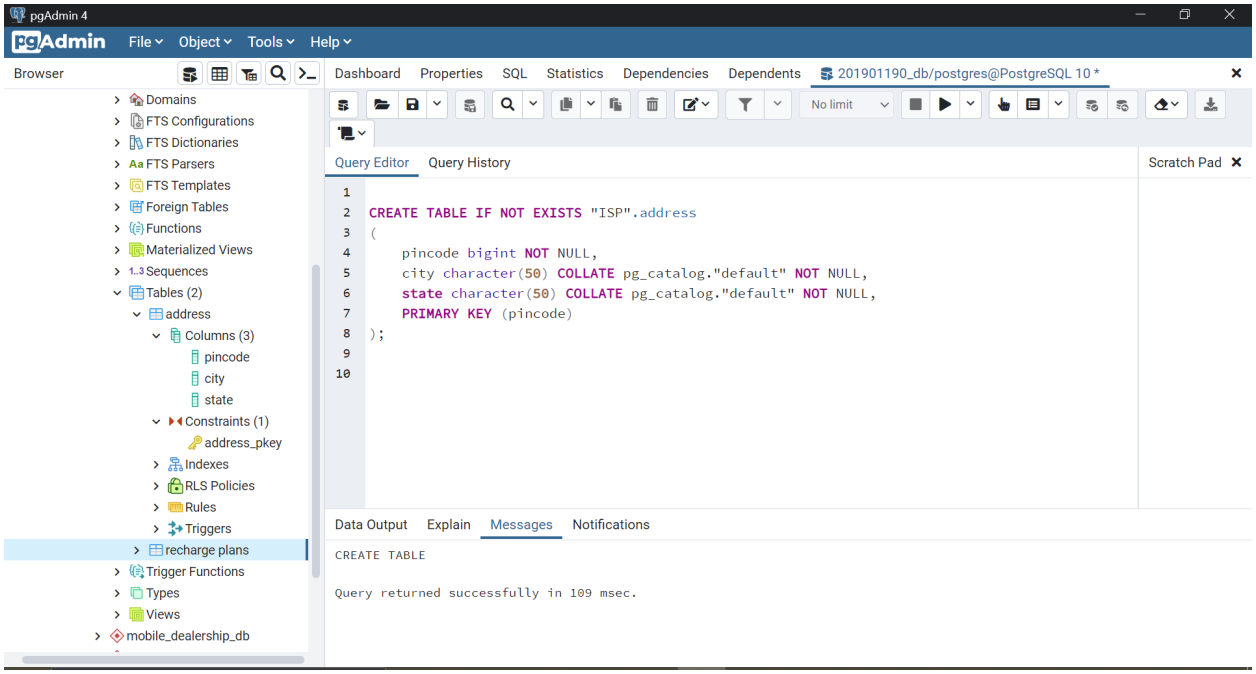
➔ **Refined Schema:**

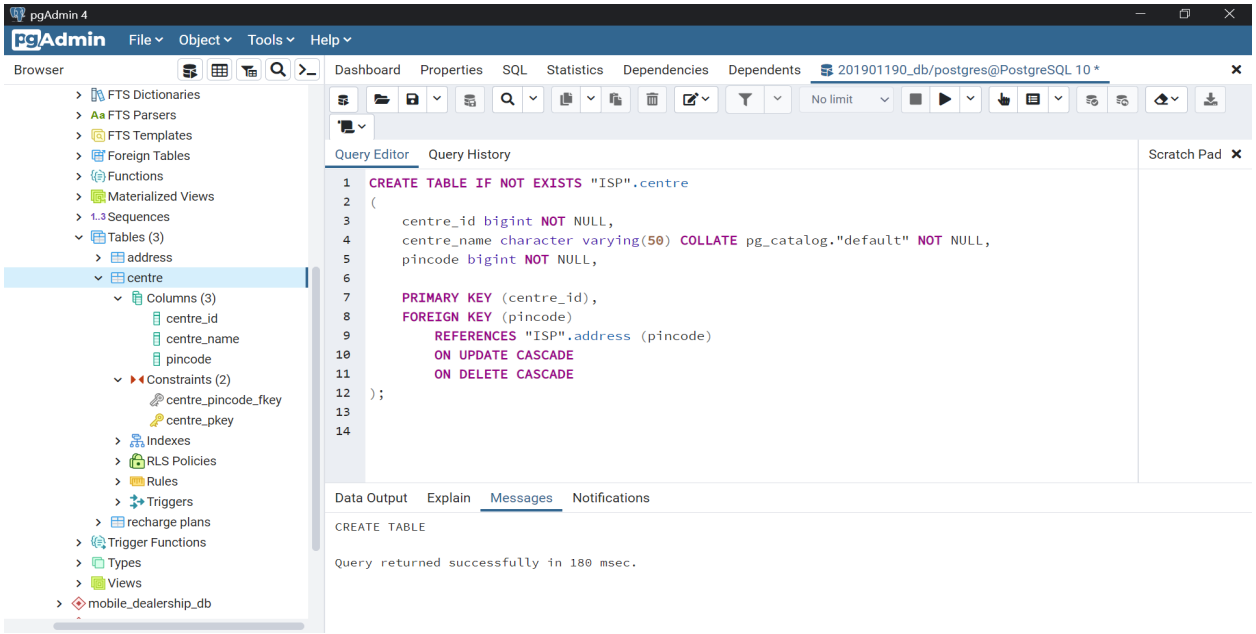


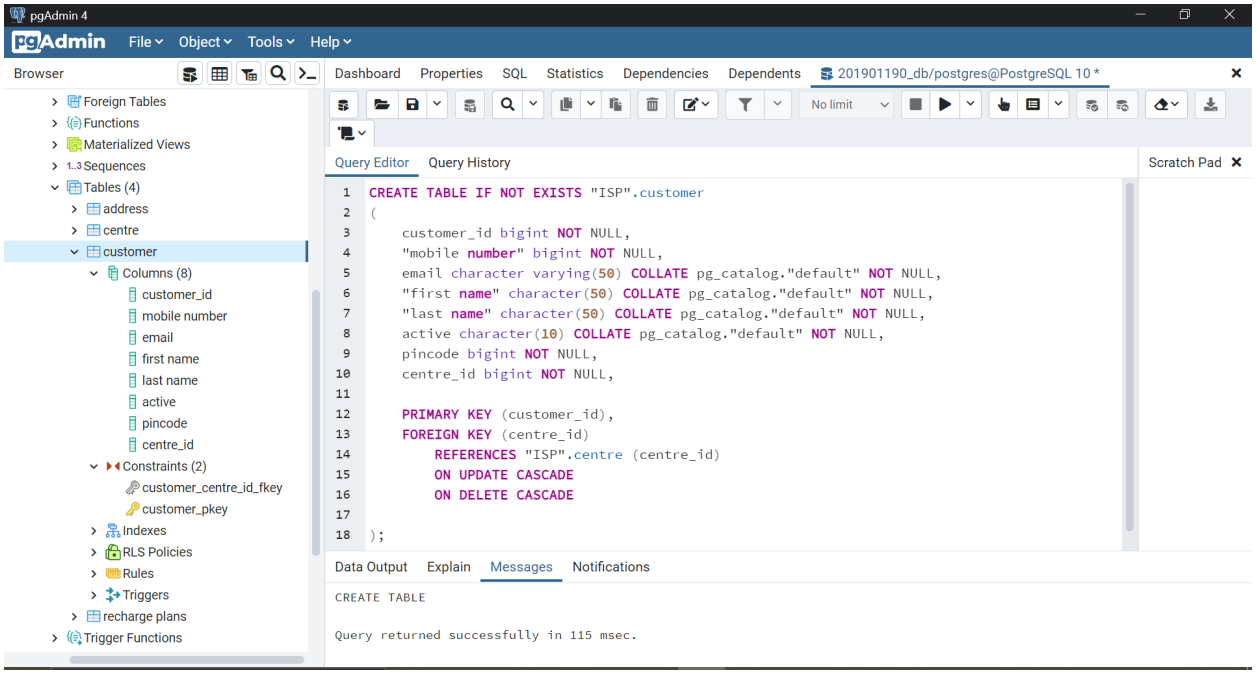
II. Re-write DDL Scripts.

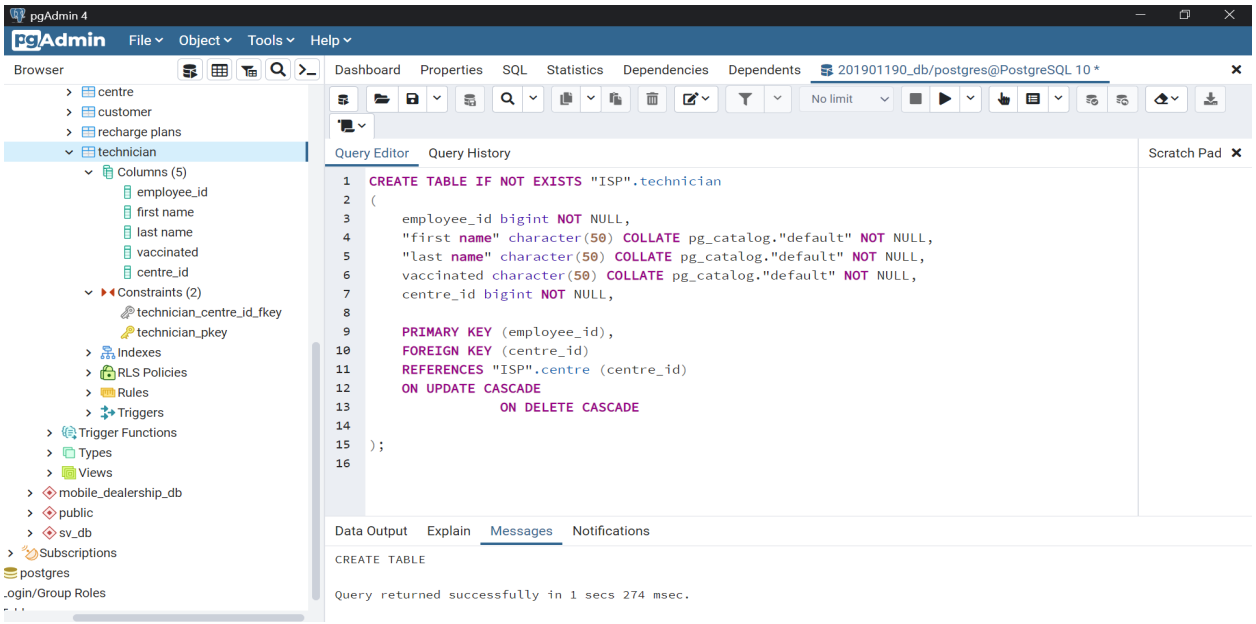
➔ **DDL Snapshots: Put the snapshot of all tables after creating them inside Postgres with DDL.**

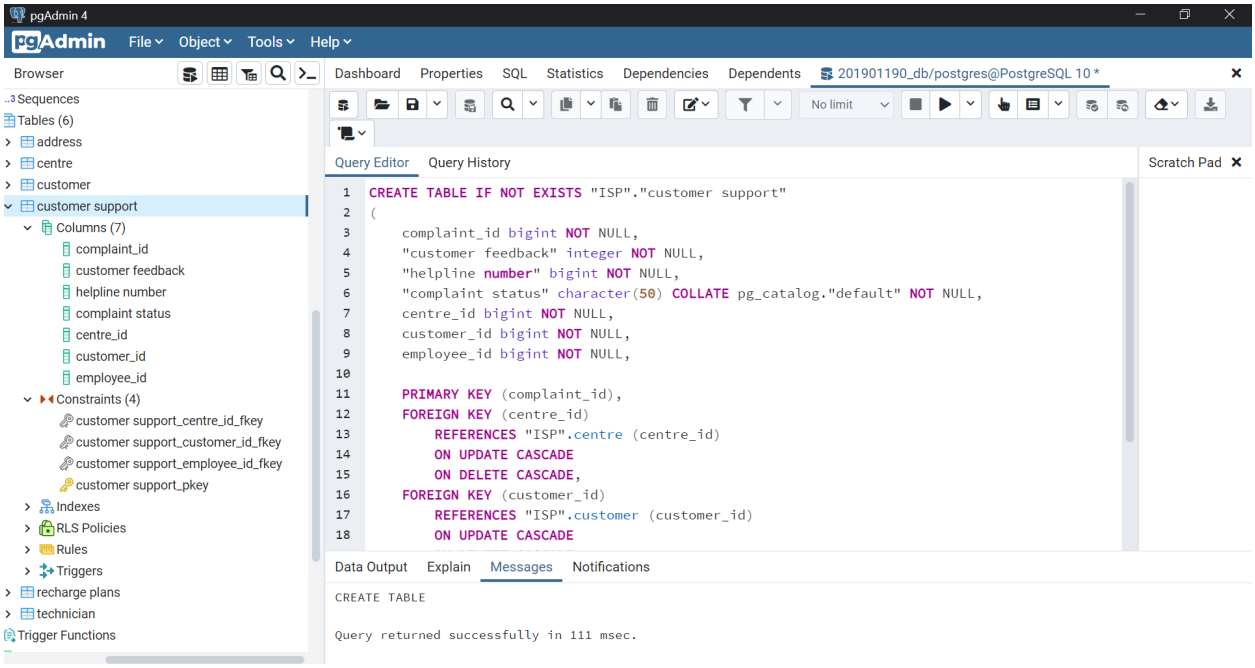


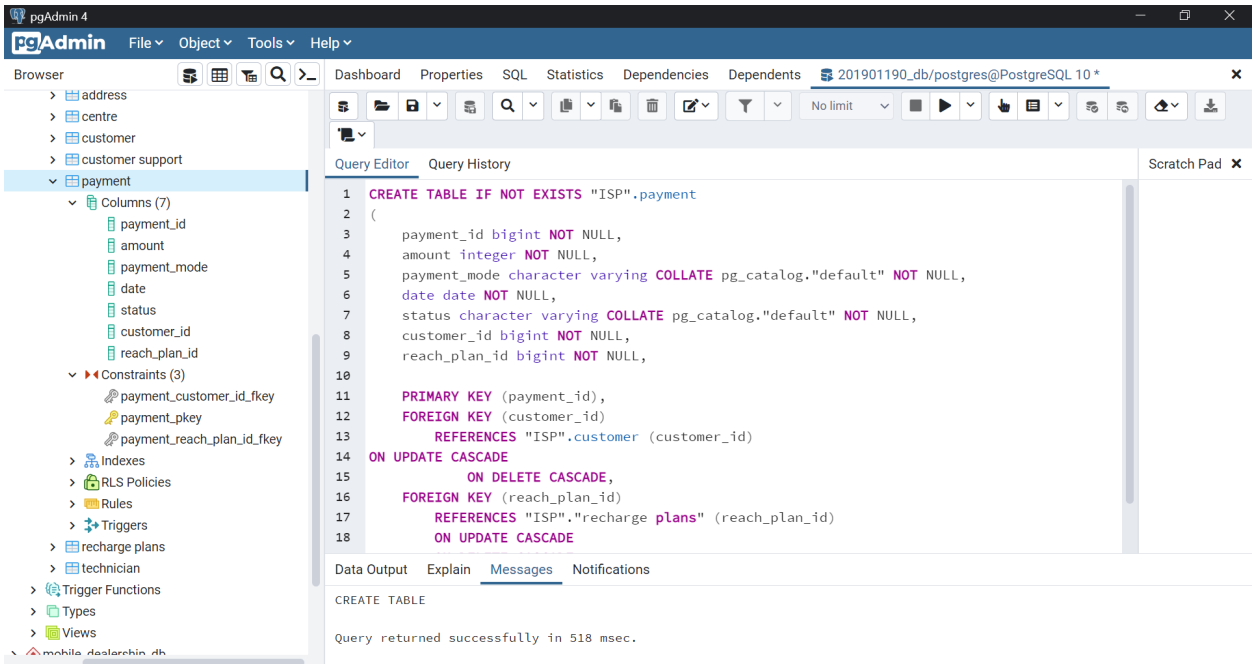

pgAdmin 4
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor
Query History
Scratch Pad
CREATE TABLE IF NOT EXISTS "ISP".address
(
pincode bigint NOT NULL,
city character(50) COLLATE pg_catalog."default" NOT NULL,
state character(50) COLLATE pg_catalog."default" NOT NULL,
PRIMARY KEY (pincode)
);
Data Output
Explain
Messages
Notifications
CREATE TABLE
Query returned successfully in 109 msec.
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Sequences
Tables (2)
address
Columns (3)
pincode
city
state
Constraints (1)
address_pkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
Trigger Functions
Types
Views
mobile_dealership_db

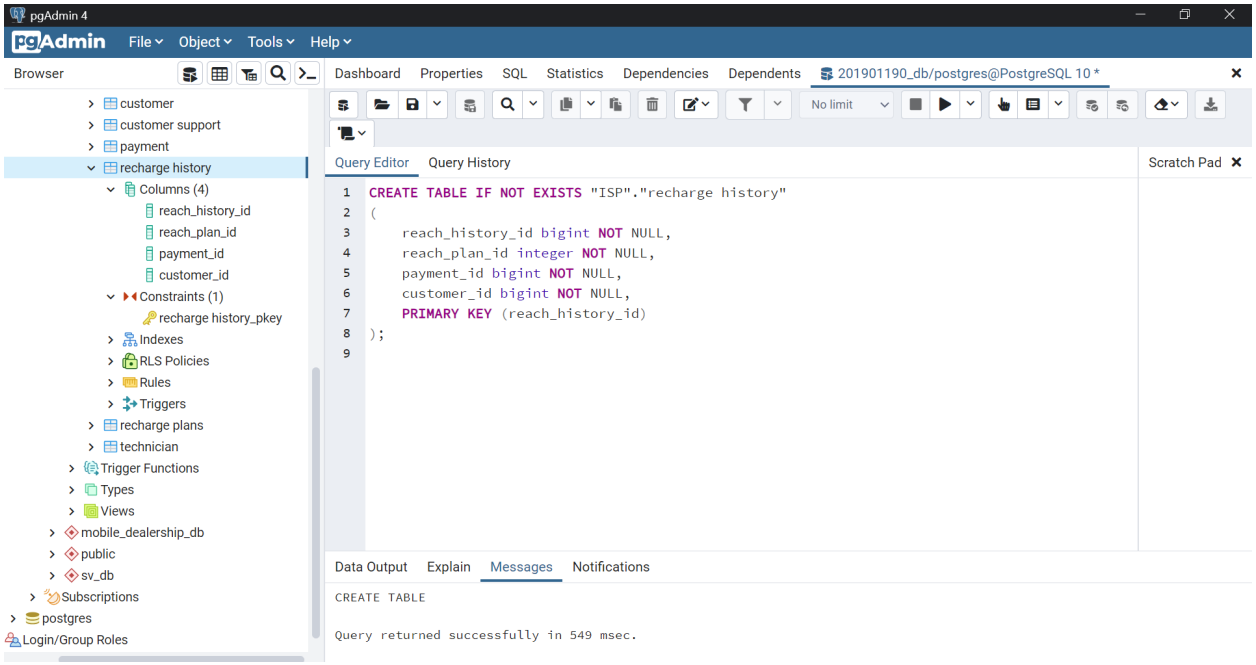

pgAdmin 4
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor
Query History
Scratch Pad
CREATE TABLE IF NOT EXISTS "ISP".centre
(
centre_id bigint NOT NULL,
centre_name character varying(50) COLLATE pg_catalog."default" NOT NULL,
pincode bigint NOT NULL,
PRIMARY KEY (centre_id),
FOREIGN KEY (pincode)
REFERENCES "ISP".address (pincode)
ON UPDATE CASCADE
ON DELETE CASCADE
);
Data Output
Explain
Messages
Notifications
CREATE TABLE
Query returned successfully in 180 msec.
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Sequences
Tables (3)
address
centre
Columns (3)
centre_id
centre_name
pincode
Constraints (2)
centre_pincode_fkey
centre_pkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
Trigger Functions
Types
Views
mobile_dealership_db

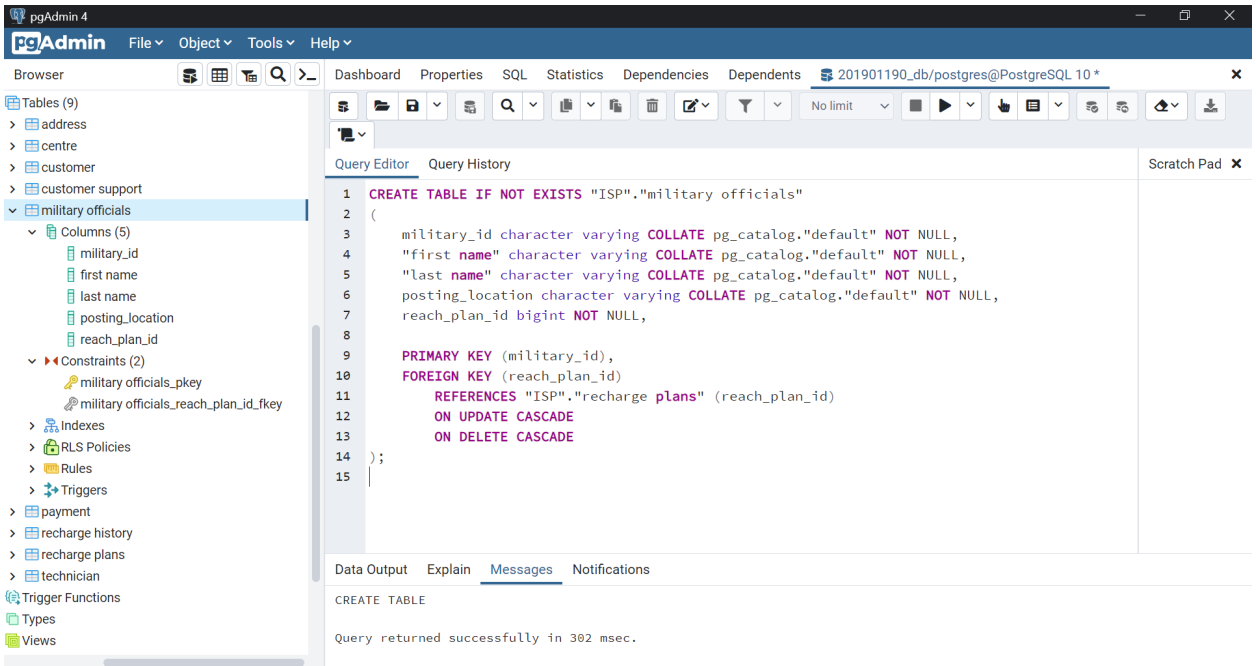

pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
Foreign Tables
Functions
Materialized Views
Sequences
Tables (4)
address
centre
customer
Columns (8)
customer_id
mobile number
email
first name
last name
active
pincode
centre_id
Constraints (2)
customer_centre_id_fkey
customer_pkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
Trigger Functions
No limit
Query Editor Query History
Scratch Pad
CREATE TABLE IF NOT EXISTS "ISP".customer
(
customer_id bigint NOT NULL,
"mobile number" bigint NOT NULL,
email character varying(50) COLLATE pg_catalog."default" NOT NULL,
"first name" character(50) COLLATE pg_catalog."default" NOT NULL,
"last name" character(50) COLLATE pg_catalog."default" NOT NULL,
active character(10) COLLATE pg_catalog."default" NOT NULL,
pincode bigint NOT NULL,
centre_id bigint NOT NULL,
PRIMARY KEY (customer_id),
FOREIGN KEY (centre_id)
REFERENCES "ISP".centre (centre_id)
ON UPDATE CASCADE
ON DELETE CASCADE
);
Data Output Explain Messages Notifications
CREATE TABLE
Query returned successfully in 115 msec.

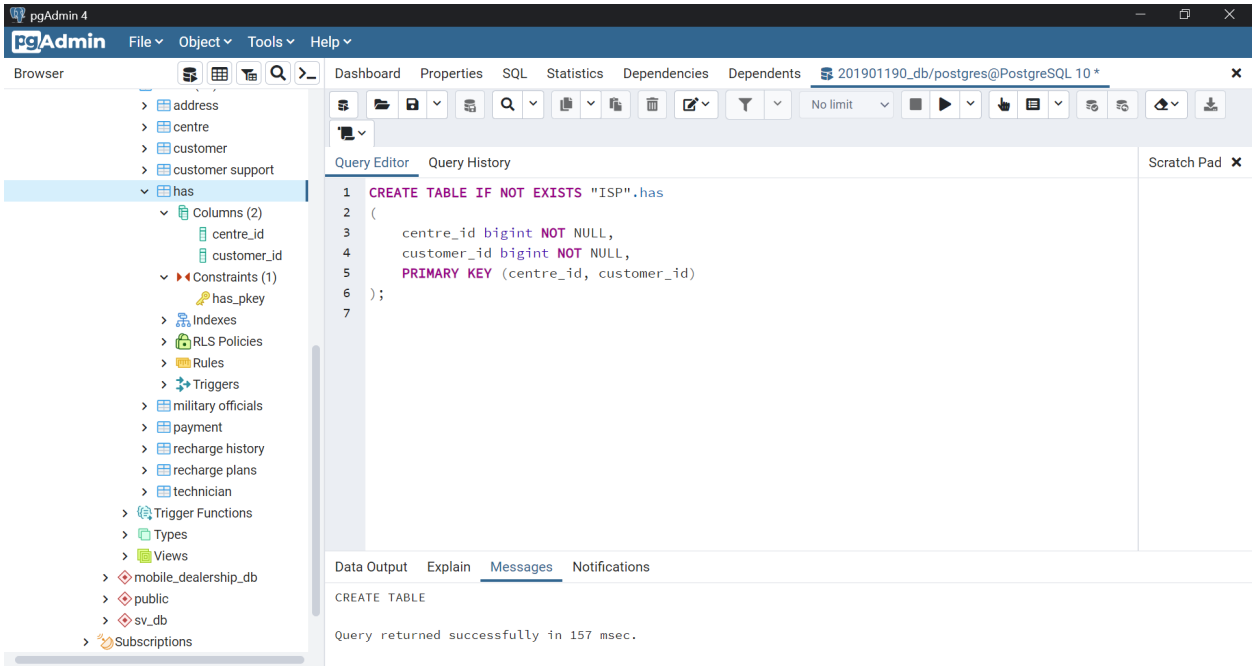

pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
centre
customer
recharge plans
technician
Columns (5)
employee_id
first name
last name
vaccinated
centre_id
Constraints (2)
technician_centre_id_fkey
technician_pkey
Indexes
RLS Policies
Rules
Triggers
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
postgres
Login/Group Roles
No limit
Query Editor Query History
Scratch Pad
CREATE TABLE IF NOT EXISTS "ISP".technician
(
employee_id bigint NOT NULL,
"first name" character(50) COLLATE pg_catalog."default" NOT NULL,
"last name" character(50) COLLATE pg_catalog."default" NOT NULL,
vaccinated character(50) COLLATE pg_catalog."default" NOT NULL,
centre_id bigint NOT NULL,
PRIMARY KEY (employee_id),
FOREIGN KEY (centre_id)
REFERENCES "ISP".centre (centre_id)
ON UPDATE CASCADE
ON DELETE CASCADE
);
Data Output Explain Messages Notifications
CREATE TABLE
Query returned successfully in 1 secs 274 msec.


pgAdmin 4
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor
Query History
Scratch Pad
Sequences
Tables (6)
address
centre
customer
customer support
Columns (7)
complaint_id
customer feedback
helpline number
complaint status
centre_id
customer_id
employee_id
Constraints (4)
customer support_centre_id_fkey
customer support_customer_id_fkey
customer support_employee_id_fkey
customer support_pkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
technician
Trigger Functions
1 CREATE TABLE IF NOT EXISTS "ISP"."customer support"
2 (
3 complaint_id bigint NOT NULL,
4 "customer feedback" integer NOT NULL,
5 "helpline number" bigint NOT NULL,
6 "complaint status" character(50) COLLATE pg_catalog."default" NOT NULL,
7 centre_id bigint NOT NULL,
8 customer_id bigint NOT NULL,
9 employee_id bigint NOT NULL,
10
11 PRIMARY KEY (complaint_id),
12 FOREIGN KEY (centre_id)
13 REFERENCES "ISP".centre (centre_id)
14 ON UPDATE CASCADE
15 ON DELETE CASCADE,
16 FOREIGN KEY (customer_id)
17 REFERENCES "ISP".customer (customer_id)
18 ON UPDATE CASCADE
Data Output
Explain
Messages
Notifications
CREATE TABLE
Query returned successfully in 111 msec.

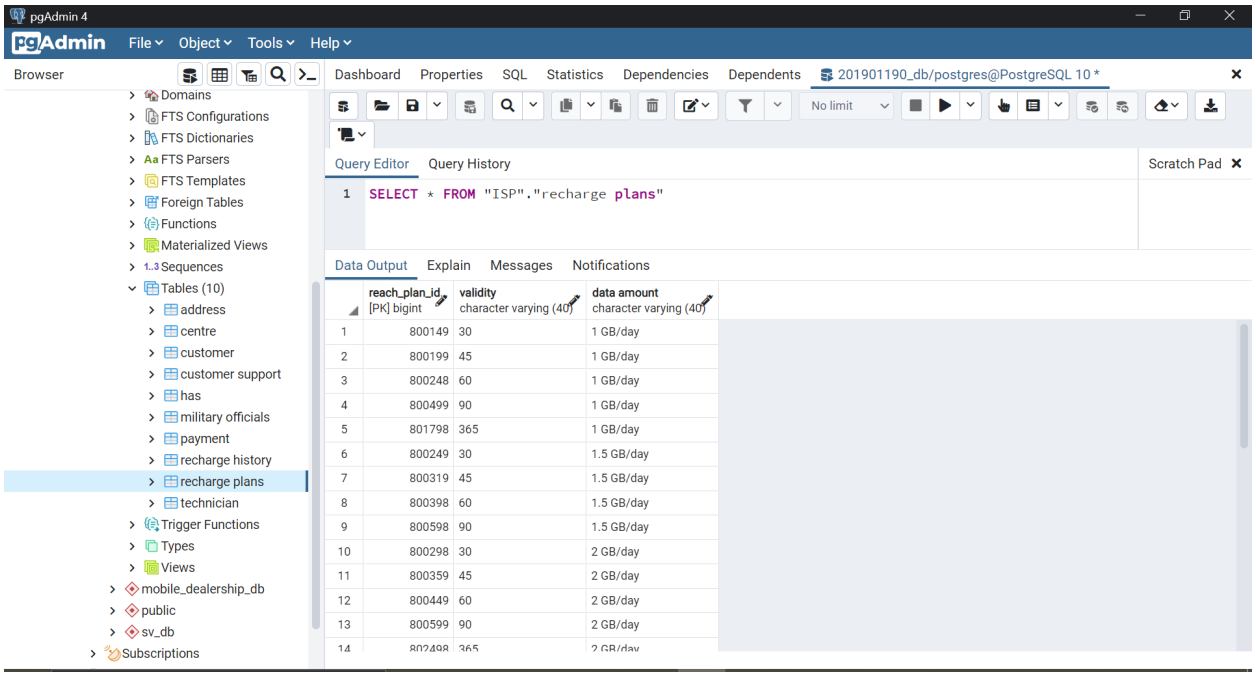

pgAdmin 4
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor
Query History
Scratch Pad
address
centre
customer
customer support
payment
Columns (7)
payment_id
amount
payment_mode
date
status
customer_id
reach_plan_id
Constraints (3)
payment_customer_id_fkey
payment_pkey
payment_reach_plan_id_fkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
technician
Trigger Functions
Types
Views
1 CREATE TABLE IF NOT EXISTS "ISP".payment
2 (
3 payment_id bigint NOT NULL,
4 amount integer NOT NULL,
5 payment_mode character varying COLLATE pg_catalog."default" NOT NULL,
6 date date NOT NULL,
7 status character varying COLLATE pg_catalog."default" NOT NULL,
8 customer_id bigint NOT NULL,
9 reach_plan_id bigint NOT NULL,
10
11 PRIMARY KEY (payment_id),
12 FOREIGN KEY (customer_id)
13 REFERENCES "ISP".customer (customer_id)
14 ON UPDATE CASCADE
15 ON DELETE CASCADE,
16 FOREIGN KEY (reach_plan_id)
17 REFERENCES "ISP"."recharge plans" (reach_plan_id)
18 ON UPDATE CASCADE
Data Output
Explain
Messages
Notifications
CREATE TABLE
Query returned successfully in 518 msec.

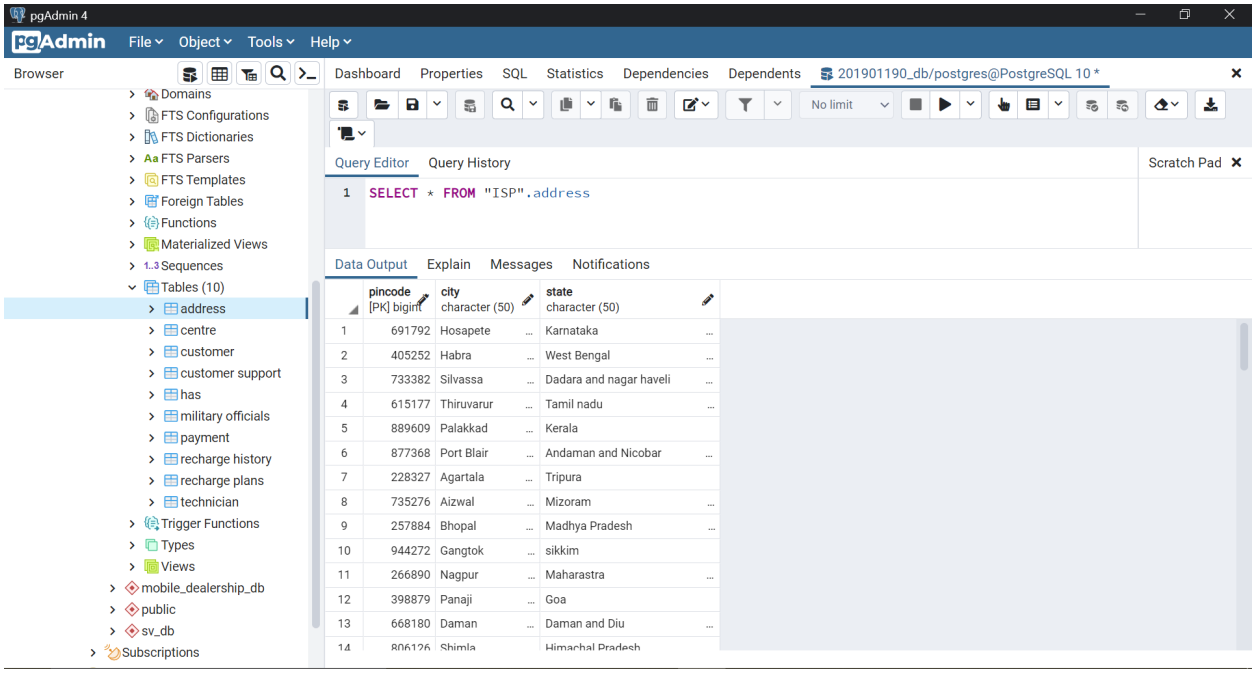

pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
customer
customer support
payment
recharge history
Columns (4)
reach_history_id
reach_plan_id
payment_id
customer_id
Constraints (1)
recharge history_pkey
Indexes
RLS Policies
Rules
Triggers
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
postgres
Login/Group Roles
1 CREATE TABLE IF NOT EXISTS "ISP"."recharge history"
2 (
3 reach_history_id bigint NOT NULL,
4 reach_plan_id integer NOT NULL,
5 payment_id bigint NOT NULL,
6 customer_id bigint NOT NULL,
7 PRIMARY KEY (reach_history_id)
8);
9
Data Output Explain Messages Notifications
CREATE TABLE
Query returned successfully in 549 msec.


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
Tables (9)
address
centre
customer
customer support
military officials
Columns (5)
military_id
first name
last name
posting_location
reach_plan_id
Constraints (2)
military officials_pkey
military officials_reach_plan_id_fkey
Indexes
RLS Policies
Rules
Triggers
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
1 CREATE TABLE IF NOT EXISTS "ISP"."military officials"
2 (
3 military_id character varying COLLATE pg_catalog."default" NOT NULL,
4 "first name" character varying COLLATE pg_catalog."default" NOT NULL,
5 "last name" character varying COLLATE pg_catalog."default" NOT NULL,
6 posting_location character varying COLLATE pg_catalog."default" NOT NULL,
7 reach_plan_id bigint NOT NULL,
8
9 PRIMARY KEY (military_id),
10 FOREIGN KEY (reach_plan_id)
11 REFERENCES "ISP"."recharge plans" (reach_plan_id)
12 ON UPDATE CASCADE
13 ON DELETE CASCADE
14);
15
Data Output Explain Messages Notifications
CREATE TABLE
Query returned successfully in 302 msec.



➔ **Data Snapshots: Put the snapshot of select * queries of all the tables after insertion of data. Mention the number of records of each table.**




pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
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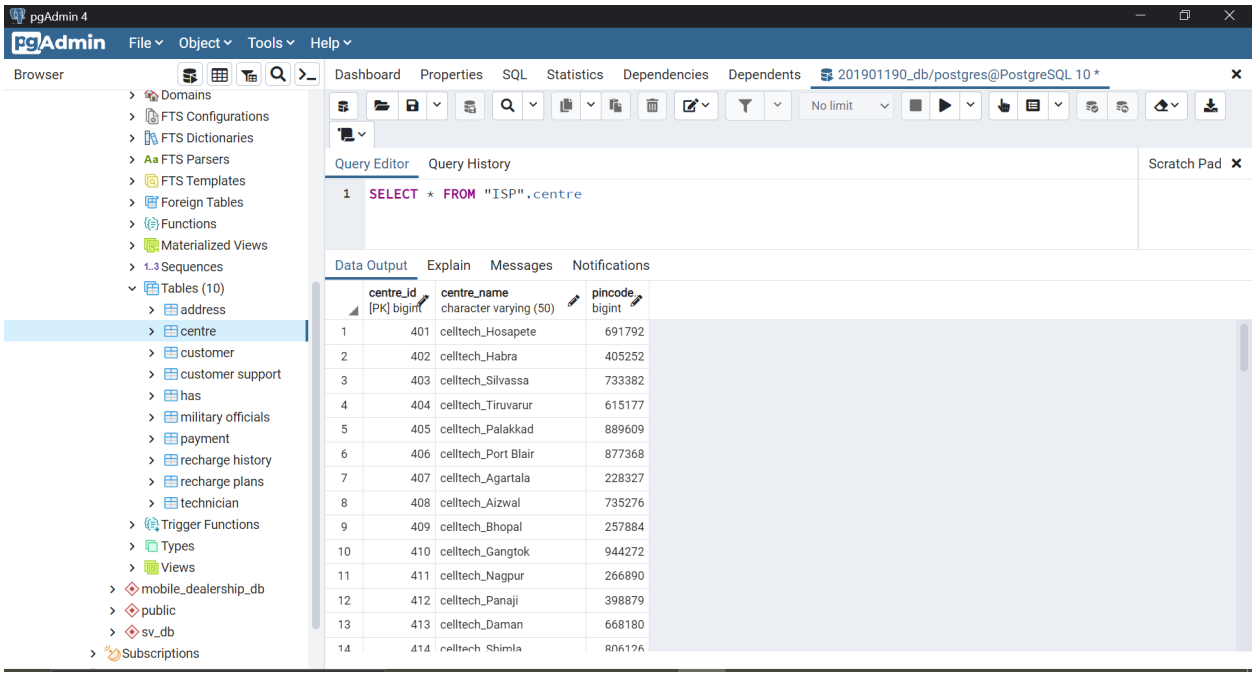
Materialized Views
Sequences
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP".address
Data Output Explain Messages Notifications
pincode [PK] bigint
city character (50)
state character (50)
1 691792 Hosapete Karnataka
2 405252 Habra West Bengal
3 733382 Silvassa Dadara and nagar haveli
4 615177 Thiruvarur Tamil nadu
5 889609 Palakkad Kerala
6 877368 Port Blair Andaman and Nicobar
7 228327 Agartala Tripura
8 735276 Aizwal Mizoram
9 257884 Bhopal Madhya Pradesh
10 944272 Gangtok sikkim
11 266890 Nagpur Maharastra
12 398879 Panaji Goa
13 668180 Daman Daman and Diu
14 806126 Shimla Himachal Pradesh


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
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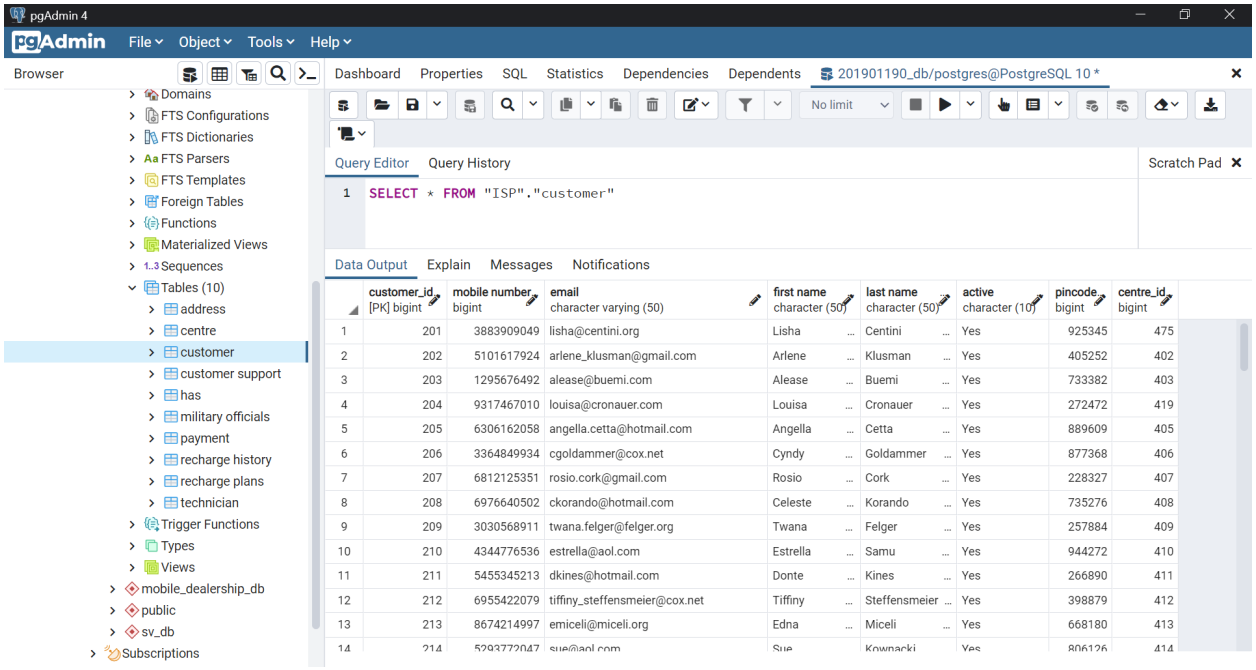
Materialized Views
Sequences
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP".centre
Data Output Explain Messages Notifications
centre_id [PK] bigint
centre_name character varying (50)
pincode bigint
1 401 celltech_Hosapete 691792
2 402 celltech_Habra 405252
3 403 celltech_Silvassa 733382
4 404 celltech_Tiruvarur 615177
5 405 celltech_Palakkad 889609
6 406 celltech_Port Blair 877368
7 407 celltech_Agartala 228327
8 408 celltech_Aizwal 735276
9 409 celltech_Bhopal 257884
10 410 celltech_Gangtok 944272
11 411 celltech_Nagpur 266890
12 412 celltech_Panaji 398879
13 413 celltech_Daman 668180
14 414 celltech_Shimla 806126


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
Domains
FTS Configurations
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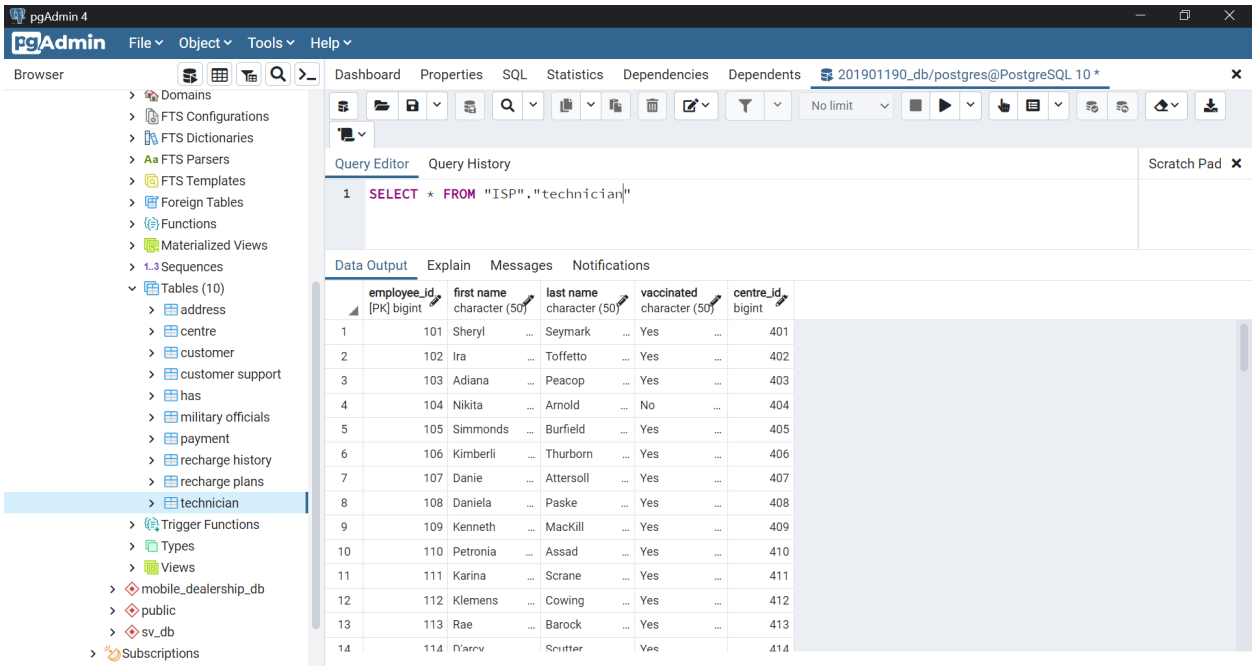
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."customer"
Data Output Explain Messages Notifications
customer_id [PK] bigint
mobile number bigint
email character varying (50)
first name character (50)
last name character (50)
active character (10)
pincode bigint
centre_id bigint
1 201 3883909049 lisha@centini.org Lisha Centini Yes 925345 475
2 202 5101617924 arlene_klusman@gmail.com Arlene Klusman Yes 405252 402
3 203 1295676492 alease@buemi.com Alease Buemi Yes 733382 403
4 204 9317467010 louisa@cronauer.com Louisa Cronauer Yes 272472 419
5 205 6306162058 angella.cetta@hotmail.com Angella Cetta Yes 889609 405
6 206 3364849934 cgoldammer@cox.net Cyndy Goldammer Yes 877368 406
7 207 6812125351 rosio.cork@gmail.com Rosio Cork Yes 228327 407
8 208 6976640502 ckorando@hotmail.com Celeste Korando Yes 735276 408
9 209 3030568911 twana.felger@felger.org Twana Felger Yes 257884 409
10 210 4344776536 estrella@aol.com Estrella Samu Yes 944272 410
11 211 5455345213 dkines@hotmail.com Donte Kines Yes 266890 411
12 212 6955422079 tiffiny_steffensmeier@cox.net Tiffiny Steffensmeier Yes 398879 412
13 213 8674214997 emiceli@miceli.org Edna Miceli Yes 668180 413


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
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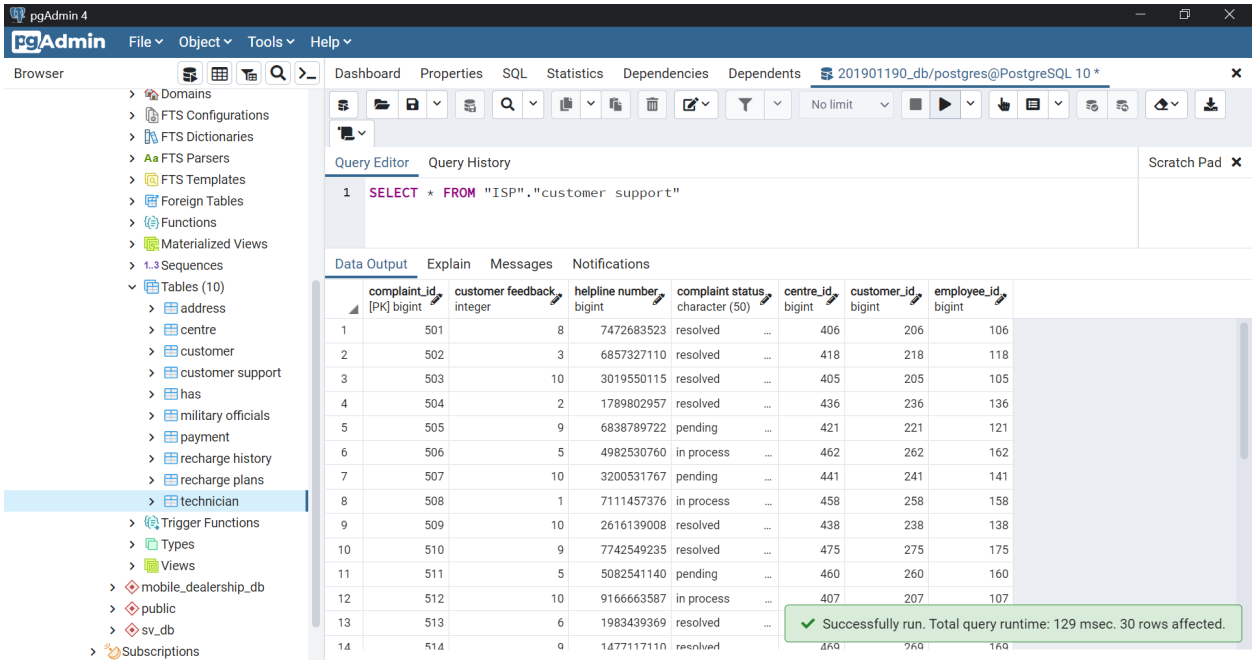
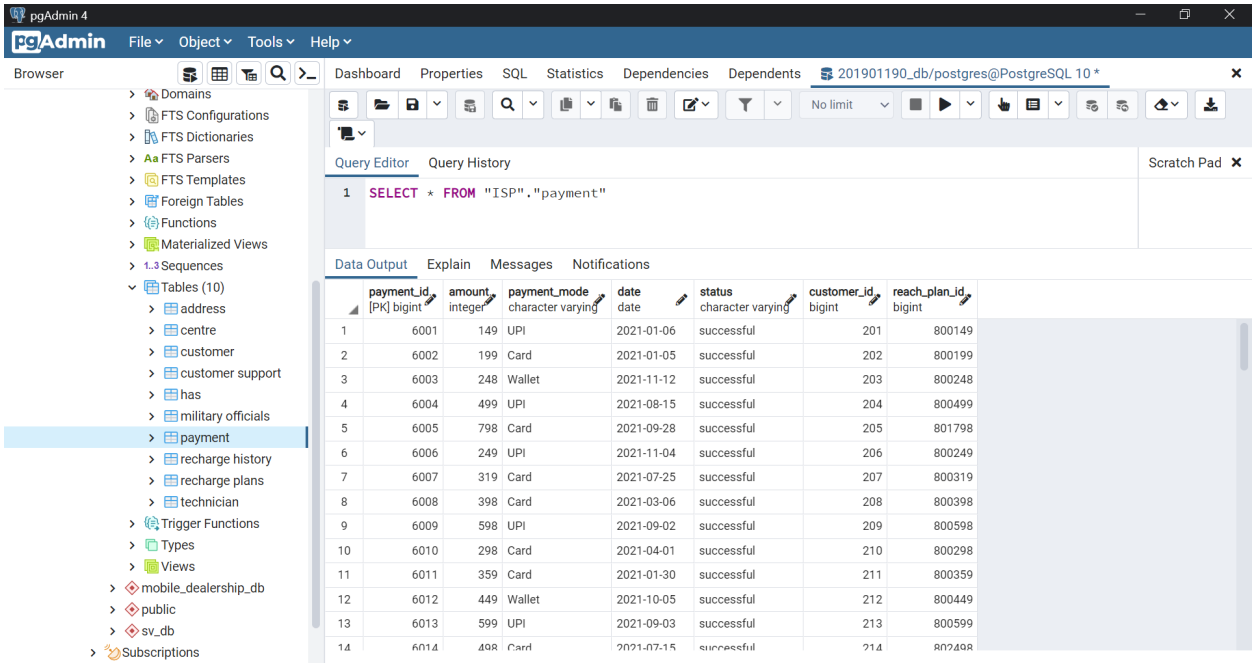
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."technician"
Data Output Explain Messages Notifications
employee_id [PK] bigint
first name character (50)
last name character (50)
vaccinated character (50)
centre_id bigint
1 101 Sheryl Seymark Yes 401
2 102 Ira Toffetto Yes 402
3 103 Adiana Peacop Yes 403
4 104 Nikita Arnold No 404
5 105 Simmonds Burfield Yes 405
6 106 Kimberli Thurborn Yes 406
7 107 Danie Attersoll Yes 407
8 108 Daniela Paske Yes 408
9 109 Kenneth MacKill Yes 409
10 110 Petronia Assad Yes 410
11 111 Karina Scrane Yes 411
12 112 Klemens Cowing Yes 412
13 113 Rae Barock Yes 413


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."customer support"
Data Output Explain Messages Notifications
complaint_id [PK] bigint
customer feedback integer
helpline number bigint
complaint status character (50)
centre_id bigint
customer_id bigint
employee_id bigint
1 501 8 7472683523 resolved ... 406 206 106
2 502 3 6857327110 resolved ... 418 218 118
3 503 10 3019550115 resolved ... 405 205 105
4 504 2 1789802957 resolved ... 436 236 136
5 505 9 6838789722 pending ... 421 221 121
6 506 5 4982530760 in process ... 462 262 162
7 507 10 3200531767 pending ... 441 241 141
8 508 1 7111457376 in process ... 458 258 158
9 509 10 2616139008 resolved ... 438 238 138
10 510 9 7742549235 resolved ... 475 275 175
11 511 5 5082541140 pending ... 460 260 160
12 512 10 9166663587 in process ... 407 207 107
13 513 6 1983439369 resolved ...
Successfully run. Total query runtime: 129 msec. 30 rows affected.
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Sequences
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."payment"
Data Output Explain Messages Notifications
payment_id [PK] bigint
amount integer
payment_mode character varying
date date
status character varying
customer_id bigint
reach_plan_id bigint
1 6001 149 UPI 2021-01-06 successful 201 800149
2 6002 199 Card 2021-01-05 successful 202 800199
3 6003 248 Wallet 2021-11-12 successful 203 800248
4 6004 499 UPI 2021-08-15 successful 204 800499
5 6005 798 Card 2021-09-28 successful 205 801798
6 6006 249 UPI 2021-11-04 successful 206 800249
7 6007 319 Card 2021-07-25 successful 207 800319
8 6008 398 Card 2021-03-06 successful 208 800398
9 6009 598 UPI 2021-09-02 successful 209 800598
10 6010 298 Card 2021-04-01 successful 210 800298
11 6011 359 Card 2021-01-30 successful 211 800359
12 6012 449 Wallet 2021-10-05 successful 212 800449
13 6013 599 UPI 2021-09-03 successful 213 800599
Domains
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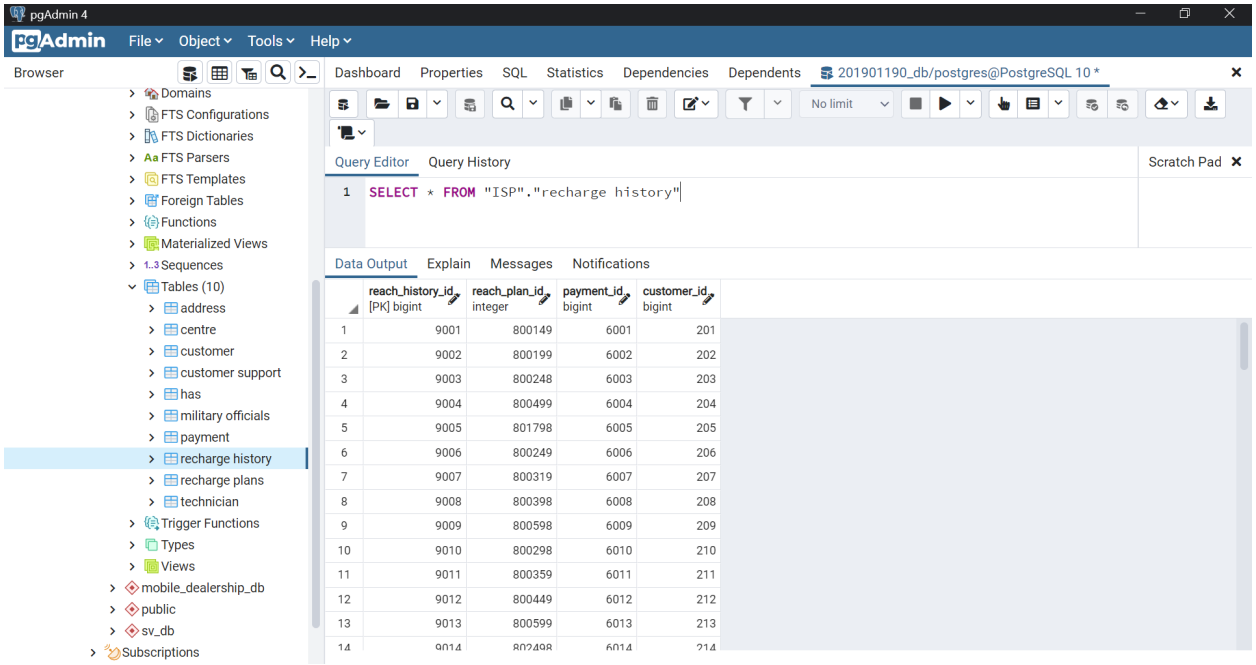
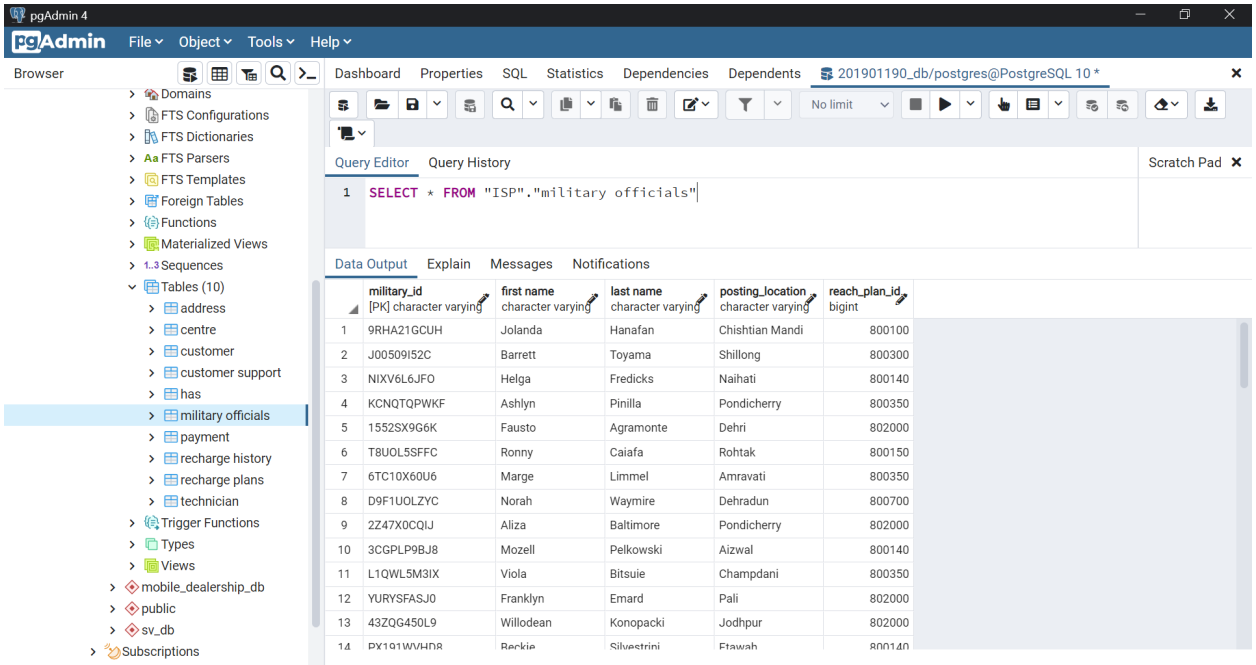
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."recharge history"
Data Output Explain Messages Notifications
reach_history_id [PK] bigint
reach_plan_id integer
payment_id bigint
customer_id bigint
1 9001 800149 6001 201
2 9002 800199 6002 202
3 9003 800248 6003 203
4 9004 800499 6004 204
5 9005 801798 6005 205
6 9006 800249 6006 206
7 9007 800319 6007 207
8 9008 800398 6008 208
9 9009 800598 6009 209
10 9010 800298 6010 210
11 9011 800359 6011 211
12 9012 800449 6012 212
13 9013 800599 6013 213
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Sequences
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents 201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor Query History
Scratch Pad
1 SELECT * FROM "ISP"."military officials"
Data Output Explain Messages Notifications
military_id [PK] character varying
first name character varying
last name character varying
posting_location character varying
reach_plan_id bigint
1 9RHA21GCUH Jolanda Hanafan Chishtian Mandi 800100
2 J00509I52C Barrett Toyama Shillong 800300
3 NIXV6L6JFO Helga Fredicks Naihati 800140
4 KCNQTQPWKF Ashlyn Pinilla Pondicherry 800350
5 1552SX9G6K Fausto Agramonte Dehri 802000
6 T8UOL5SFFC Ronny Caiafa Rohtak 800150
7 6TC10X60U6 Marge Limmel Amravati 800350
8 D9F1UOLZYC Norah Waymire Dehradun 800700
9 2Z47X0CQIJ Aliza Baltimore Pondicherry 802000
10 3CGPLP9BJ8 Mozell Pelkowski Aizwal 800140
11 L1QWL5M3IX Viola Bitsuie Champdani 800350
12 YURYSFASJ0 Franklyn Emard Pali 802000
13 43ZQG450L9 Willodean Konopacki Jodhpur 802000
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
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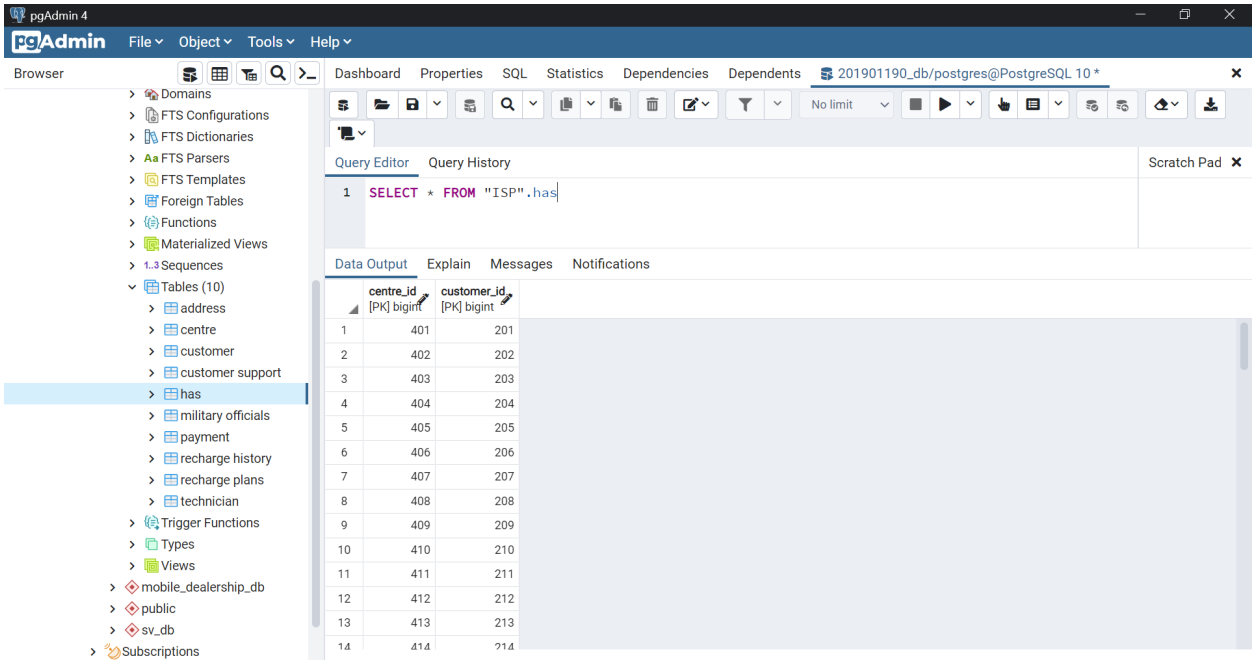
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions


pgAdmin 4
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
201901190_db/postgres@PostgreSQL 10 *
No limit
Query Editor
Query History
Scratch Pad
SELECT * FROM "ISP".has
Data Output
Explain
Messages
Notifications
centre_id [PK] bigint
customer_id [PK] bigint
1 401 201
2 402 202
3 403 203
4 404 204
5 405 205
6 406 206
7 407 207
8 408 208
9 409 209
10 410 210
11 411 211
12 412 212
13 413 213
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
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Materialized Views
Sequences
Tables (10)
address
centre
customer
customer support
has
military officials
payment
recharge history
recharge plans
technician
Trigger Functions
Types
Views
mobile_dealership_db
public
sv_db
Subscriptions

Section6:
SQL: Final DDL Scripts, 40 SQL Queries with
Snapshots of output of each query.

DDL Scripts for Celltech Database

1. **Recharge plans**

```
CREATE TABLE IF NOT EXISTS "ISP"."recharge plans"
(
    reach_plan_id bigint NOT NULL,
    validity character varying(40) COLLATE pg_catalog."default" NOT NULL,
    "data amount" character varying(40) COLLATE pg_catalog."default" NOT NULL,
    PRIMARY KEY (reach_plan_id)
);
```

2. **Address**

```
CREATE TABLE IF NOT EXISTS "ISP".address
(
    pincode bigint NOT NULL,
    city character(50) COLLATE pg_catalog."default" NOT NULL,
    state character(50) COLLATE pg_catalog."default" NOT NULL,
    PRIMARY KEY (pincode)
);
```

3. **Centre**

```
CREATE TABLE IF NOT EXISTS "ISP".centre
(
    centre_id bigint NOT NULL,
    centre_name character varying(50) COLLATE pg_catalog."default" NOT NULL,
    pincode bigint NOT NULL,

    PRIMARY KEY (centre_id),
    FOREIGN KEY (pincode)
        REFERENCES "ISP".address (pincode)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);
```

4. **Customer**

```
CREATE TABLE IF NOT EXISTS "ISP".customer
(
    customer_id bigint NOT NULL,
    "mobile number" bigint NOT NULL,
    email character varying(50) COLLATE pg_catalog."default" NOT NULL,
    "first name" character(50) COLLATE pg_catalog."default" NOT NULL,
    "last name" character(50) COLLATE pg_catalog."default" NOT NULL,
    active character(10) COLLATE pg_catalog."default" NOT NULL,
    pincode bigint NOT NULL,
    centre_id bigint NOT NULL,

    PRIMARY KEY (customer_id),
    FOREIGN KEY (centre_id)
        REFERENCES "ISP".centre (centre_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE

);
```

5. **Technician**

```
CREATE TABLE IF NOT EXISTS "ISP".technician
(
    employee_id bigint NOT NULL,
    "first name" character(50) COLLATE pg_catalog."default" NOT NULL,
    "last name" character(50) COLLATE pg_catalog."default" NOT NULL,
    vaccinated character(50) COLLATE pg_catalog."default" NOT NULL,
    centre_id bigint NOT NULL,

    PRIMARY KEY (employee_id),
    FOREIGN KEY (centre_id)
    REFERENCES "ISP".centre (centre_id)
    ON UPDATE CASCADE
    ON DELETE CASCADE

);
```

6. **Customer support**

```
CREATE TABLE IF NOT EXISTS "ISP"."customer support"
(
    complaint_id bigint NOT NULL,
    "customer feedback" integer NOT NULL,
    "helpline number" bigint NOT NULL,
    "complaint status" character(50) COLLATE pg_catalog."default" NOT NULL,
    centre_id bigint NOT NULL,
    customer_id bigint NOT NULL,
    employee_id bigint NOT NULL,

    PRIMARY KEY (complaint_id),
    FOREIGN KEY (centre_id)
        REFERENCES "ISP".centre (centre_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE,
    FOREIGN KEY (customer_id)
        REFERENCES "ISP".customer (customer_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE,
    FOREIGN KEY (employee_id)
        REFERENCES "ISP".technician (employee_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);
```

7. **Payment**

```
CREATE TABLE IF NOT EXISTS "ISP".payment
(
    payment_id bigint NOT NULL,
    amount integer NOT NULL,
    payment_mode character varying COLLATE pg_catalog."default" NOT NULL,
    date date NOT NULL,
    status character varying COLLATE pg_catalog."default" NOT NULL,
    customer_id bigint NOT NULL,
    reach_plan_id bigint NOT NULL,

    PRIMARY KEY (payment_id),
    FOREIGN KEY (customer_id)
        REFERENCES "ISP".customer (customer_id)
            ON UPDATE CASCADE
```

```
        ON DELETE CASCADE,
    FOREIGN KEY (reach_plan_id)
        REFERENCES "ISP"."recharge plans" (reach_plan_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);
```

8. **Recharge history**

```
CREATE TABLE IF NOT EXISTS "ISP"."recharge history"
(
    reach_history_id bigint NOT NULL,
    reach_plan_id integer NOT NULL,
    payment_id bigint NOT NULL,
    customer_id bigint NOT NULL,
    PRIMARY KEY (reach_history_id)
);
```

9. **Military officials**

```
CREATE TABLE IF NOT EXISTS "ISP"."military officials"
(
    military_id character varying COLLATE pg_catalog."default" NOT NULL,
    "first name" character varying COLLATE pg_catalog."default" NOT NULL,
    "last name" character varying COLLATE pg_catalog."default" NOT NULL,
    posting_location character varying COLLATE pg_catalog."default" NOT NULL,
    reach_plan_id bigint NOT NULL,

    PRIMARY KEY (military_id),
    FOREIGN KEY (reach_plan_id)
        REFERENCES "ISP"."recharge plans" (reach_plan_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);
```

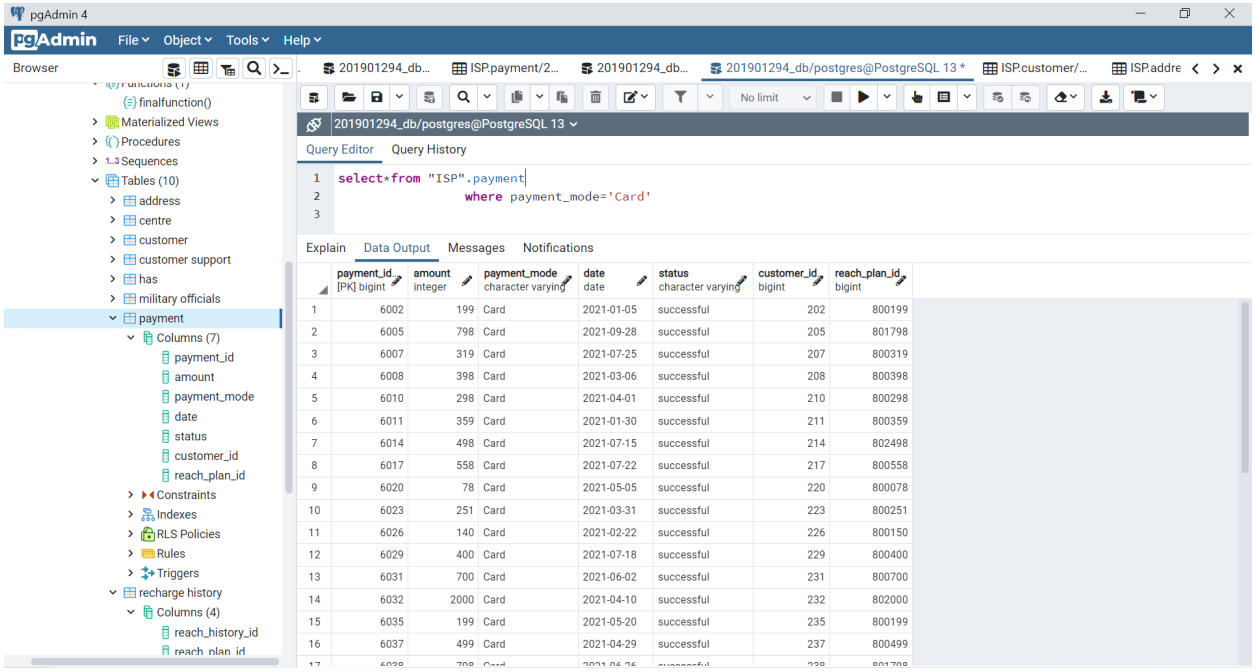
10. **Has**

```
CREATE TABLE IF NOT EXISTS "ISP".has
(
    centre_id bigint NOT NULL,
    customer_id bigint NOT NULL,
    PRIMARY KEY (centre_id, customer_id)
);
```

SQL QUERIES

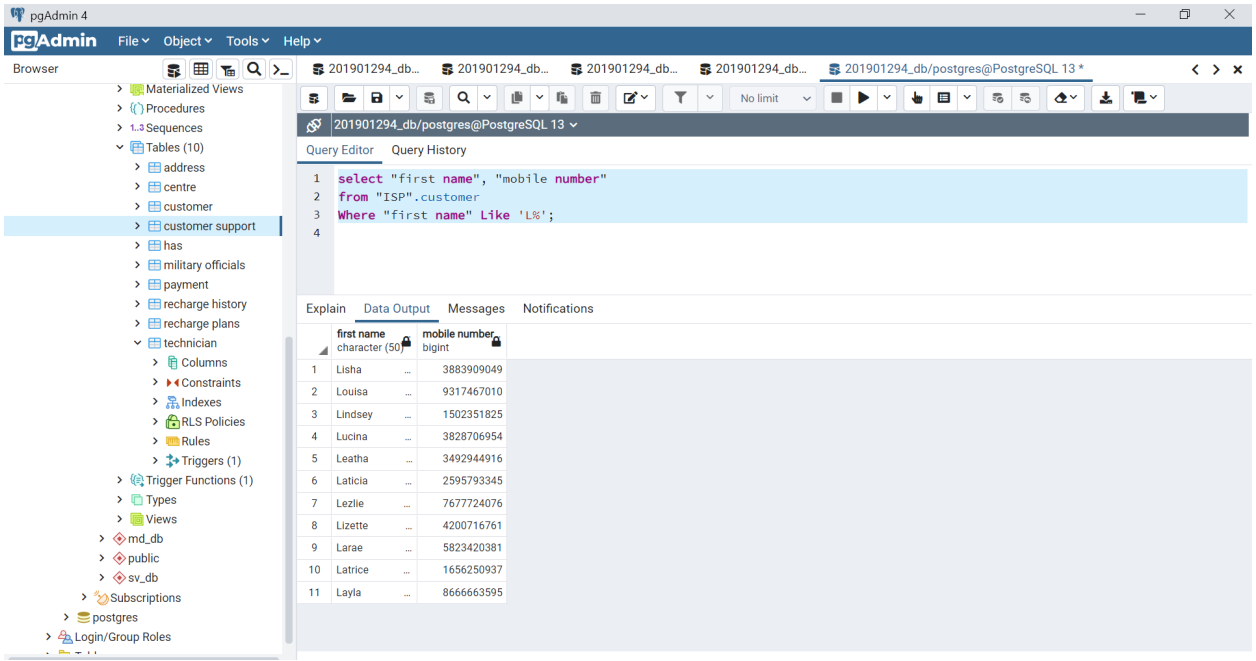
Q1. Show user details for all the users that use card payment mode.

```
select*from "ISP".payment
 where payment_mode='Card'
```



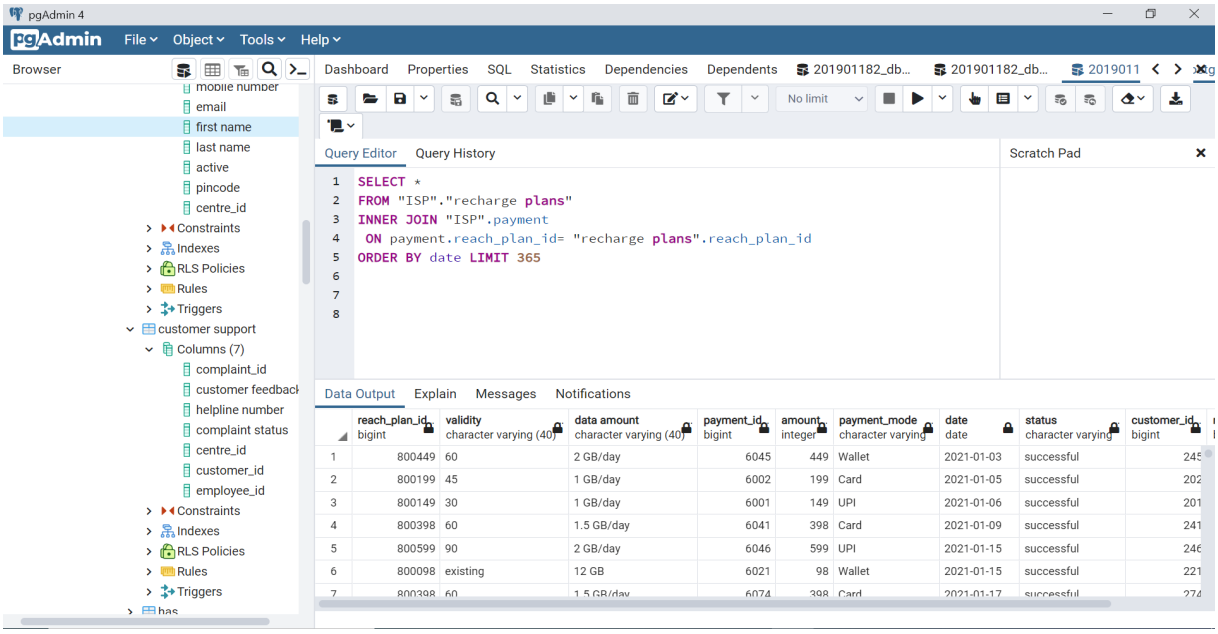
Q2. Selecting names and contact numbers of customers who have /has Lisha as their name/surname.

```
select "first name", "mobile number"
   from "ISP".customer
   Where "first name" Like 'L%';
```



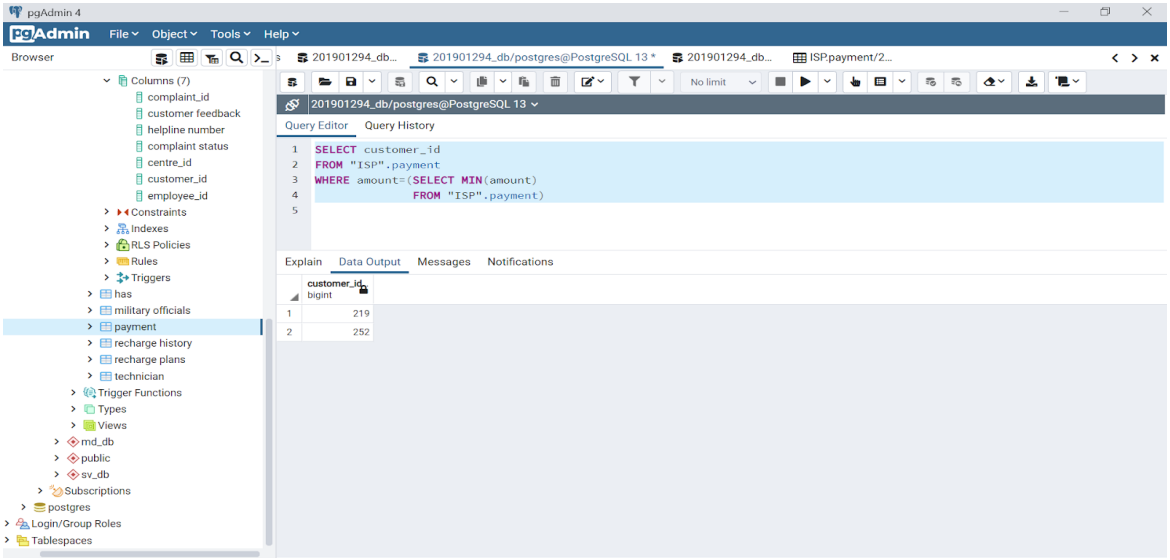
Q3. To understand the details of recharge plans bought by every customer over the last 365 days.

```
SELECT*
FROM "ISP"."recharge plans"
INNER JOIN "ISP".payment
ON payment.reach_plan_id="recharge plans".reach_plan_id
ORDER BY date LIMIT 365
```



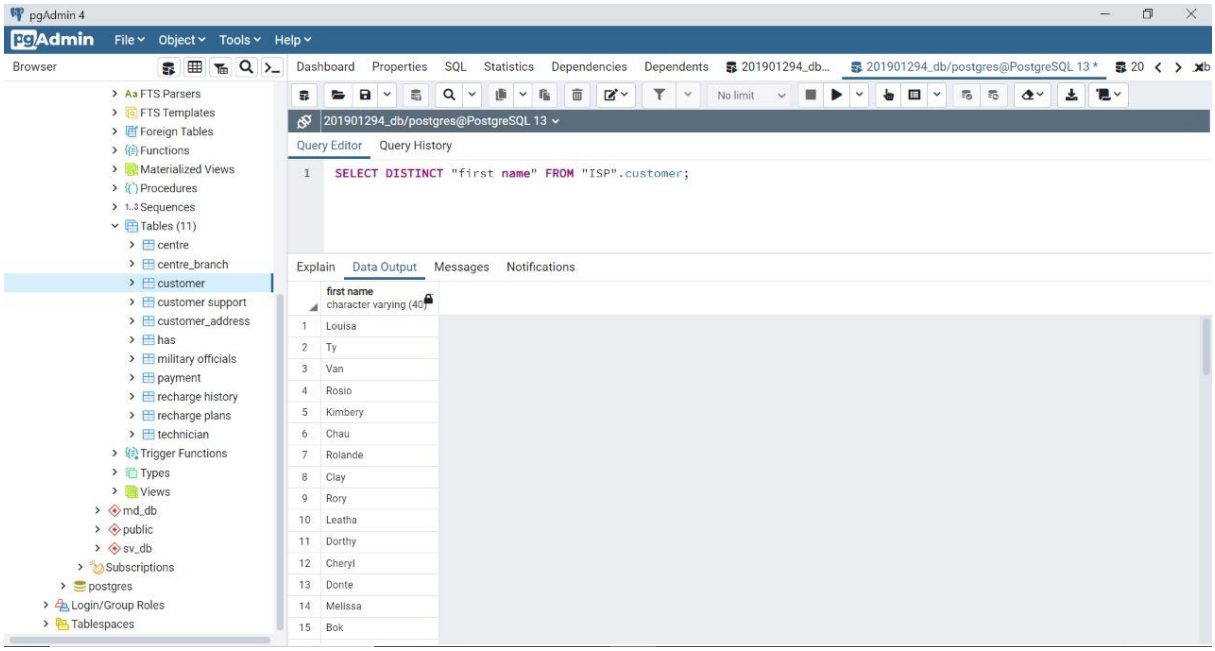
Q4. Select id of the customer who has paid minimum amount –sq

```
SELECT customer_id
FROM "ISP".payment
WHERE amount=(SELECT MIN(amount)
FROM "ISP".payment)
```



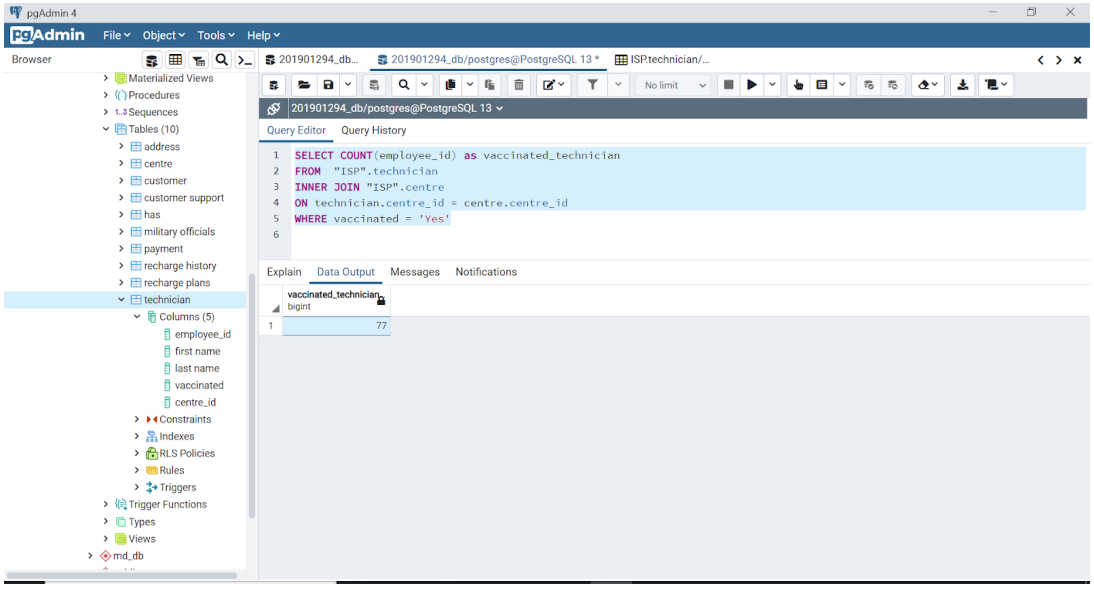
Q5. Same customers have been added to the customer table by mistake,we are required to do proper indexing.

SELECT DISTINCT “first name” FROM ISP.customer;



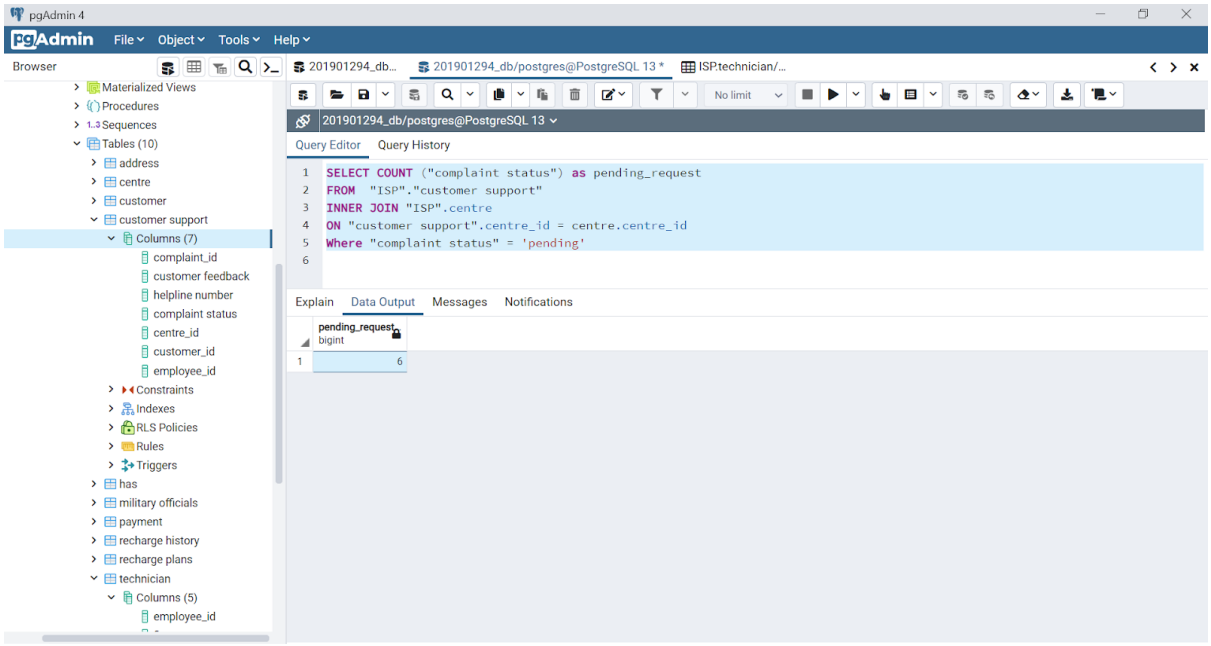
Q6. Count the number of vaccinated technicians over all the centers

```
SELECT COUNT(employee_id) as vaccinated_technician
FROM  “ISP”.technician
INNER JOIN “ISP”.centre
ON technician.centre_id = centre.centre_id
WHERE vaccinated= ‘Yes’
```



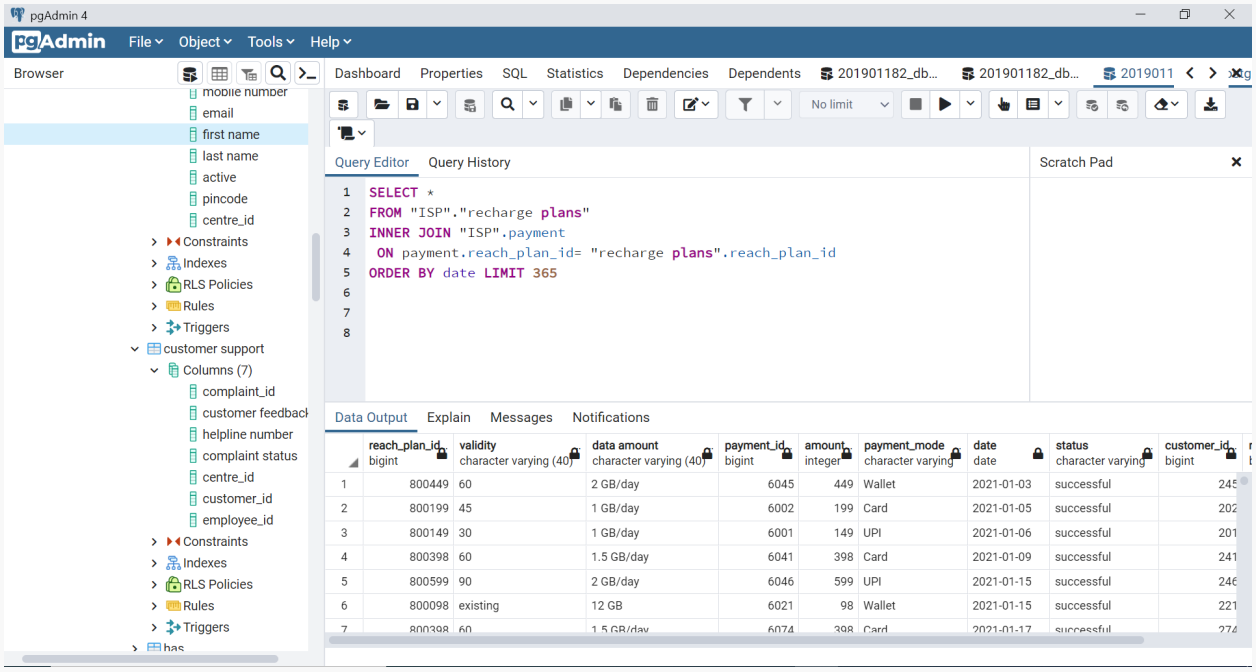
Q7. Number of pending request at particular center

```
SELECT COUNT ("complaint status") as pending_request
FROM  "ISP"."customer support"
INNER JOIN "ISP".centre
ON "customer support".centre_id = centre.centre_id
Where "complaint status" = 'pending'
```

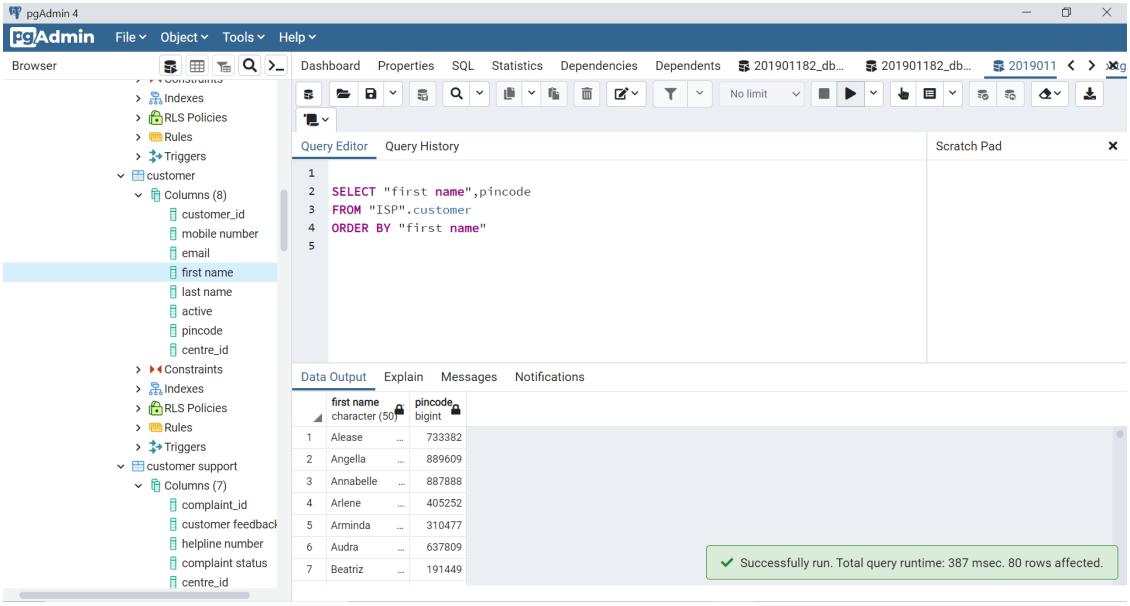


Q8.Print recharge details of last years.

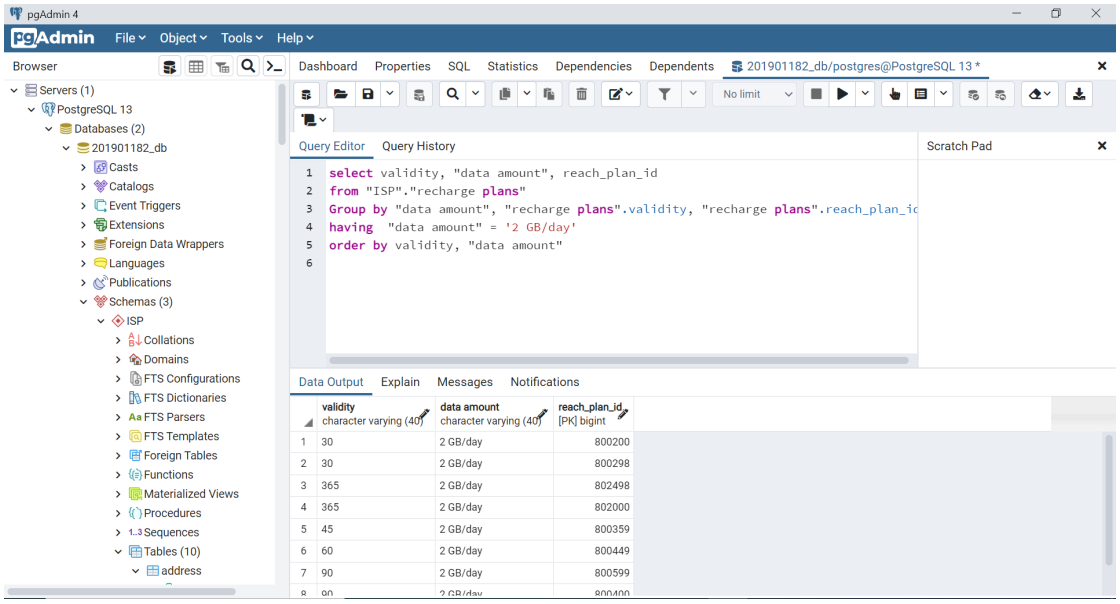
```
SELECT *
FROM "ISP"."recharge plans"
INNER JOIN "ISP".payment
 ON payment.reach_plan_id= "recharge plans".reach_plan_id
ORDER BY date LIMIT 365
```



Q9. Get the first name and pincode of customers from customer table in ascending order.
SELECT first name and pincode
FROM “ISP”.customer
ORDER BY first name and pincode

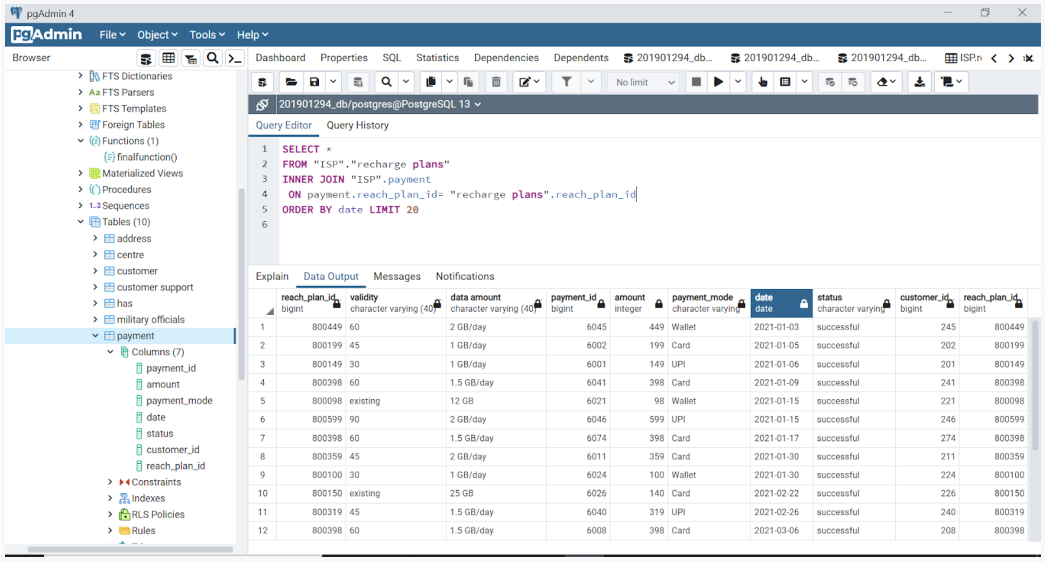


Q10. Find reach_plan_id whose data amount = 2GB/day using Grouping.
select validity, "data amount", reach_plan_id
from "ISP"."recharge plans"
Group by "data amount", "recharge plans".validity, "recharge plans".reach_plan_id
having "data amount" = '2 GB/day'
order by validity, "data amount"



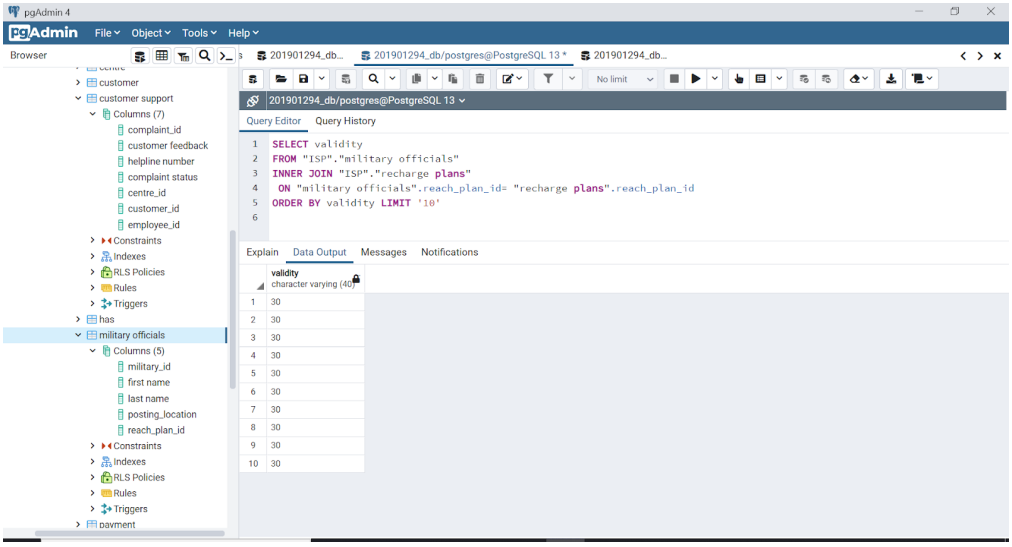
Q11. Print recharge details of last 20 days

```
SELECT *
FROM "ISP"."recharge plans"
INNER JOIN "ISP".payment
 ON payment.reach_plan_id= "recharge plans".reach_plan_id
ORDER BY date LIMIT 20
```



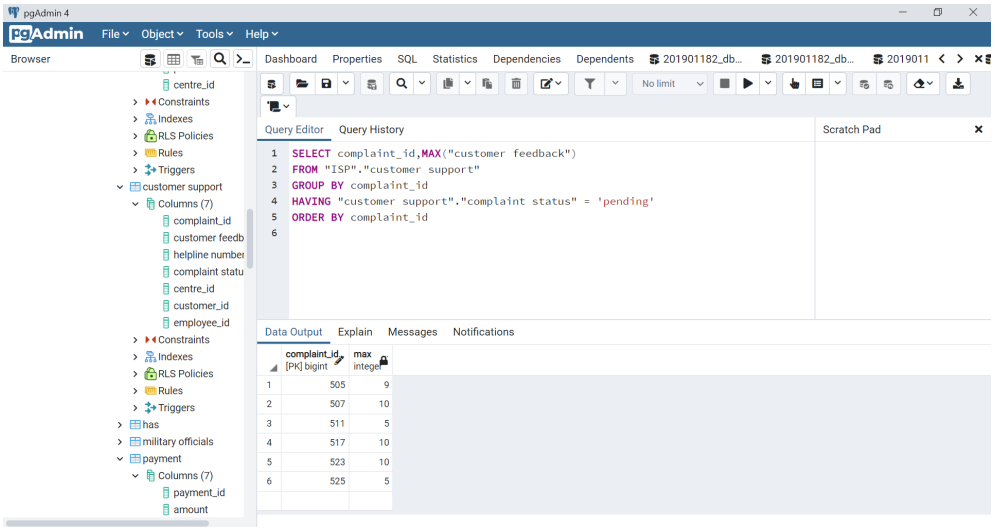
Q12. Minimum validity for military officials'

```
SELECT validity
FROM "ISP"."military officials"
INNER JOIN "ISP"."recharge plans"
 ON "military officials".reach_plan_id= "recharge plans".reach_plan_id
ORDER BY validity LIMIT '10'
```



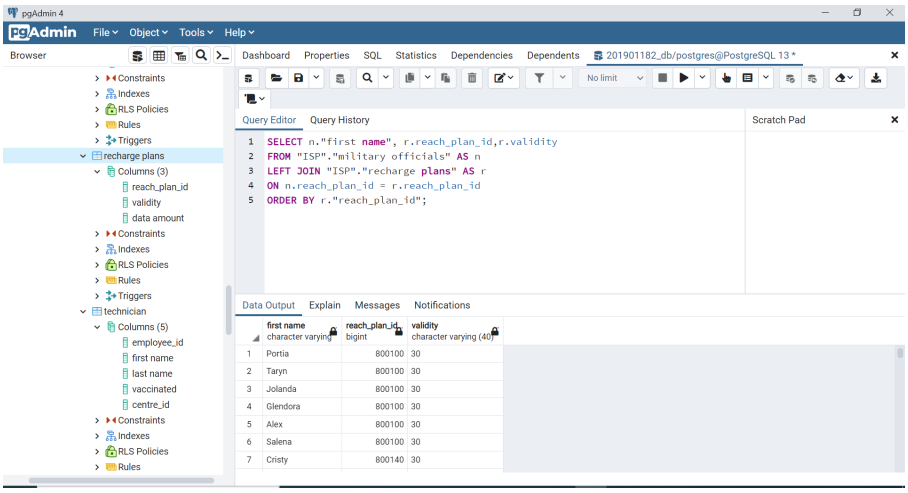
Q13. In which centre was maximum feedback received and complaint status is pending,in order of centre ID.

```
SELECT complaint_id,MAX("customer feedback")
FROM "ISP"."customer support"
GROUP BY complaint_id
HAVING "customer support"."complaint status" = 'pending'
ORDER BY complaint_id
```



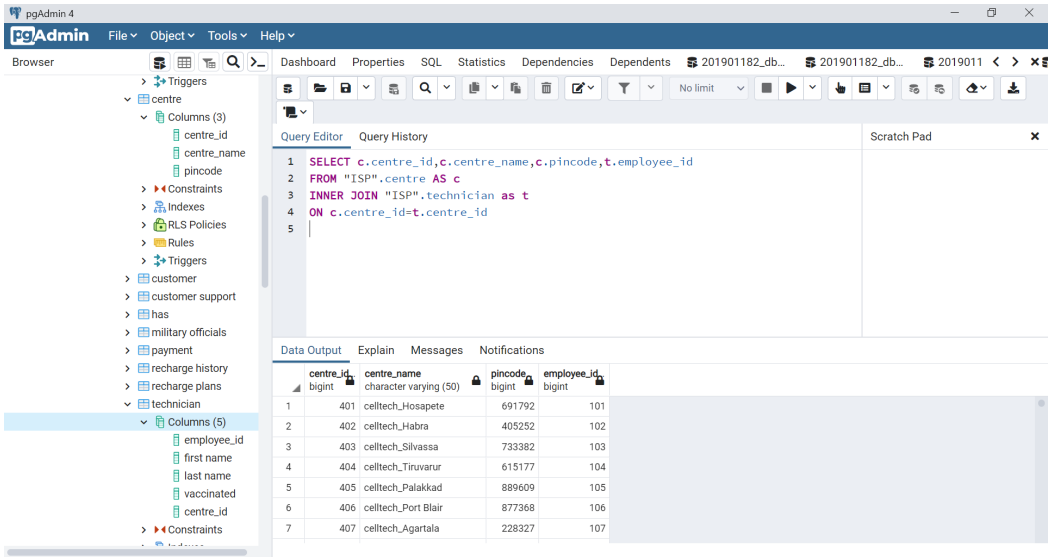
Q14. To get a list of which recharge plans the military officials have opted for and validity of those plans.

```
SELECT n."first name", r.reach_plan_id,r.validity
FROM "ISP"."military officials" AS n
LEFT JOIN "ISP"."recharge plans" AS r
ON n.reach_plan_id = r.reach_plan_id
ORDER BY r."reach_plan_id";
```



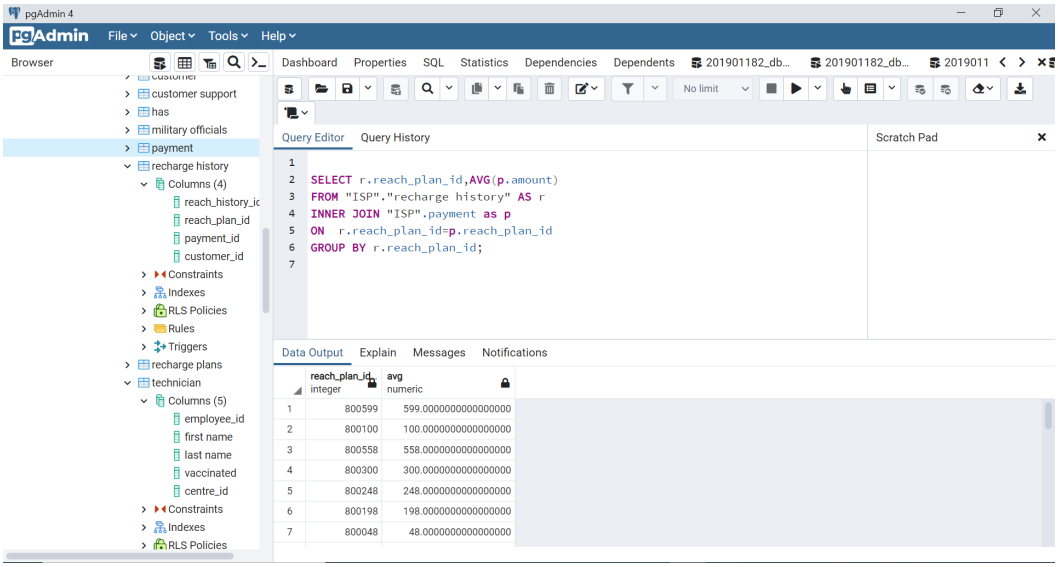
Q15 Inner join the technician and centre table to find out all the details of centre a technician belongs to.

```
SELECT c.centre_id,c.centre_name,c.pincode,t.employee_id
FROM "ISP".centre AS c
INNER JOIN "ISP".technician as t
ON c.centre_id=t.centre_id
```



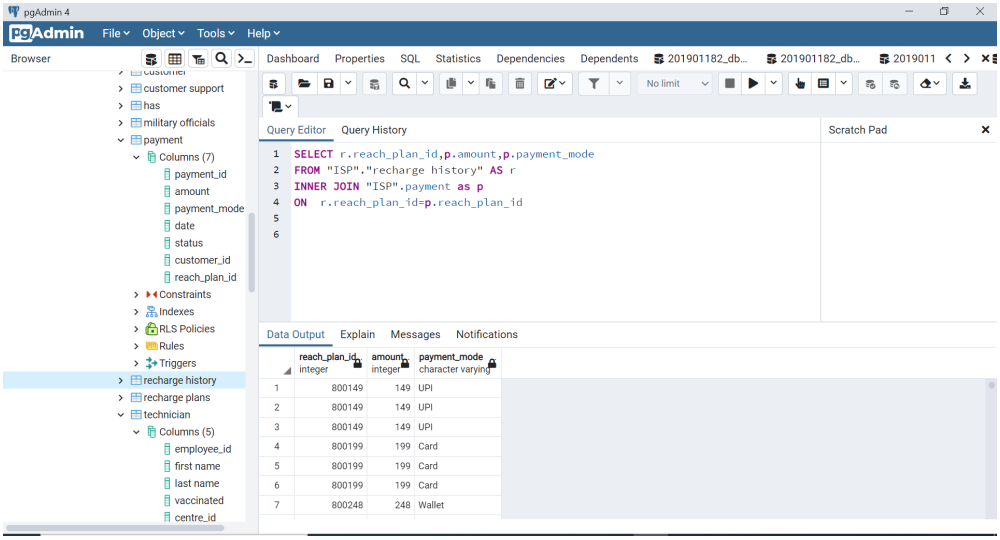
Q16 To find the average amount that is paid for each of the recharge plans given.

```
SELECT r.reach_plan_id,AVG(p.amount)
FROM “ISP”.recharge history AS r
INNER JOIN “ISP”.payment as p
ON  r.reach_plan_id=p.reach_plan_id
GROUP BY r.reach_plan_id
```



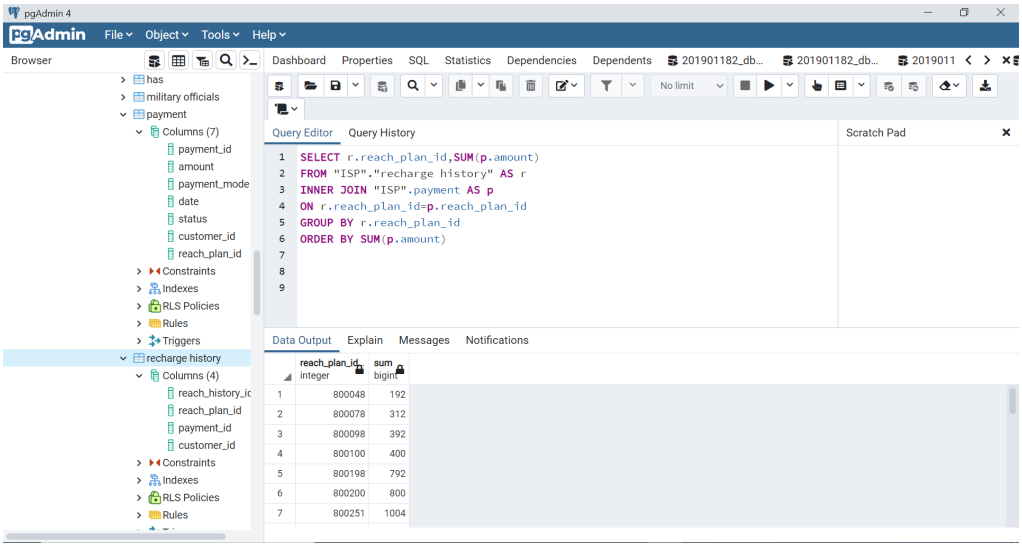
Q17 To understand which payment mode is being used with the amount details,to understand which mode of payment do the users prefer for plans with larger amount.

```
SELECT r.reach_plan_id,p.amount,p.payment_mode
FROM "ISP"."recharge history" AS r
INNER JOIN "ISP".payment as p
ON  r.reach_plan_id=p.reach_plan_id
```



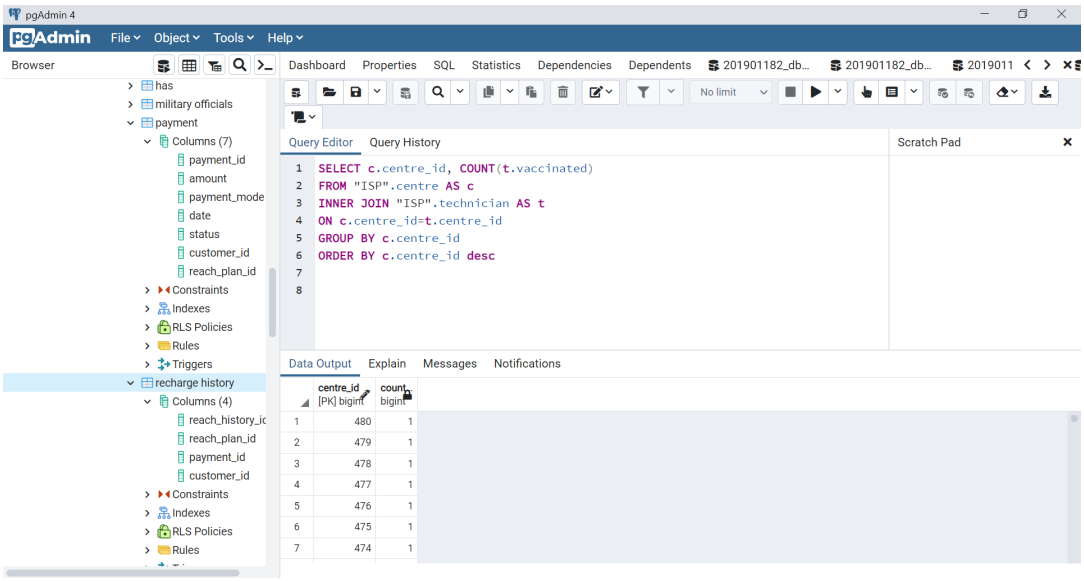
Q18 To get the total amount spent per plan id in the past three months.

```
SELECT r.reach_plan_id,SUM(p.amount)
FROM recharge history
INNER JOIN payment AS p
ON r.reach_plan_id=p.reach_plan_id
GROUP BY reach_plan_id
ORDER BY SUM(p.amount)
```



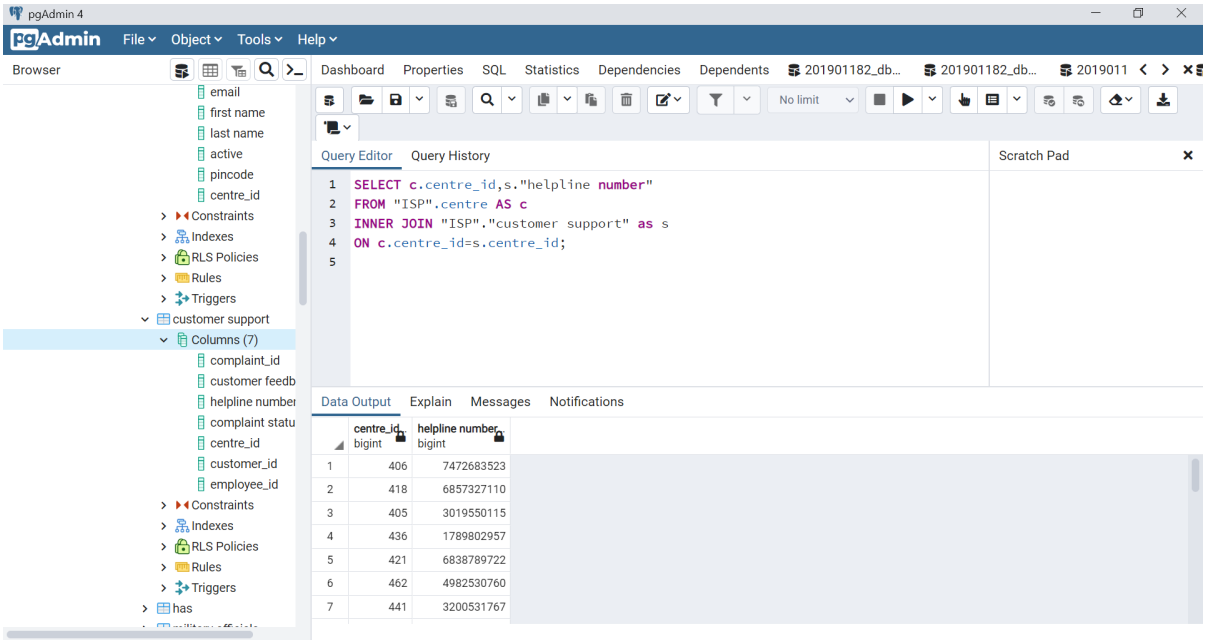
Q19 To fetch the centres of our company where at least one technician has been vaccinated to notice how many centres have not even begun with their vaccination drive.

```
SELECT c.centre_id, COUNT(t.vaccinated)
FROM "ISP".centre AS c
INNER JOIN "ISP".technician AS t
ON c.centre_id=t.centre_id
GROUP BY c.centre_id
ORDER BY c.centre_id desc
```



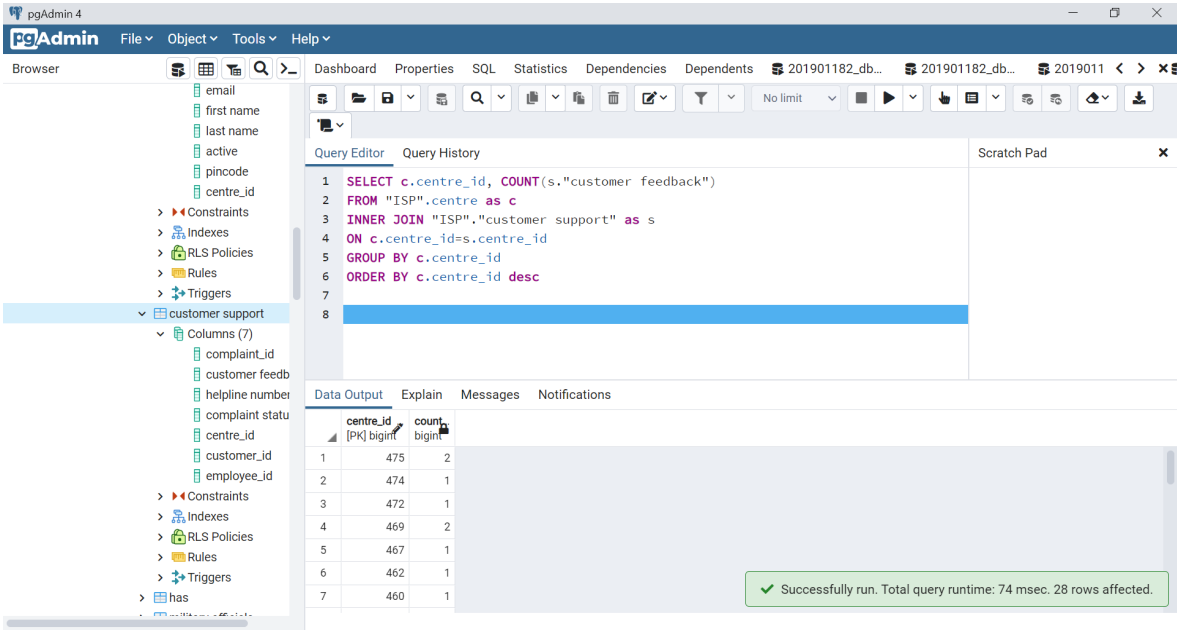
20. To fetch the helpline no. detailsOo of each centre equipped with customer support for the annual company directory.

```
SELECT c.centre_id,s."helpline number"
FROM "ISP".centre AS c
INNER JOIN "ISP"."customer support" as s
ON c.centre_id=s.centre_id;
```



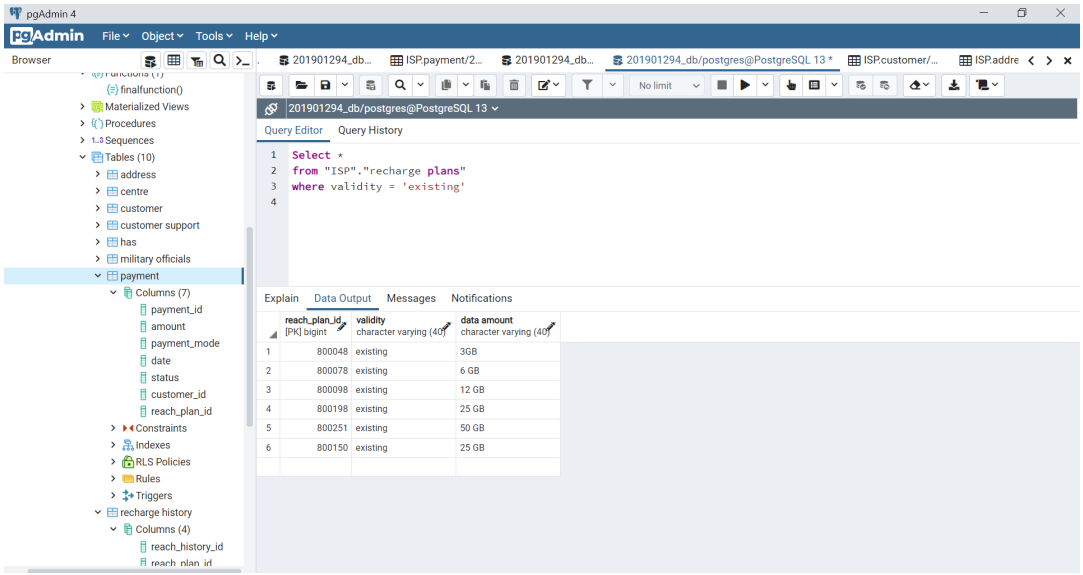
Q21. To find out how much feedback do all the centres get in total.

```
SELECT c.centre_id, COUNT(s."customer feedback")
FROM "ISP".centre as c
INNER JOIN "ISP"."customer support" as s
ON c.centre_id=s.centre_id
GROUP BY c.centre_id
ORDER BY c.centre_id desc
```



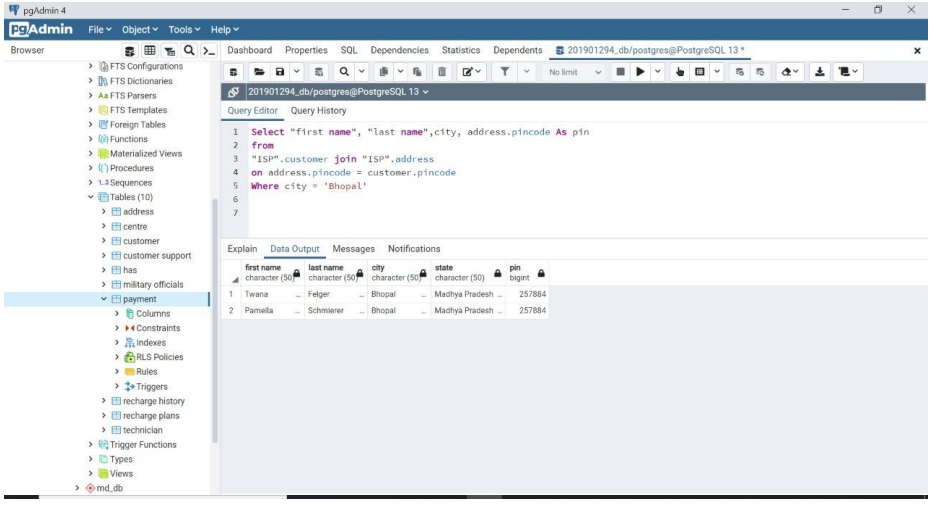
Q22. Find top up plans with existing plan's validity.

```
Select *
from "ISP"."recharge plans"
where validity = 'existing'
```



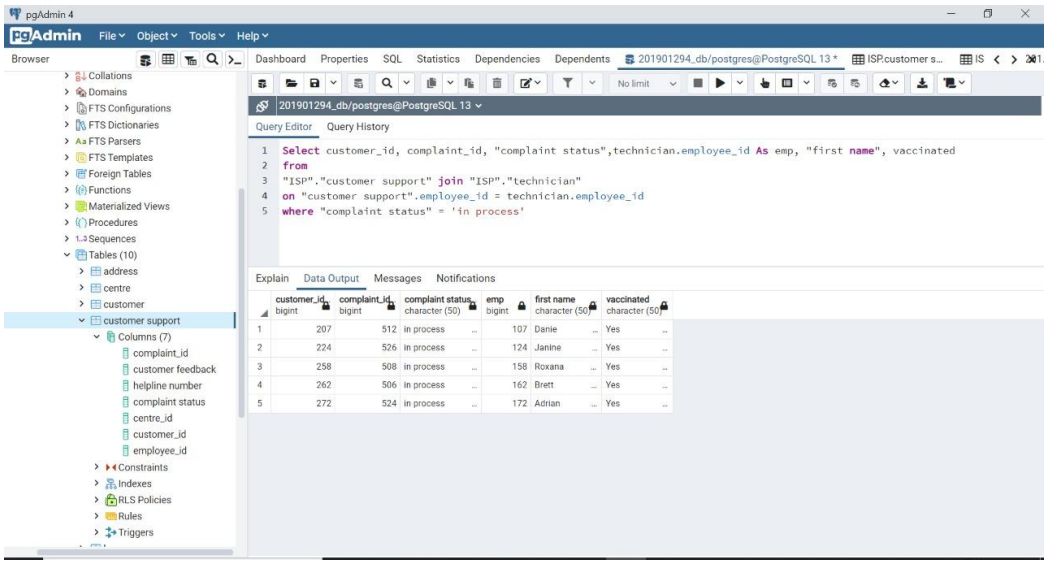
Q23. Find Customer's full name and pincode who live in the city Bhopal.

```
Select "first name", "last name",city, state, address.pincode As pin
from "ISP".customer join "ISP".address
on address.pincode = customer.pincode
Where city = 'Bhopal'
```



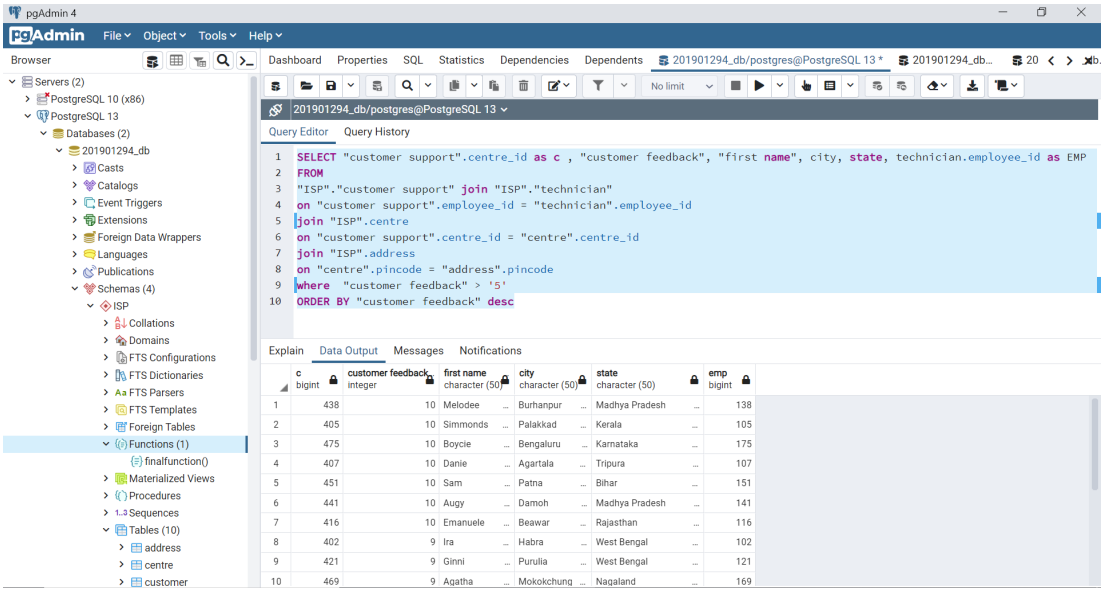
Q24. Find customer_id and complaint_id whose complaint status are in process and the employee_id.

Select customer_id, complaint_id, "complaint status",technician.employee_id As emp, "first name", vaccinated
From "ISP"."customer support" join "ISP"."technician"
on "customer support".employee_id = technician.employee_id
where "complaint status" = 'in process'



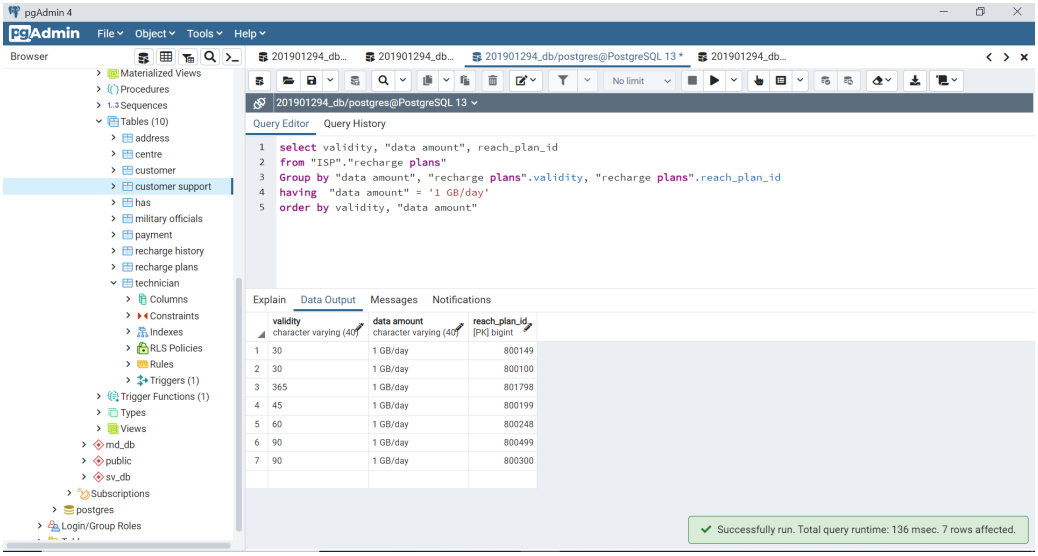
Q.25 Find maximum customer feedback and centre_id showing city and state where the complaints are registered and which employee is assigned to the complaint.

SELECT "customer support".centre_id as c , "customer feedback", "first name", city, state, technician.employee_id as EMP
FROM "ISP"."customer support" join "ISP"."technician"
on "customer support".employee_id = "technician".employee_id
join "ISP".centre
on "customer support".centre_id = "centre".centre_id
join "ISP".address
on "centre".pincode = "address".pincode
where "customer feedback" > '5'
ORDER BY "customer feedback" desc



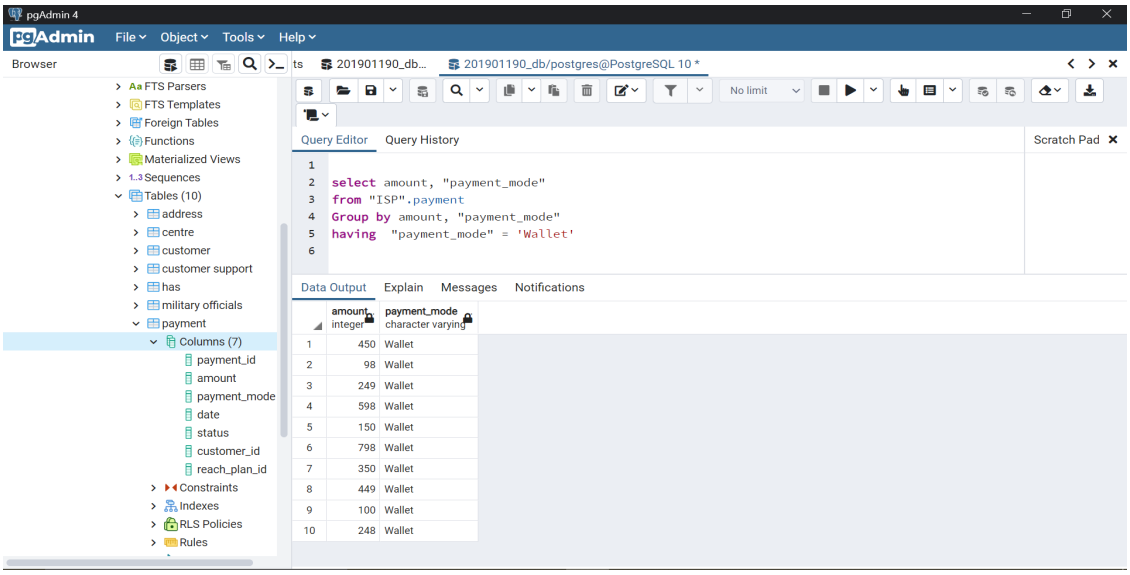
Q26. Find reach_plan_id whose data amount = 1GB/day using Grouping.

```
select validity, "data amount", reach_plan_id
from "ISP"."recharge plans"
Group by "data amount", "recharge plans".validity, "recharge plans".reach_plan_id
having  "data amount" = '1 GB/day'
order by validity, "data amount"
```



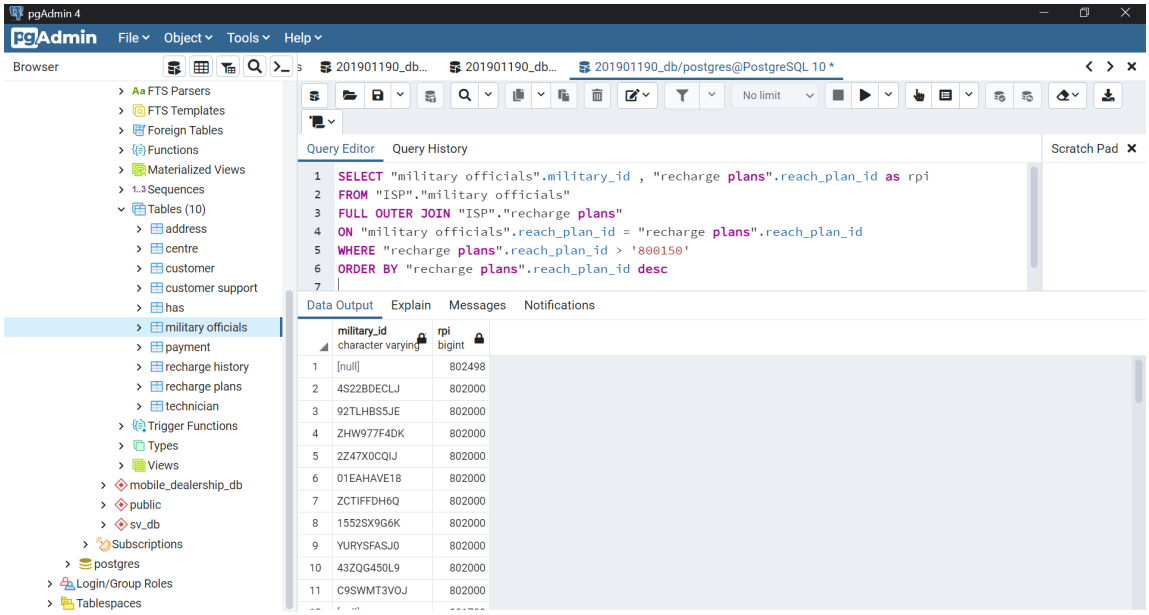
Q27. Find amount for which payment mode is wallet

```
select amount, "payment_mode"
from "ISP".payment
Group by amount, "payment_mode"
having  "payment_mode" = 'Wallet'
```



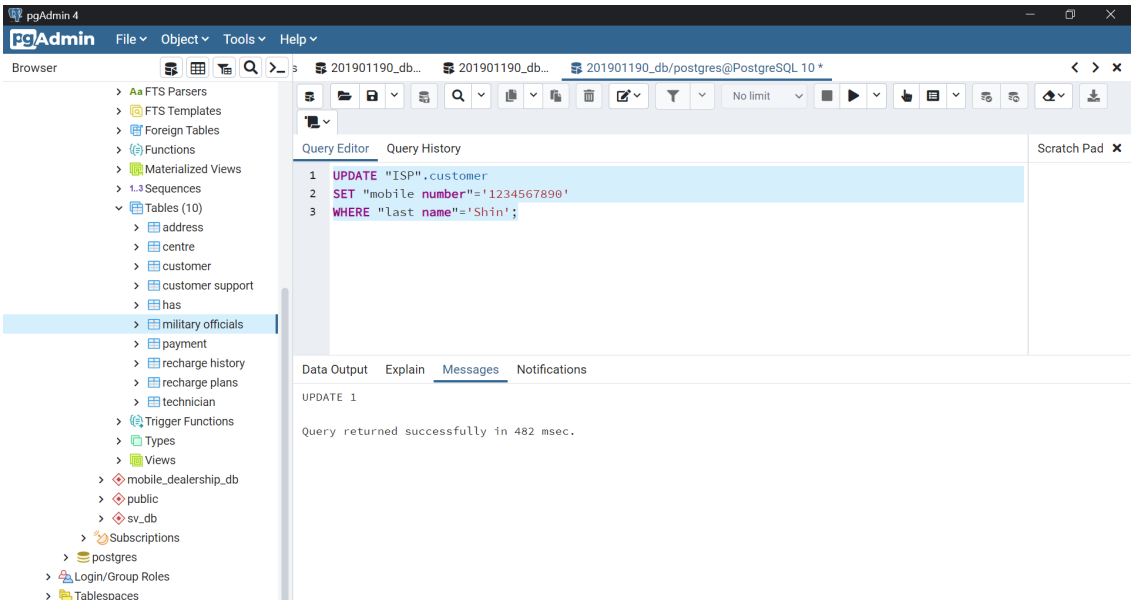
Q28. Show all recharge plans in descending order including those not associated with military IDs

```
SELECT "military officials".military_id , "recharge plans".reach_plan_id as rpi
FROM "ISP"."military officials"
FULL OUTER JOIN "ISP"."recharge plans"
ON "military officials".reach_plan_id = "recharge plans".reach_plan_id
WHERE "recharge plans".reach_plan_id > '800150'
ORDER BY "recharge plans".reach_plan_id desc
```



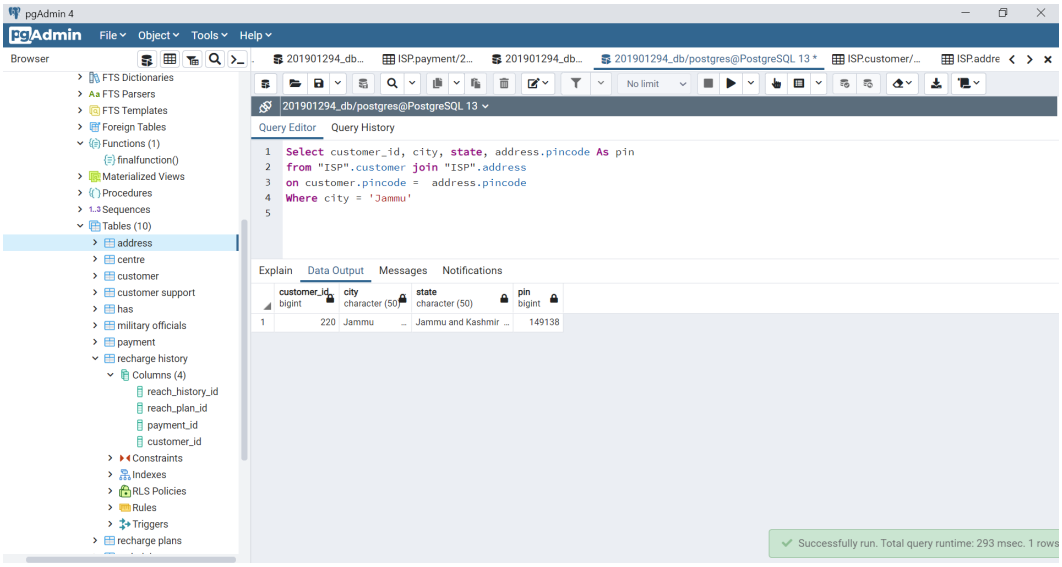
Q29. Write a query to update mobile number of a given customer

```
UPDATE "ISP".customer
SET "mobile number"='1234567890'
WHERE "last name"='Shin';
```



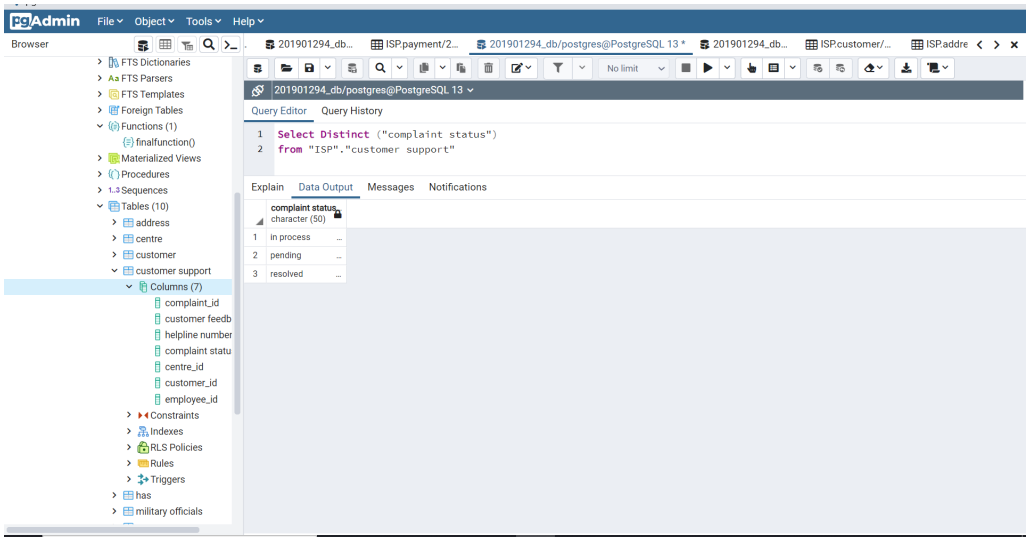
Q30 We are yet to target a good audience in Jammu, check how many people from Jammu are our customers.

Select customer_id, city, state, address.pincode As pin
from "ISP".customer join "ISP".address
on customer.pincode = address.pincode
Where city = 'Jammu



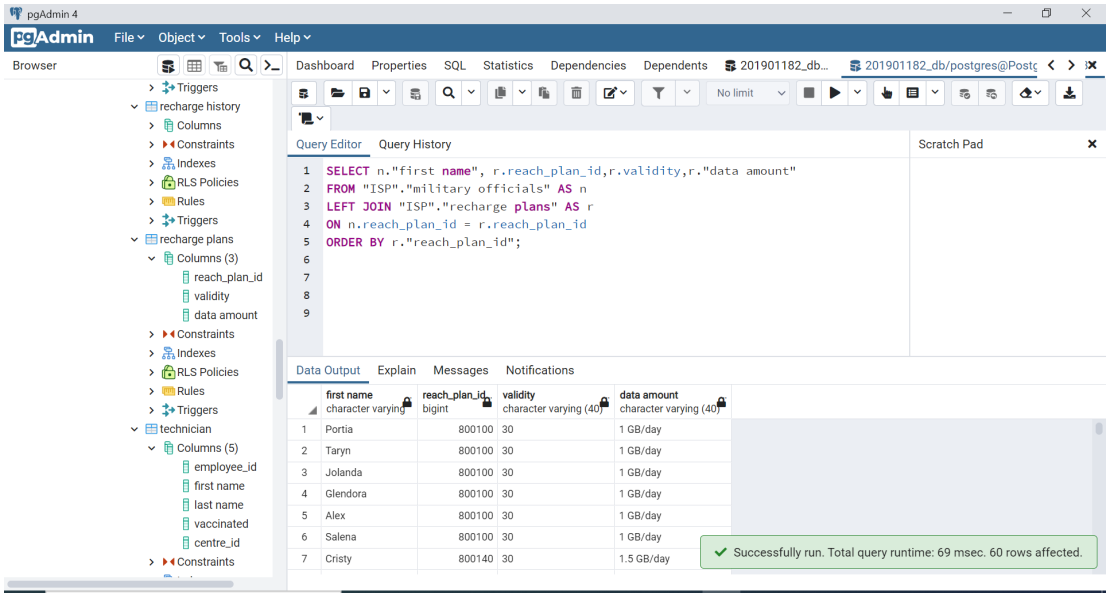
Q31 Check what are the types categories for complaint status

Select Distinct ("complaint status")
from "ISP"."customer support"



Q32 To get a list of which recharge plans the military officials have opted for and validity of those plans.

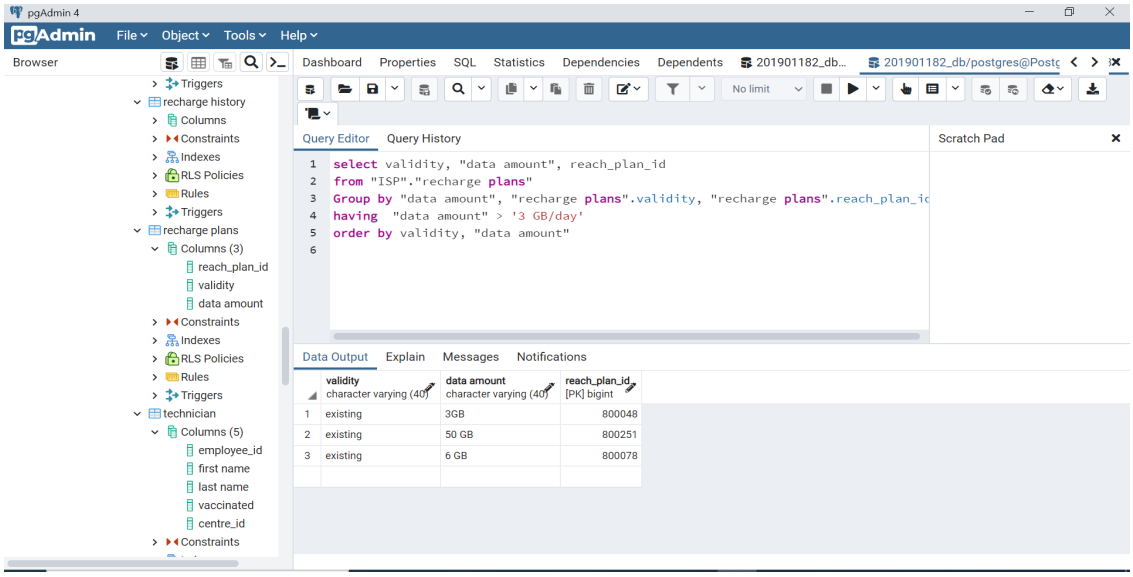
```
SELECT n."first name", r.reach_plan_id,r.validity,r.”data amount”
FROM "ISP"."military officials" AS n
LEFT JOIN "ISP"."recharge plans" AS r
ON n.reach_plan_id = r.reach_plan_id
ORDER BY r."reach_plan_id";
```



	first name character varying	reach_plan_id bigint	validity character varying (40)	data amount character varying (40)
1	Portia	800100	30	1 GB/day
2	Taryn	800100	30	1 GB/day
3	Jolanda	800100	30	1 GB/day
4	Glendora	800100	30	1 GB/day
5	Alex	800100	30	1 GB/day
6	Salena	800100	30	1 GB/day
7	Cristy	800140	30	1.5 GB/day

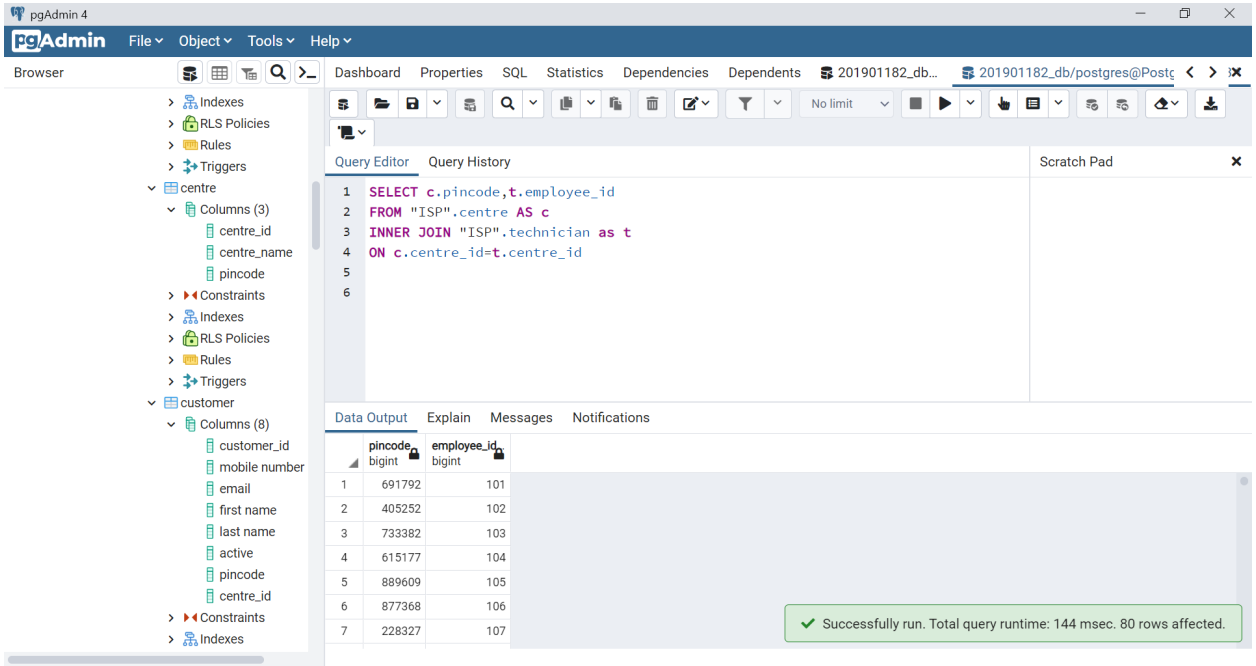
Q33 Find the number of customers whose data amount usage > 3GB/day using Grouping.

```
select validity, "data amount", reach_plan_id
from "ISP"."recharge plans"
Group by "data amount", "recharge plans".validity, "recharge plans".reach_plan_id
having  "data amount" > '3 GB/day'
order by validity, "data amount"
```



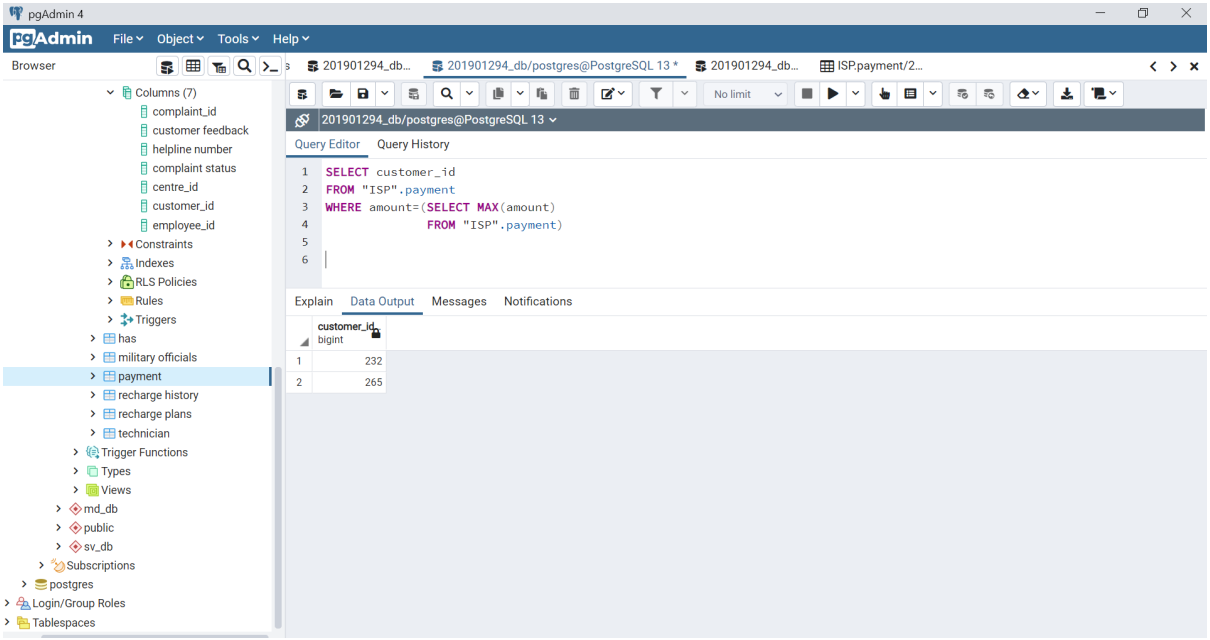
Q34 Inner join the technician and centre table to find out all the the city each technician is allotted to via pincode.

SELECT c.city,c.state,t.employee_id
FROM "ISP".centre AS c
INNER JOIN "ISP".technician as t
ON c.centre_id=t.centre_id



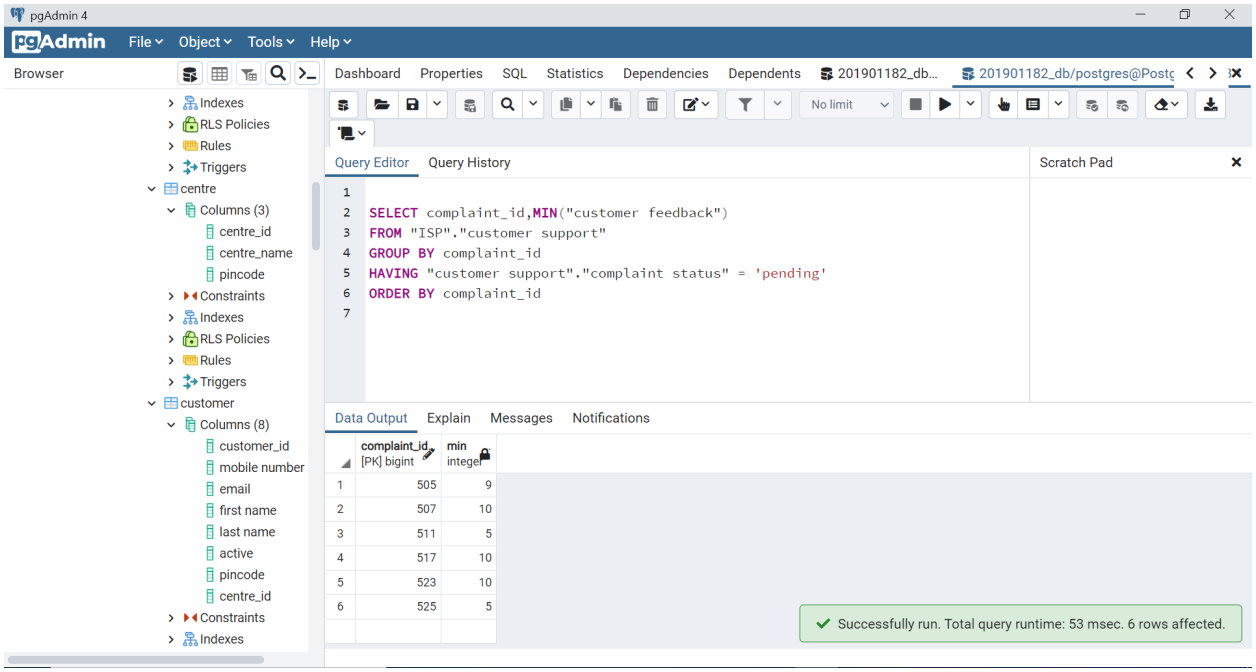
Q35 Select id of the customer who has paid maximum amount -sq

```
SELECT customer_id
FROM "ISP".payment
WHERE amount=(SELECT MAX(amount)
FROM "ISP".payment)
```



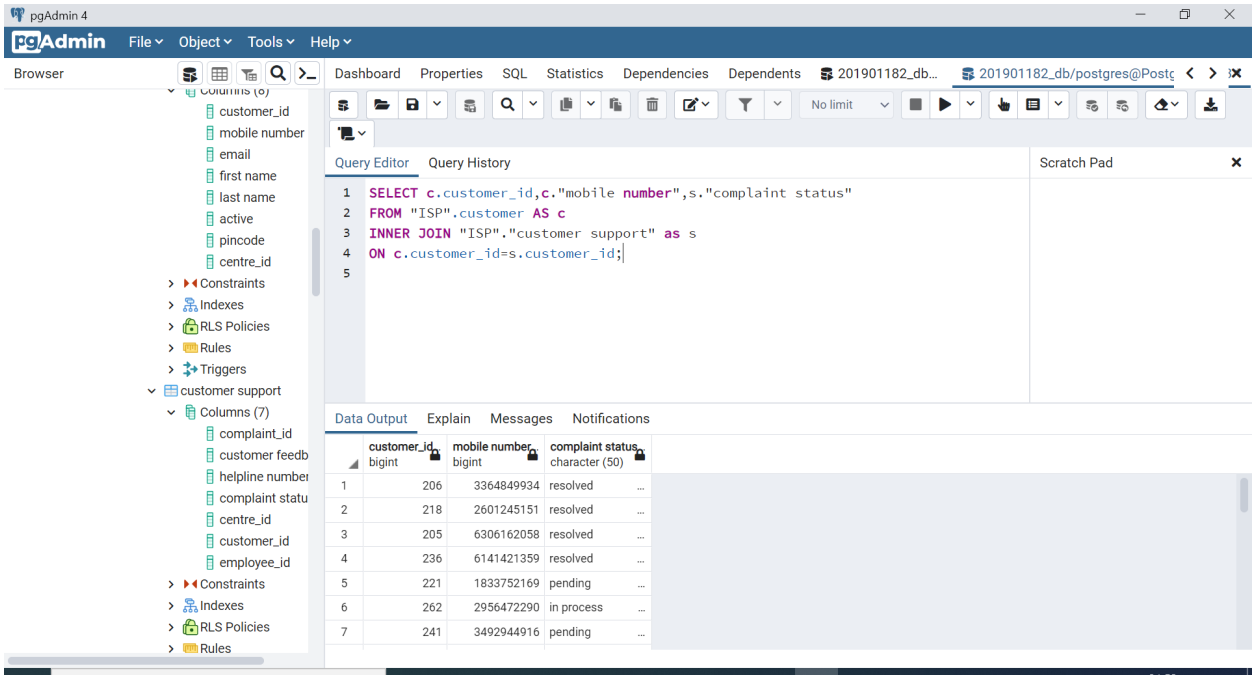
Q36 In which centre was minimum feedback received and complaint status is pending, in order of centre ID.

```
SELECT complaint_id,MIN("customer feedback")
FROM "ISP"."customer support"
GROUP BY complaint_id
HAVING "customer support"."complaint status" = 'pending'
ORDER BY complaint_id
```



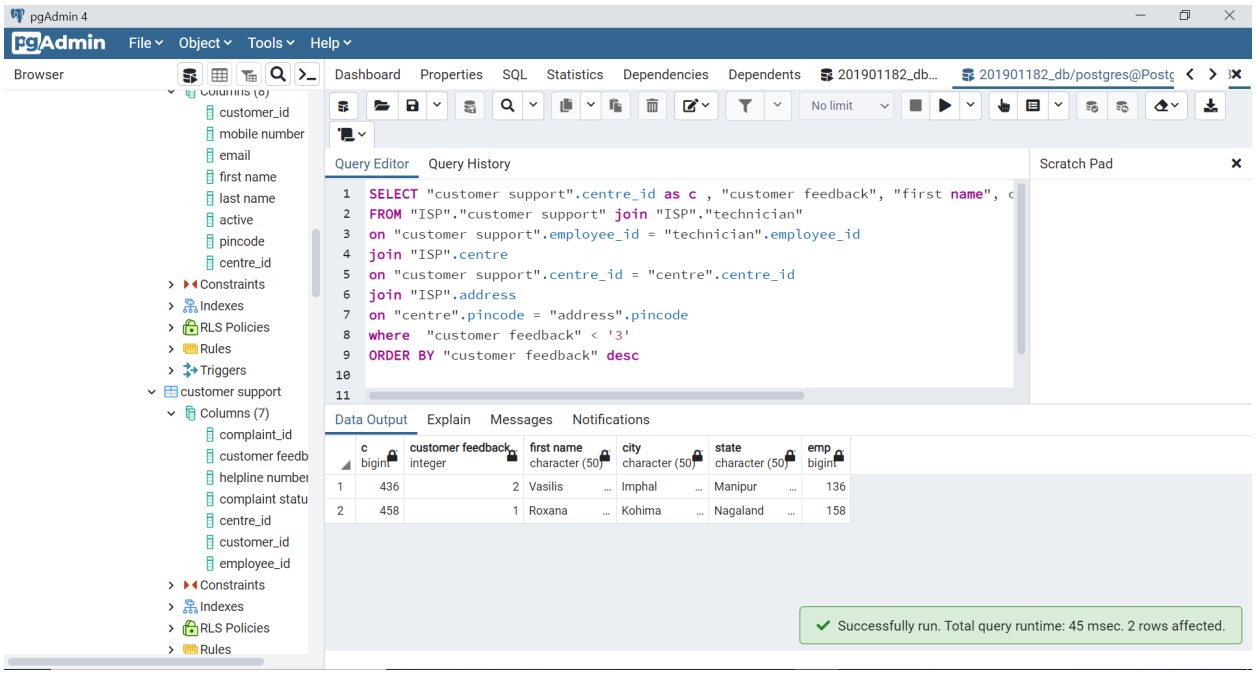
Q37 To fetch the complaint status of each customer along with their mobile number.

```
SELECT c.customer_id,c."mobile number",s."complaint status"
FROM "ISP".customer AS c
INNER JOIN "ISP"."customer support" as s
ON c.customer_id=s.customer_id;
```



Q38.Find minimum customer feedback and centre_id showing city and state where the complaints are registered and which employee is assigned to the complaint.

```
SELECT "customer support".centre_id as c , "customer feedback", "first name", city, state,
technician.employee_id as EMP
FROM "ISP"."customer support" join "ISP"."technician"
on "customer support".employee_id = "technician".employee_id
join "ISP".centre
on "customer support".centre_id = "centre".centre_id
join "ISP".address
on "centre".pincode = "address".pincode
where  "customer feedback" < '3'
ORDER BY "customer feedback" desc
```

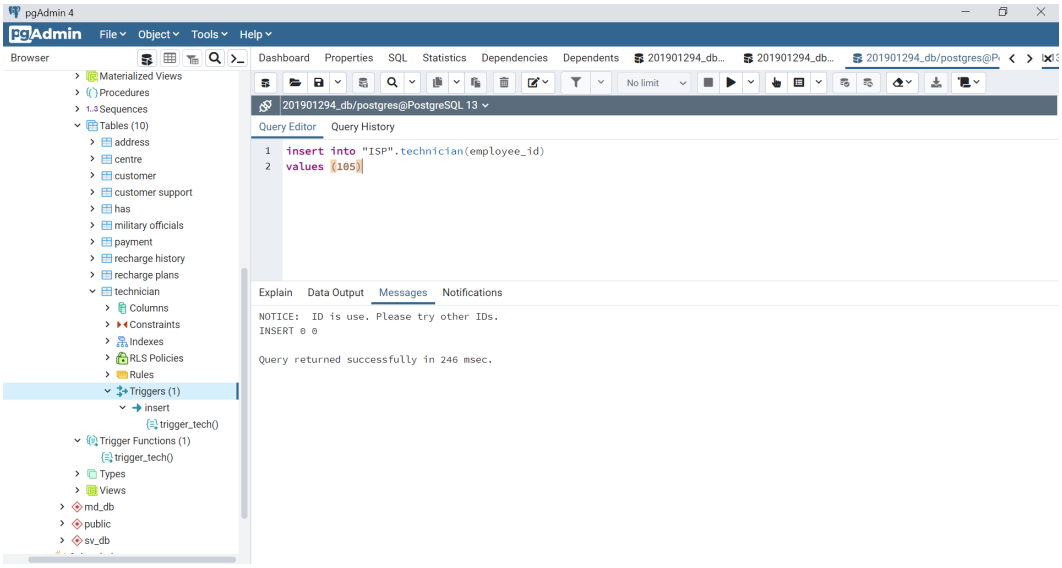


	c bigint	customer feedback integer	first name character (50)	city character (50)	state character (50)	emp bigint
1	436	2	Vasilis	Imphal	Manipur	136
2	458	1	Roxana	Kohima	Nagaland	158

Q39. Triggers function

Create a trigger on the technician table to display a message when a new employee_id is added but already exists.

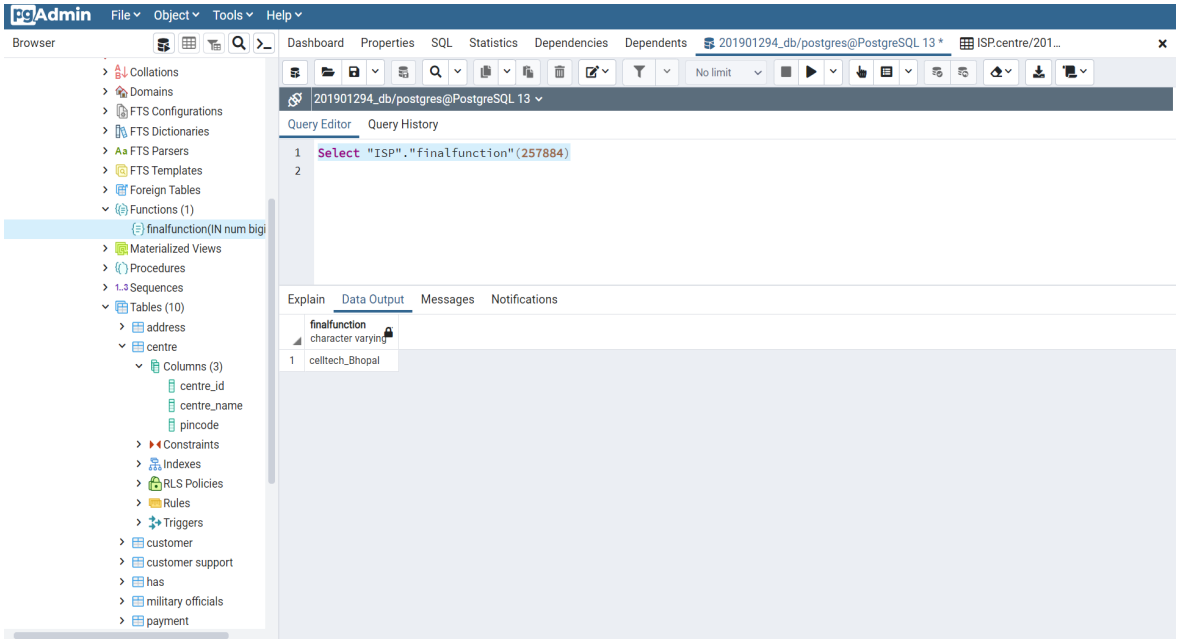
SQL Query: insert into “ISP”.technician(employee_id) values (105);



Q40. Function

Function to display centre_name by giving pincode from the centre table

SQL Query: Select "ISP"."finalfunction"(257884)



Section7:
Project Code with output screenshots

Front-end Development

For setting up a connection with Postgresql and python we used anaconda navigator. Then we have to run the ‘conda terminal’ and install these packages. After installing the packages, we now open Juypter Notebook and access our database from Postgresql using python. Below are the steps to set up the database connection.

```
%load_ext sql from
sqlalchemy import
create_engine
%sql postgresql://postgres:admin@localhost:5432/201901182_db
```

After performing these 3 steps, we have established a connection between our database and the Juypter Notebook. Next, we have created an object ‘engine’ using the ‘create_engine’ function: `engine = create_engine('postgresql://postgres:admin@localhost:5432/201901182_db').`

Packages to install:

- conda install -y -c conda-forge ipython-sql
- conda install -y -c conda-forge postgresql
- conda install -y -c anaconda psycopg2
- conda install -y -c conda-forge pgspecial

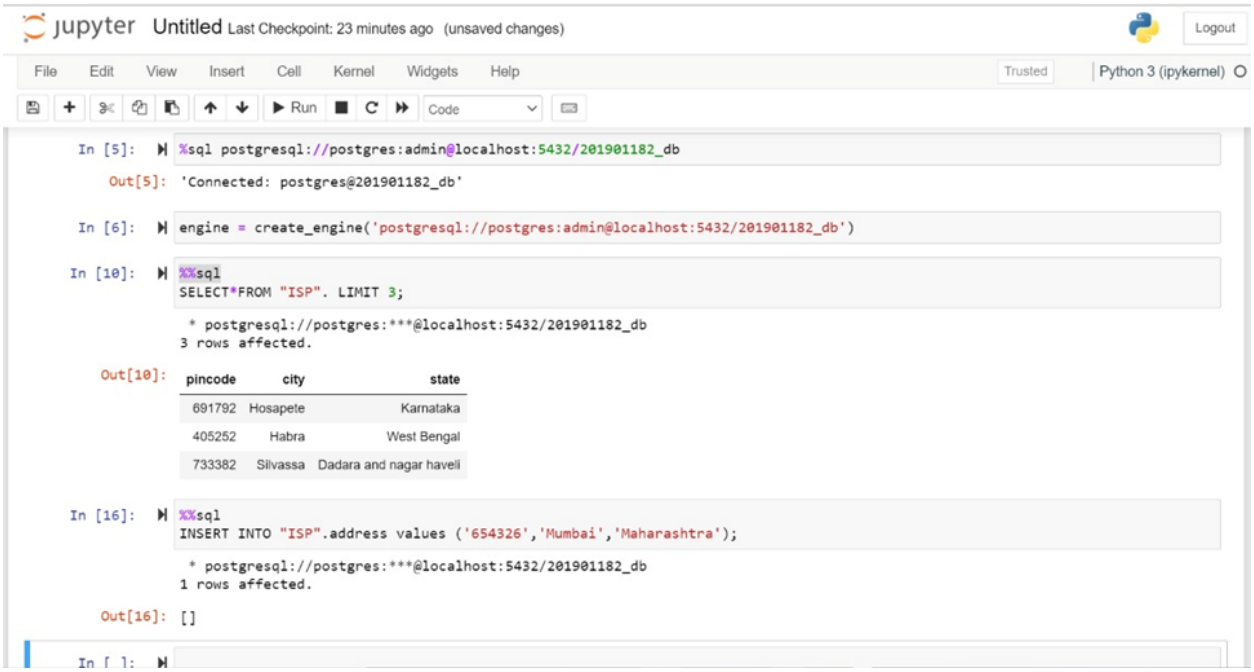
Code:

```
%load_ext sql from
sqlalchemy import
create_engine
%sql postgresql://postgres:admin@localhost:5432/201901182_db
```

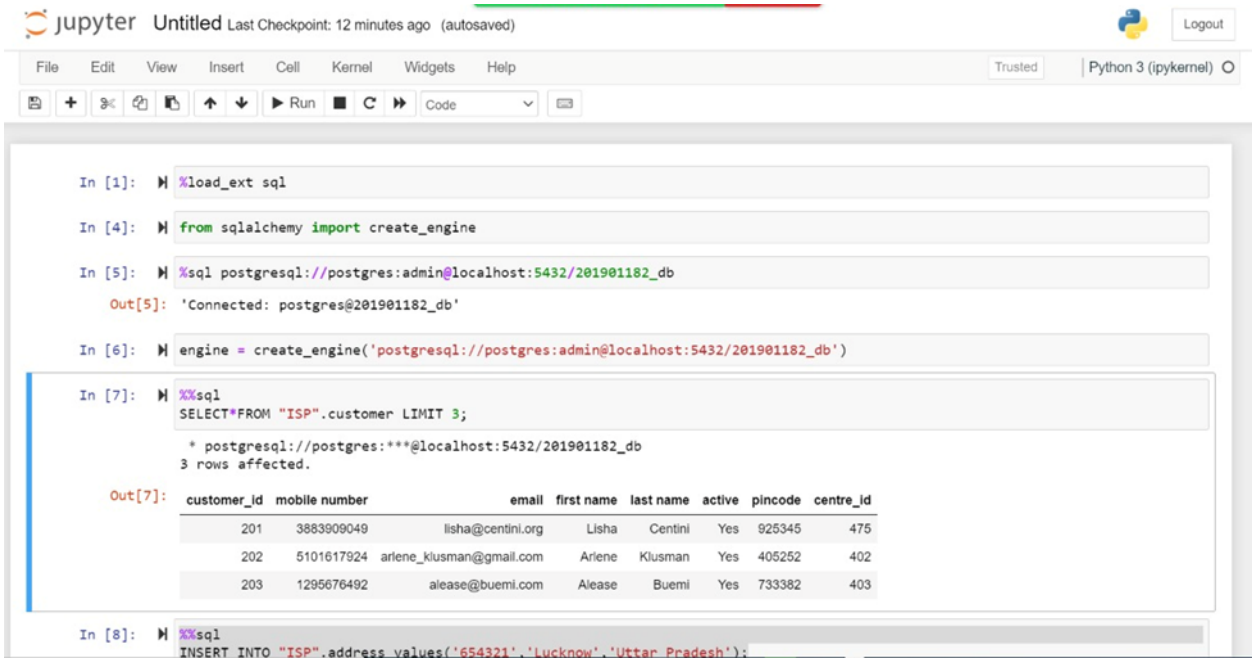
‘connected: postgres@201901182_db’
Function: engine =
create_engine('postgresql://postgres:admin@localhost:5432/201901182_db')

Screenshot of output or web/app pages with data.

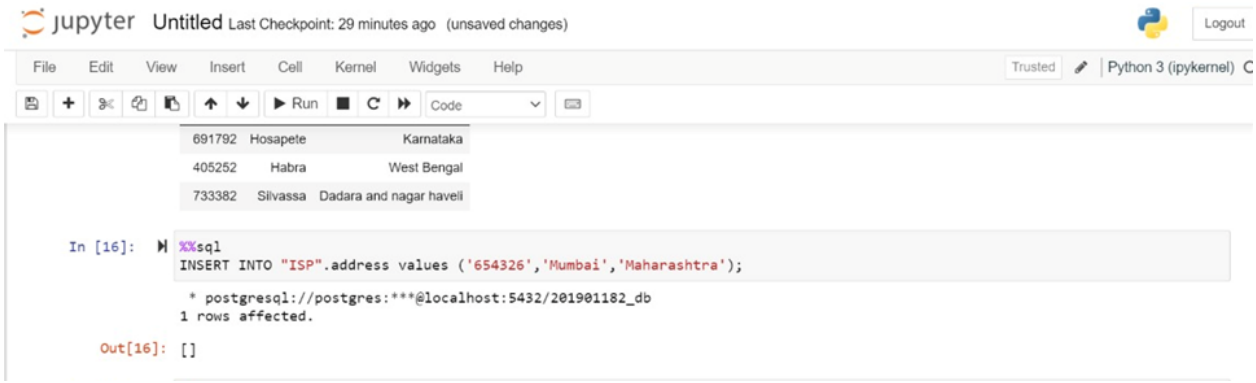
1. Display rows from the address table to see all address details



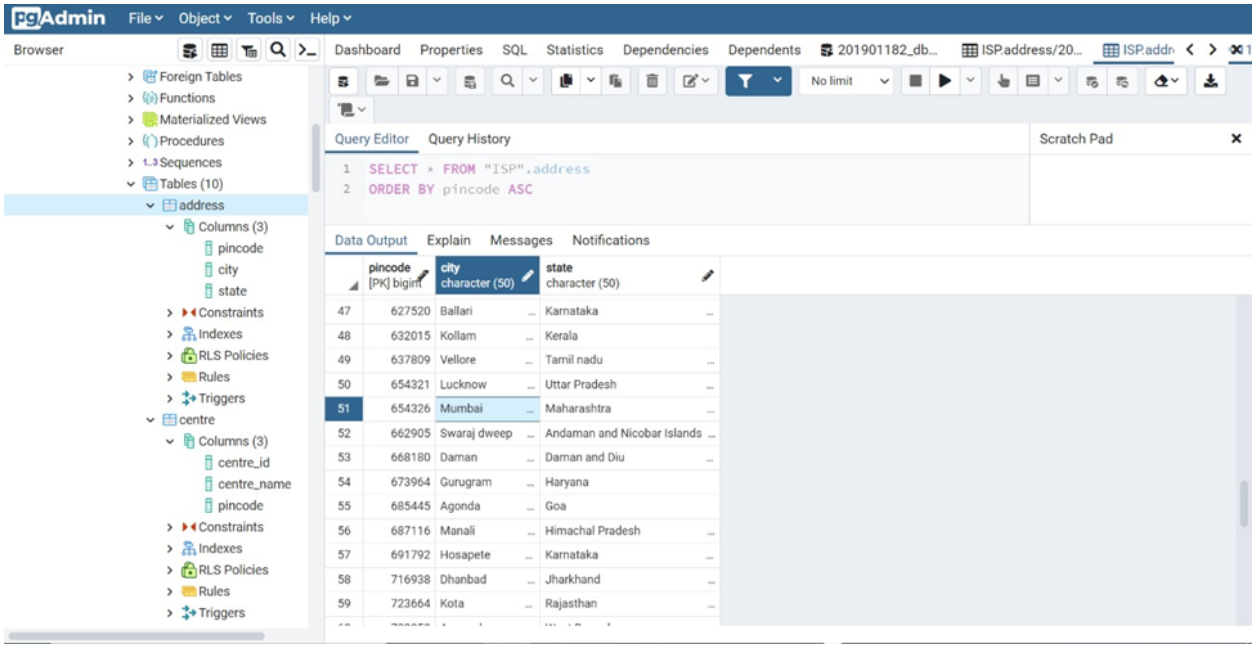
2. Display first 3 customer’s complete details from the customer table



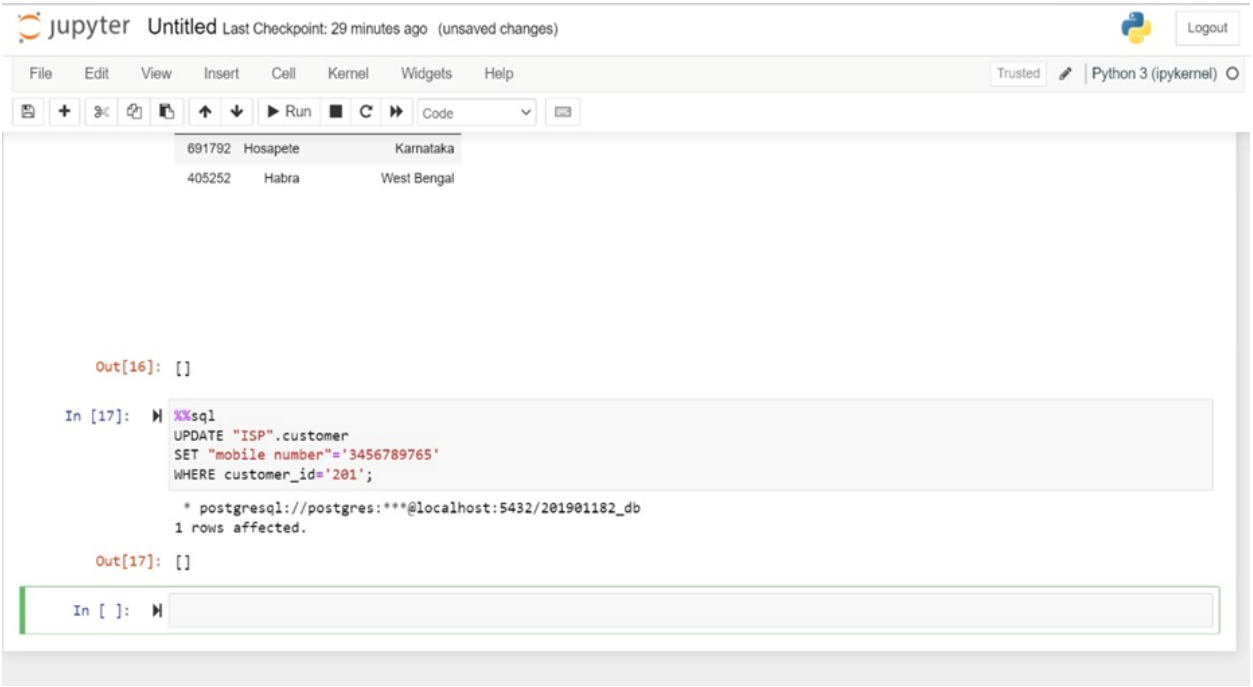
3. Insert a new address detail row in the address table



This is the PgAdmin window showing the new row number 51 inserted with pincode ‘654326’, city ‘Mumbai’ and state ‘Maharashtra’.

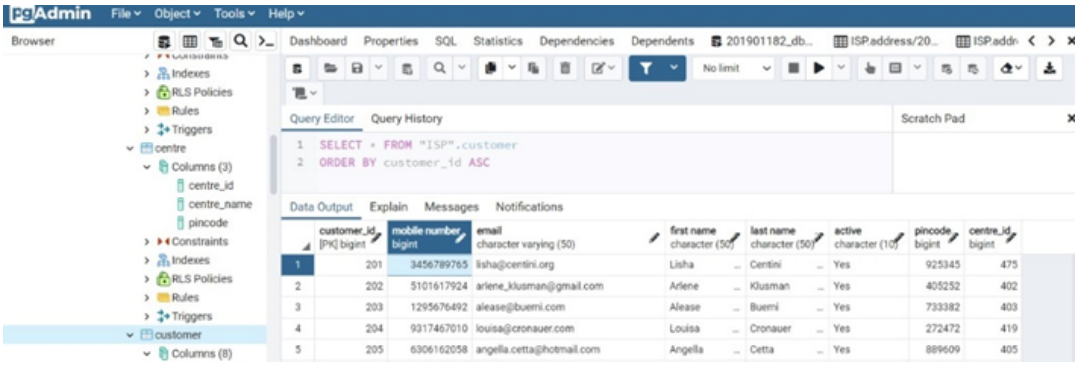

pgAdmin
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
No limit
Foreign Tables
Functions
Materialized Views
Procedures
Sequences
Tables (10)
address
Columns (3)
pincode
city
state
Constraints
Indexes
RLS Policies
Rules
Triggers
centre
Columns (3)
centre_id
centre_name
pincode
Constraints
Indexes
RLS Policies
Rules
Triggers
Query Editor
Query History
Scratch Pad
1 SELECT * FROM "ISP".address
2 ORDER BY pincode ASC
Data Output
Explain
Messages
Notifications
pincode [PK] bigint
city character (50)
state character (50)
47 627520 Ballari Karnataka
48 632015 Kollam Kerala
49 637809 Vellore Tamil nadu
50 654321 Lucknow Uttar Pradesh
51 654326 Mumbai Maharashtra
52 662905 Swaraj dweep Andaman and Nicobar Islands
53 668180 Daman Daman and Diu
54 673964 Gurugram Haryana
55 685445 Agonda Goa
56 687116 Manali Himachal Pradesh
57 691792 Hosapete Karnataka
58 716938 Dhanbad Jharkhand
59 723664 Kota Rajasthan

4. Update any customer's mobile number in the customer table

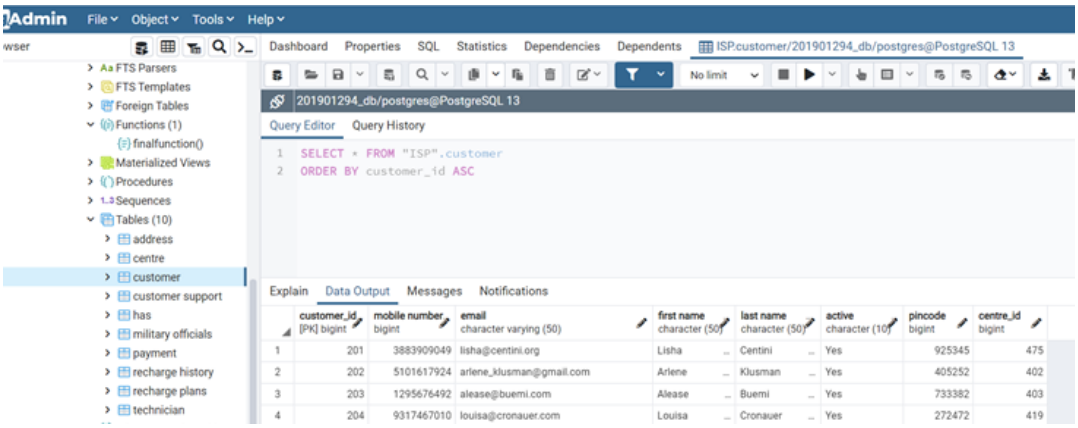


This is the PgAdmin window showing the customer 201, Lisha's new number being updated.

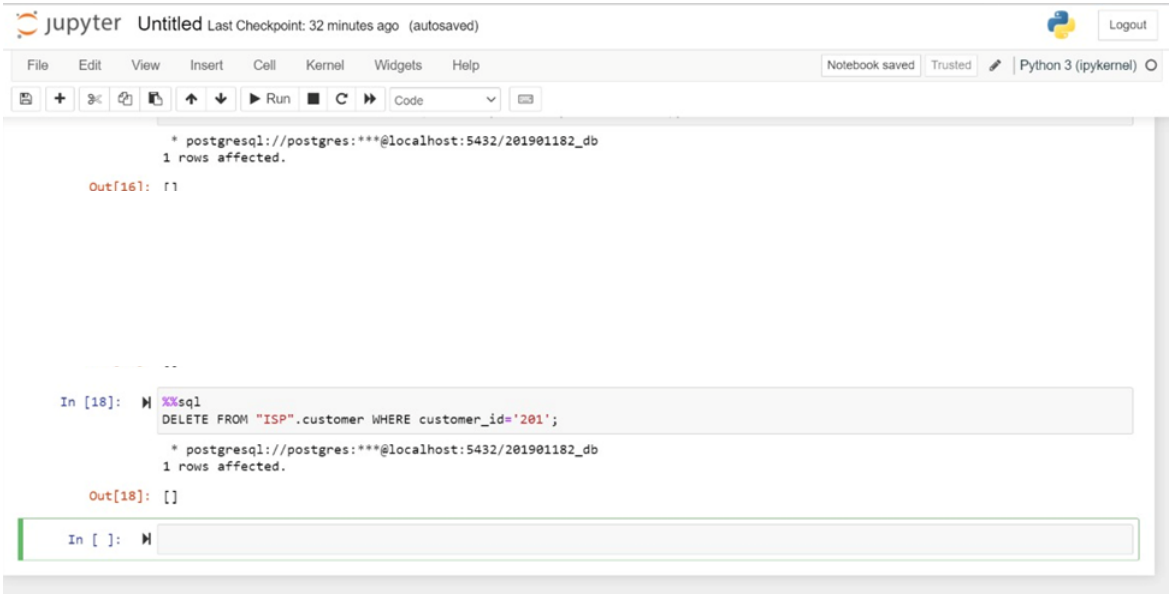
New



Old

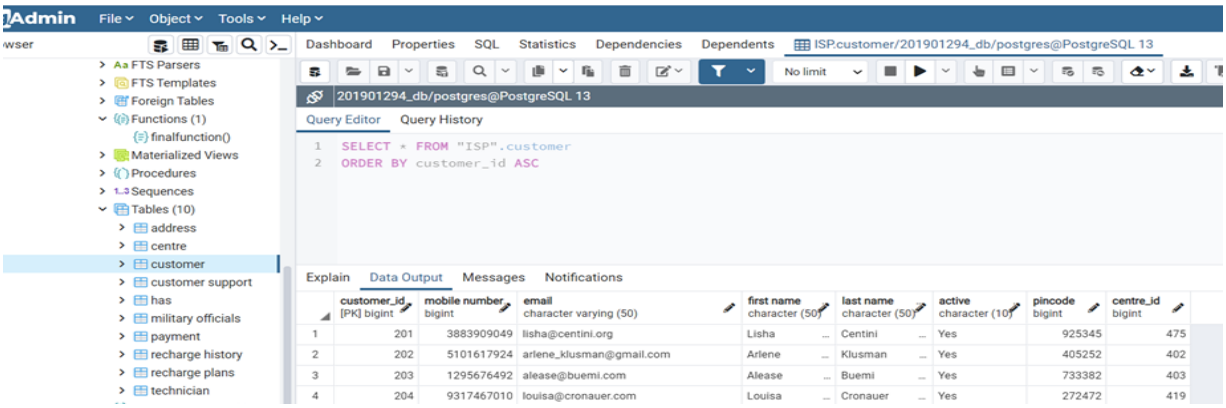


5. Delete any customer's details from the customer table

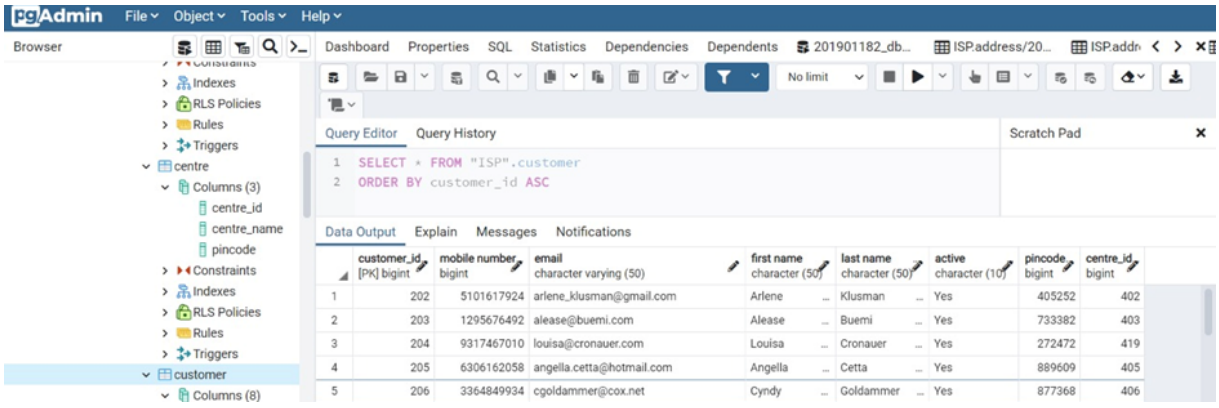


This is the PgAdmin window showing the customer 201 is now deleted.

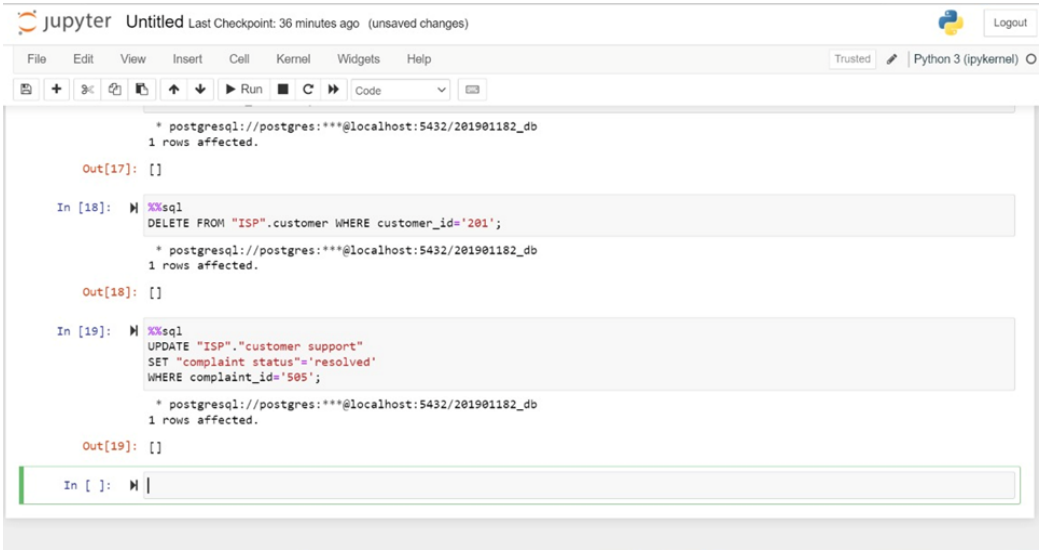
Old



New

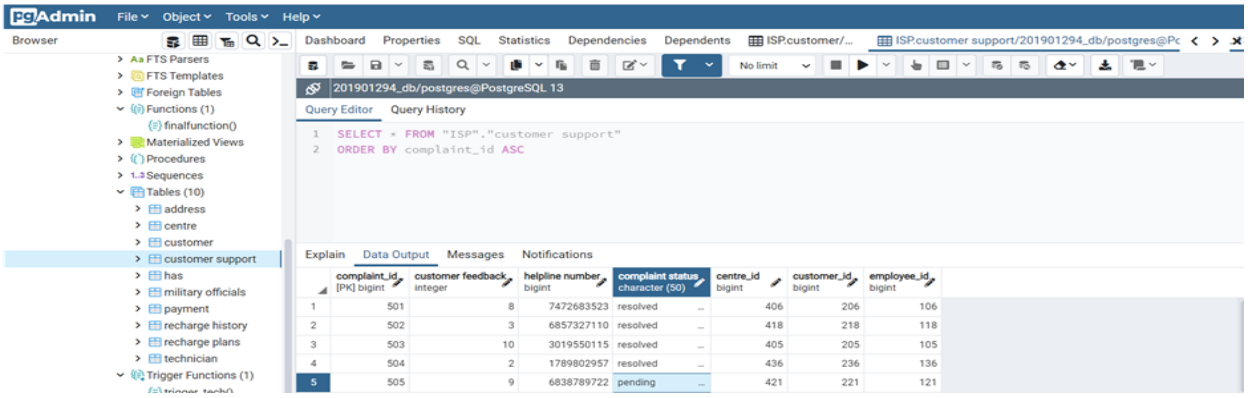


6. Update any customer's complaint status from the customer support table



This is the PgAdmin window showing the complaint_id 505's status being updated from pending to resolved.

New



Old