Final Project Submission

for

Home Care Worker Providing Agency Database Management System

Version 1.6 Approved

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Software Requirements Specification

Contents

Revision History

Name	Date	Reason For Changes	Version
Home Care Worker System	23-08-23	Initial Version	0.1
Home Care Worker System	10-09-2023	Added Introduction and Overall Description for the project	0.5
Home Care Worker System	17-09-2023	Added Interview, Questionnaire Requirements	1.0
Home Care Worker System	21-09-2023	Added Assumptions and Constraints	1.5
Home Care Worker System	18-11-2023	Revised SRS	1.6

1. Descriptions

1.1 Purpose:

The core objectives of this document are multifaceted, primarily aiming to:

- Articulate the sequential development of the foundational requirements for the Home Care Worker Providing Agency Database Management System.

- Present the specifications for the Database Management System in a manner that delineates the transformation of requirements from their embryonic, vague phase to a clear, well-defined state.

- Illustrate our comprehensive consideration and rigorous analysis of the needs, demonstrating how dependencies were identified, problems were resolved, and the depth of our understanding of the requirements.

- Consequently, this document is not merely a compilation of requirements but also serves as a narrative detailing the derivation, interrelation, and refinement of these requirements from the initial inputs received.

1.2 Audience and Reading Suggestions:

- Entities committed to providing personalized care services to individuals within their homes, employing a cadre of caregivers and health practitioners to render diverse, specialized assistance.

- This demographic includes individuals receiving home care services, such as the elderly, the differently-abled, and those in medical recuperation. Their families, who are integral to the caregiving decisions, are also encompassed within this audience.

- This group consists of medical specialists and dedicated caregivers, including doctors, therapists, and nurses, who synergize with home care organizations to deliver bespoke, expert care solutions to clients.

1.3 Product Scope:

- The Home Care Worker Providing Agency Database Management System is designed to envelop a plethora of functionalities, enabling the meticulous management of the agency's diverse operational facets. Below is an enhanced overview of the system's comprehensive scope:

- Preserve extensive client profiles encompassing both personal and medical details.
- Facilitate optimal client-caregiver matches, according to preferences and needs, while enabling smooth communication for scheduling and feedback.

- Sustain exhaustive worker profiles detailing qualifications and availability and orchestrate their schedules to ensure seamless client service.
- Monitor the progress and status of worker training and certifications.

- Formulate and modify individualized care plans, adapting to the fluctuating needs of clients.

- Consolidate billing details, process invoices, and oversee payment information, while generating insightful reports for compliance and analytical purposes.

- Allocate shifts, provide instantaneous updates, and maintain a user-friendly mobile interface to enhance user convenience and accessibility.

- Uphold stringent data security measures and conduct quality assurance to gather constructive feedback for continual service improvement.

- Adapt to organizational growth, manage operational expenses effectively, and leverage data-driven insights to facilitate informed strategic decisions.

1.4 Home Care Industry:

The Home Care Industry is a rapidly growing sector within healthcare, providing essential services to individuals who require assistance with their daily living activities. This industry primarily focuses on delivering care services to the elderly, disabled, or chronically ill individuals who prefer to stay in their homes rather than move to nursing homes or healthcare facilities. Services offered by the home care industry include personal care, medical care, meal preparation, housekeeping, and companionship.

1.5 Product's Perspective:

In this context, the product is a sophisticated database system designed to optimize the operation of home care service agencies. It aims to streamline service allocation, improve communication, enhance user satisfaction, and ensure the security of sensitive information. The product seeks to cater to the unique needs and preferences of caregivers, clients, and administrative staff, focusing on user-centric design, advanced feature integration, and effective feedback mechanisms.

1.6 Problems Faced by Client and Caregiver Before the Product:

Before the introduction of this product, clients and caregivers in the home care industry were grappling with several challenges:

- Clients and caregivers often struggled with mismatched service allocations, where caregivers were assigned to clients whose needs did not align with their skills or preferences.

- Inadequate communication channels led to misunderstandings and inefficiencies, impacting the quality of care provided and the overall satisfaction of both clients and caregivers.

- Caregivers often felt under supported and undertrained, struggling to adapt to new technologies and lacking the necessary skills to meet the diverse needs of their clients.

- The absence of robust security measures raised concerns about the confidentiality and integrity of sensitive information, undermining trust between clients and caregivers.

- The lack of a user-friendly, mobile-responsive platform made it challenging for users to manage tasks, receive updates, and access essential information on the go.

1.7 Problems Being Solved by the Product:

This product is designed to address the challenges by offering the following solutions:

- The system ensures accurate and efficient service allocation, matching caregivers with clients based on their skills, experience, and service preferences, thereby enhancing service quality and user satisfaction.

- By providing multiple communication options and streamlined reporting mechanisms, the product facilitates clear and effective communication between clients, caregivers, and administrative staff, reducing misunderstandings and improving operational efficiency.

- The product assesses and improves the training and support provided to users, ensuring that caregivers are well-equipped to handle diverse client needs and can effectively utilize the system.

- The integration of advanced security features protects user information and builds trust by ensuring the confidentiality and security of sensitive data.

- The development of a user-centric, intuitive interface and a responsive mobile app enhances user experience and accessibility, allowing users to manage tasks and receive updates efficiently through their preferred platforms.

- The incorporation of effective feedback mechanisms and analytical tools enables continuous improvement and prioritization of feature development based on user needs and preferences, ensuring the system remains relevant and user-friendly.

1.8 Product Functions:

- Administrators enrich the system by populating it with various caregiving specialties pertinent to the home care industry, ensuring a comprehensive representation of all available services and care types.

- The system meticulously links these specialties to the respective caregivers, forming a robust foundation for the caregiver database, allowing for precise and efficient service allocations.
- Integration of Chemist and Lab Information:

- The system integrates detailed information from local chemists and labs into their designated databases, providing a consolidated view of all available medical resources and facilities in the vicinity.

- Home care workers register within the system, detailing their professional qualifications, experience, availability, and preferred tasks, forming a comprehensive caregiver profile.

- Clients seeking caregiving services are facilitated to register and specify their care requirements, preferences, and schedules, ensuring a customized and client-centric approach to service allocation.

- The system employs advanced matching algorithms to pair clients with the most suitable caregivers, considering factors like specialty, availability, client needs, and preferences, ensuring optimal satisfaction and service quality.

- Caregivers are granted access to enriched client profiles, complete with detailed care needs, schedules, and specific instructions, fostering a well-informed and efficient caregiving process.

- Administrative users are endowed with extensive management and oversight capabilities, enabling them to create and manage user accounts, configure system settings, and access advanced analytics to monitor and optimize caregiver performance and agency operations.

- The system is built with a user-centric approach, focusing on creating a seamless and intuitive user experience for both caregivers and clients, while also providing administrators with the tools necessary to manage and optimize the system effectively.

1.9 References:

- IEEE 830-1998
- https://medium.com/@f20180617/business-model-of-urban-clap-company-c342485c1b49
- https://www.document-logistix.com/hospitality/hotels/restaurants/events/document-management-for-hotels.html
- https://demigos.com/blog-post/how-to-develop-an-it-solution-that-saves-management-effort-for-a-caregiving-company/
- https://www.osplabs.com/insights/how-to-develop-home-healthcare-application-from-scratch/
- https://www.g2.com/categories/home-health-care

2. Background Reading:

2.1.1 Description of Reading:

Books:

1. Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob:

It provides a comprehensive understanding of designing, implementing, and managing databases. While not tailored specifically to home care worker agencies, the book covers essential concepts such as data modeling, relational databases, SQL, security, integrity, and performance tuning. It can offer valuable insights for building a robust and efficient database management system to handle client records, staff information, scheduling, billing, communication, and more within a home care worker providing agency context.

2. Home Care How To" by Brendan John:

-The book emphasizes the importance of a well-thought-out plan, laying the foundation for the agency's mission, vision, and long-term objectives.
-Insights on essential legal prerequisites, documentation, and regulations crucial for running a compliant in-home care service.
-Detailed steps on setting up an efficient workflow, ensuring smooth day-to-day running of the agency.
-Guidelines on recruiting skilled and compassionate professionals, maintaining the quality and reputation of the service.
-Strategies to develop personalized care plans, addressing the unique needs and preferences of each senior.
-Tips on promoting the agency, reaching out to potential clients, and building a strong brand presence in the market.
-Expertise on budgeting, billing, financial record-keeping, and ensuring the agency's profitability.

3. The Complete Eldercare Planner: Where to Start, Which Questions to Ask, and How to Find Help" by Joy Loverde:

-Offers insights into various care possibilities, helping families make informed decisions about residential care, home care, and specialized services.
-Addresses critical topics like power of attorney, medical directives, patient rights, and navigating medical treatments.
-Provides strategies for managing stress and ensuring mental wellness for both caregivers and the elderly.
-The book's insights can enhance an agency's ability to comprehensively address client needs, adhere to legal standards, and coordinate effective medical care.

4. "Business Intelligence Guidebook: From Data Integration to Analytics" by Rick Sherman:

-Data Integration and Warehousing**: Delivers insights on consolidating various data sources, ensuring seamless data storage, retrieval, and analysis in the context of client profiles and staff performance.

-Emphasizes deriving actionable insights from data, allowing for effective staff scheduling, performance tracking, and quality assurance measures.

-Highlights the importance of maintaining data integrity, security, and consistent management practices for an efficient database system.

-Equips readers with knowledge on the latest tools and practices, driving innovation in data-driven strategies to improve agency performance and client care.

Articles:

1. Design and Development of a Web-Based Home Healthcare Information System –

- Lifestyle-related diseases like stroke, heart disease, and cancer are closely related to daily lifestyle choices.
- Security attributes like integrity, availability, and confidentiality must be safeguarded.
- Users can access their data from anywhere via the Internet and receive specialist feedback.
- The article concludes with the implementation of a prototype WBHMS, emphasizing secure communication protocols.
- Users can access their data from anywhere via the Internet and receive specialist feedback. The system uses server computers with open-source software, ensuring data security and backup.

2. Home care clients: a research protocol -

- Utilizes an encompassing socio-ecological model to scrutinize the system of home care specifically designed for senior citizens.
- Centers attention on two principal data streams, namely Client/Service Data and Constellation Data.
- The Constellation Data Stream delves into the experiences encountered by clients, caregivers, healthcare professionals, and workers.
- Employs qualitative research methods to delve into the myriad factors impacting service pathways, striving to understand the intricate relationships and influences.

3. The Future of Home Health Care:

- The role of agencies certified by Medicare is crucial, serving as the linchpin in achieving this vision by delivering superior and efficient care within home and community settings.
- Given the preference among recipients for home care due to its cost-efficient and high-quality services, it is instrumental in fostering patient-centric and economical healthcare solutions.
- The role of agencies certified by Medicare is crucial, serving as the linchpin in achieving this vision by delivering superior and efficient care within home and community settings.

4. Optimizing Weekend Schedules in Home Health Care:

- The Essential Care on Weekends (ECoW) strategy is central to refining scheduling practices in home health care, specifically targeting limitations in service capacity prevalent during weekends.
- ECoW's deployment underscores the viability of refining scheduling protocols to amplify the capacity of home-based care, guaranteeing that at-risk clients procure the requisite

support to stay within their communities. This methodology is in harmony with the objectives of a Home Care Worker Providing Agency DB Management System, promoting the judicious distribution of resources and enhancing the caliber of care dispensed.

5. A qualitative study of home care client:

- The study underscores the beneficial influences of the DIVERT-CARE intervention on participants' abilities to manage their own care, educational attainment, and emotional wellness.
- Such a system should be designed to streamline communication, disseminate education efficiently, and cultivate enriching interactions between patients and providers, thereby refining the experiences of home-based care recipients.

6. Planning the Episode: Home Care Admission Nurse Decision-Making:

- The study illuminates the intricate decision-making pathways that nurses navigate to establish visit schedules, a process shaped by the conditions of the patients and the accessibility of pertinent information.
- The insights gained underscore the critical need for robust information transfer and decision assistance within a Home Care Worker Providing Agency DB Management System, enabling the formulation of precise and suitable scheduling of visits.

2.1.2 References

- "Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob
- "Home Care How To: The Guide to Starting Your Senior in Home Care Business" by Brendan John:
- "The Complete Eldercare Planner: Where to Start, Which Questions to Ask, and How to Find Help" by Joy Loverde:
- Design and development of a Web-based hospital information system
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7291732/
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2.2 Interview:

2.2.1 Interview Plan:

System: Home Care Worker Providing Agency Database Management

Participants: Ashutosh Anand(G21), Kunal Anand (Owner), Anurag Shukla (Co-Owner)

Date: 17/9/2023

Time: 12:30
Duration: 30 minutes

Place: DS Lab

Purpose of Interview:

— To delve into the operational dynamics of an agency providing home care services and gain a profound understanding of its functionalities.
— To acquaint oneself with the prevailing working environments and the routine processes undertaken daily within the agency.
— To grasp the complexities and challenges encountered by the proprietor of the agency in navigating the provision of home care services.
— To comprehend the apprehensions and considerations of the service providers within the agency's framework.
— To procure in-depth knowledge and insights into the intricate workings of the agency, discerning the nuances of its operational structure.
— To pinpoint potential realms requiring refinement and augmentation, aiming to elevate the standards of service provision.
— To facilitate enhancements in the overall proficiency and efficacy of the services rendered in home care, contributing to the betterment of care quality and delivery.

Interview Agenda:

— Insight into the agency’s origins and mission.
— Outline of principal services provided.
— Overview of the agency’s scale and reach.

— In-depth exploration of daily functionalities and operational procedures.
— Examination of workflow strategies and standard practices.
— Highlighting of distinctive or exemplary operational methods.

— Reflection on the hurdles, ambitions, and goals from the standpoint of the agency proprietor.
— Deliberation on pivotal strategic intentions and plans.
— Review of the apprehensions and feedback from the agency’s service personnel.
— Investigation into the staff’s viewpoints on the operational aspects of the agency.

— Recognition of potential areas necessitating refinement.
— Proposals for advancements in operational efficacy and productivity.

Question Asked in interview carried out by Role Playing:

- Have there been remarkable cases or conflicts where a structured complaint resolution process would have been beneficial?
- What approaches are you contemplating to set up a proficient resolution system?
- Can you explain how newly recruited employees are delegated specific tasks within the agency?
- Have there been instances or concerns regarding new staff members being allocated challenging tasks?
- What methodologies could be implemented to guarantee optimal task assignment for newcomers?
- Could you shed light on any disparities in skills among your workforce?
- How does the inequitable spread of skills impact the functioning of the agency?
- Are there any strategies or programs in place to balance the skill distribution within the team?
- Can you identify the services that are perceived to pose significant occupational risks?
- What factors contribute to the lack of insurance provisions for employees engaged in high-risk services?
- Can you outline the procedures your agency currently employs for maintaining records?
- Have you experienced any challenges or restrictions due to the absence of electronic record-keeping?
- Are there certain categories of records that you think should be digitized as a priority?
- Could you delve into how customers usually schedule services with your agency?
- Have you noted any inefficiencies or obstacles in the process of manual reservations?
- Have manual bookings ever resulted in overlooked opportunities or inaccuracies?
- Could you elaborate on how feedback from customers regarding provided services is currently obtained?

2.2.2 Requirements Gathered:

1. Intelligent Caregiver-Client Matching System:

Develop advanced algorithms focusing on the intelligent matching of caregivers and clients, considering their individual skills, needs, and specializations, to ensure optimal assignment and enhanced service quality.

2. Efficient Scheduling and Conflict Resolution:

Design a robust system capable of generating efficient schedules while minimizing overlaps and conflicts, with automated reminders and notifications for shifts and updates, ensuring seamless operations and enhanced productivity.

3. Enhanced Data Security and Privacy:

Implement stringent measures to safeguard sensitive caregiver and client information, ensuring data security and privacy, and compliance with relevant regulations.

4. Comprehensive Reporting and Analytics:

Incorporate detailed and intuitive reporting features to monitor caregiver performance, client satisfaction, and agency management, allowing for informed decision-making and continuous improvement.

5. Real-Time Updates and Communications:

Provide instant notifications and real-time updates to all stakeholders, enabling clients to monitor care provision and facilitating direct communication between clients and caregivers.

6. User-Friendly Mobile App:

Develop a user-friendly mobile app for caregivers and clients, allowing easy access to schedules, communications, and updates, and enabling clients to request services and provide feedback conveniently.

7. Automated Service Booking and Digital Calendar Integration:

Implement an automated service booking feature that allows clients to schedule services online efficiently, integrated with a digital calendar system to manage bookings and allocate service providers accurately.

8. Formal Customer Feedback and Grievance Redressal Mechanism:

Establish formal mechanisms for collecting and analyzing customer feedback and resolving grievances from both customers and service providers, contributing to service improvement and enhanced customer satisfaction.

9. Expertise Distribution and Development:

Implement strategies for training and development to balance the distribution of expertise among employees, focusing on areas where expertise is lacking, to improve service quality and employee skillsets.

10. Insurance and Safety Provisions for High-Risk Roles:

Review and establish policies for providing insurance and safety provisions to employees in high-risk service roles, identifying high-risk roles, and determining the level of coverage to be provided.

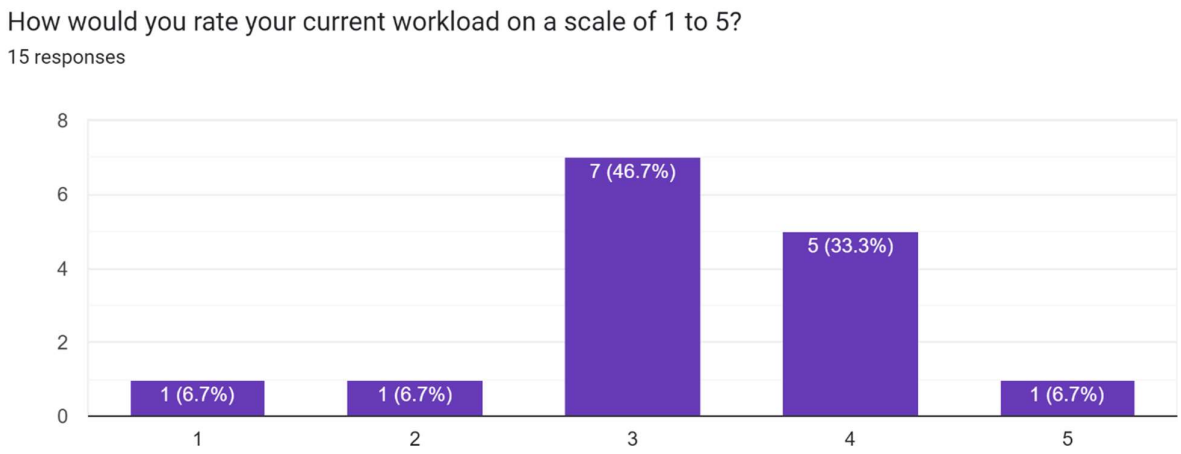
11. Digitization and Prioritization of Records:

Develop a system for digitizing agency records efficiently, specifying the types of records to be digitized first based on their operational impact, to ensure streamlined and efficient record-keeping.

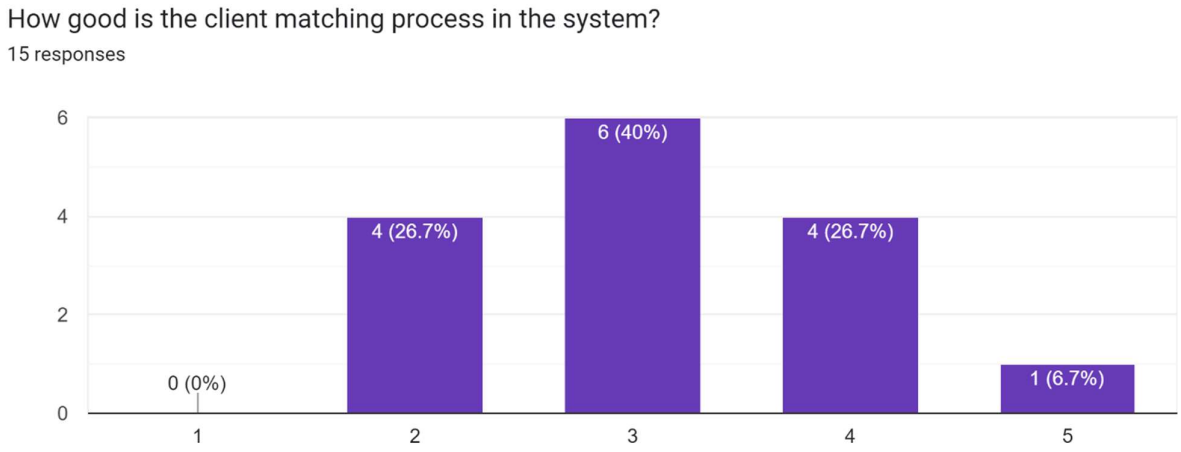
These requirements will serve as a comprehensive framework for developing the Home Care Worker Database Management System.

2.3 Questionnaire/s

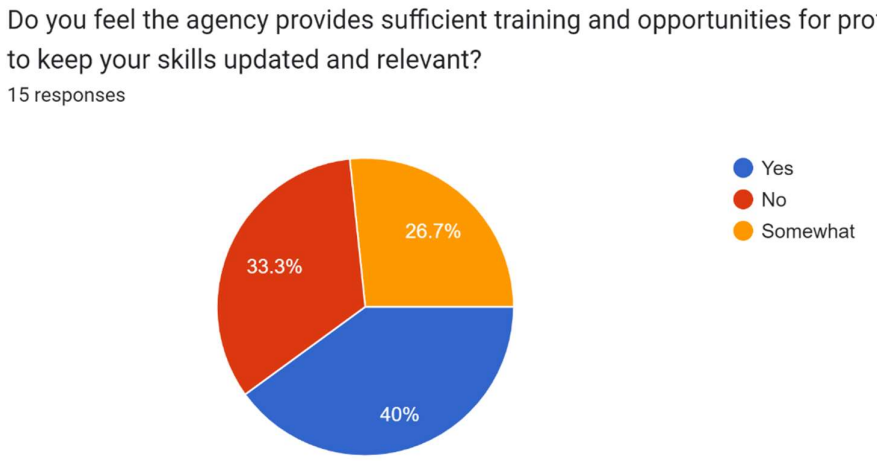
2.3.1 Caregiver Questionnaire:



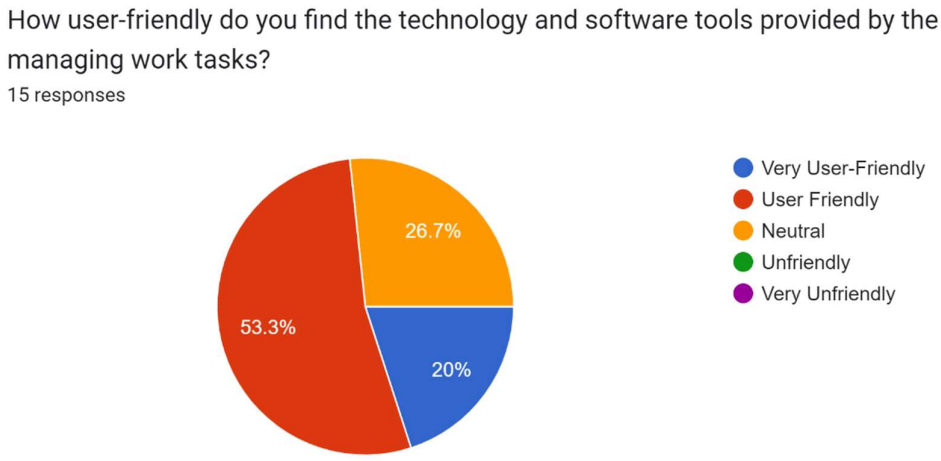
Most caregivers have rated their current workload as average to high, indicating a balanced to a slightly heavy workload. This may imply a need to reevaluate assignment processes to ensure workload equity.



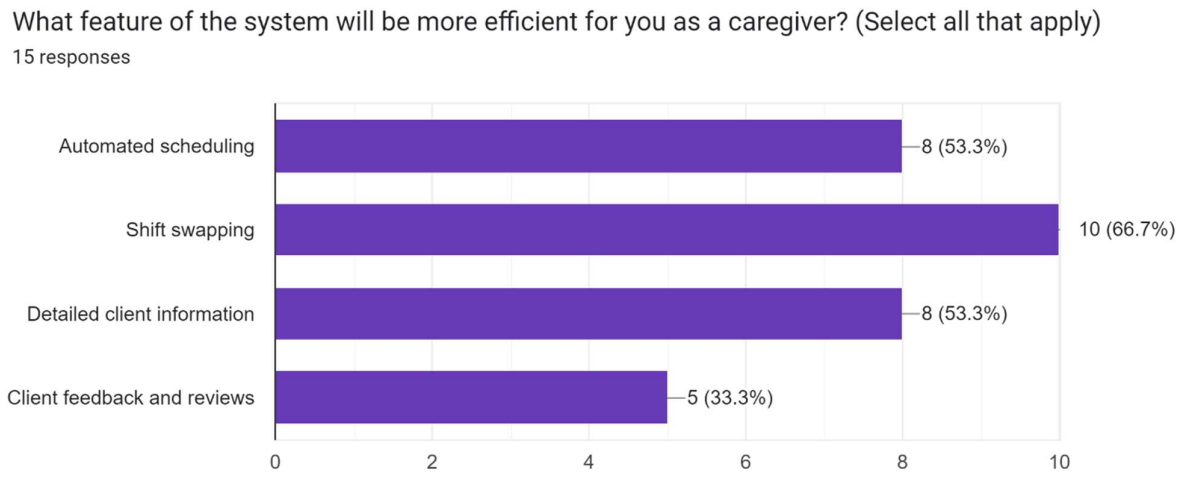
Responses varied, but a significant number found the client matching process satisfactory. This indicates that while the current matching process is functional, there is room for improvement to enhance caregiver satisfaction.



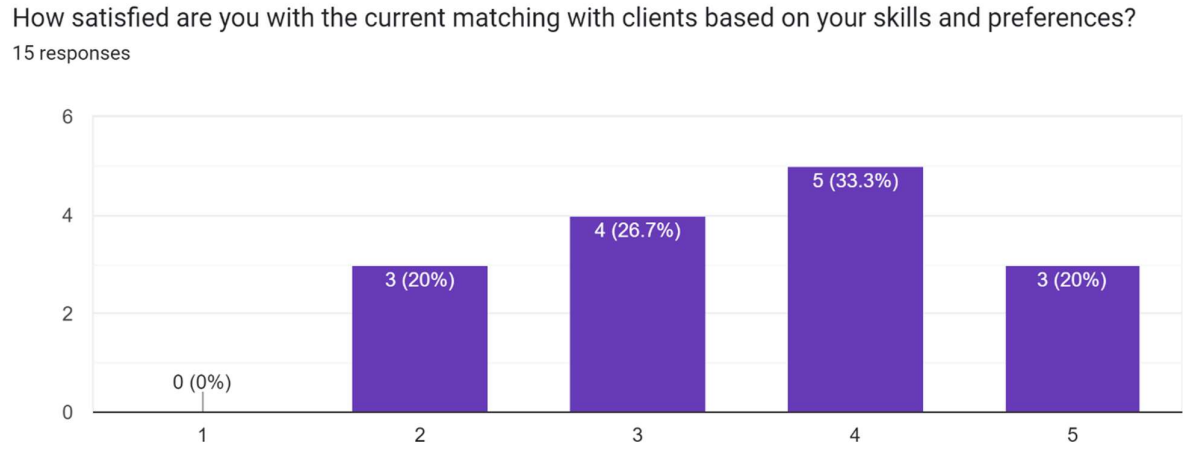
Mixed responses were recorded, with some caregivers finding the training and development opportunities sufficient, while others did not. This suggests a need for more consistent and comprehensive training and development programs.



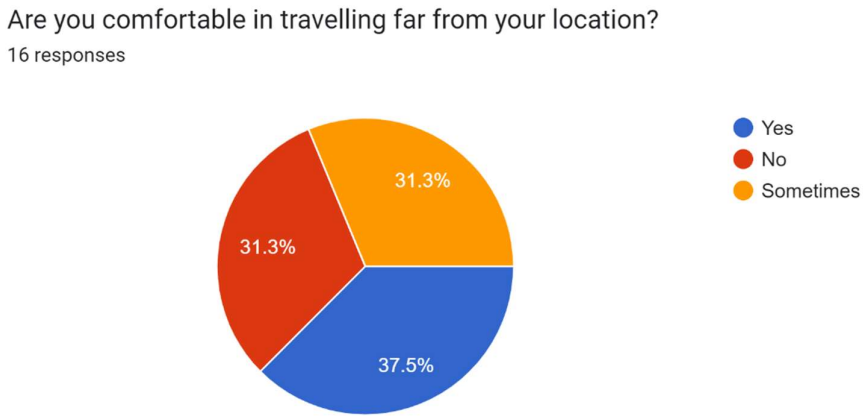
The majority found the provided tools to be user-friendly, but a few indicated neutrality. This implies that while the technology is generally accessible, further refinements can be made to improve user experience and accessibility.



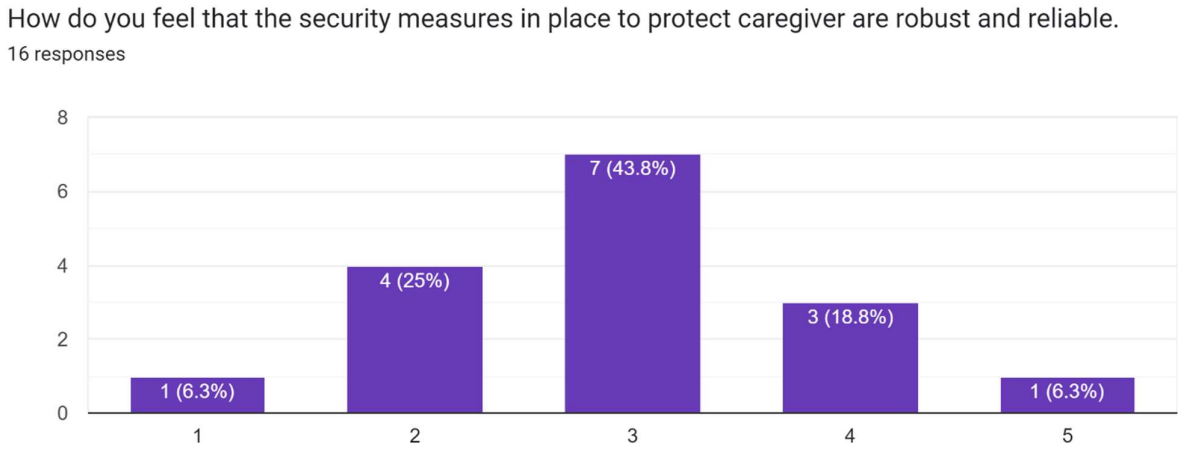
Automated scheduling and shift swapping were frequently selected as preferable features, highlighting a desire for more efficient and flexible scheduling options. Detailed client information and client feedback were also valued, indicating the importance of comprehensive and relevant client data.



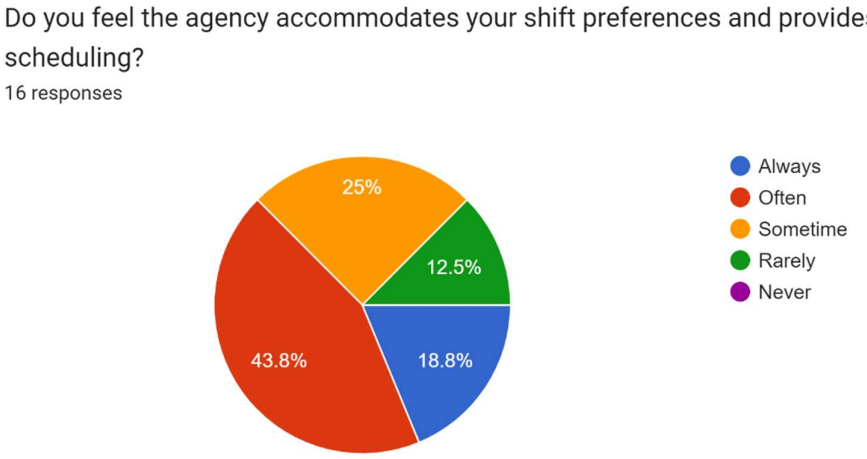
Most caregivers expressed moderate satisfaction with how they are matched with clients based on their skills and preferences. This reveals a potential area for enhancement in the client matching algorithm to improve caregiver satisfaction.



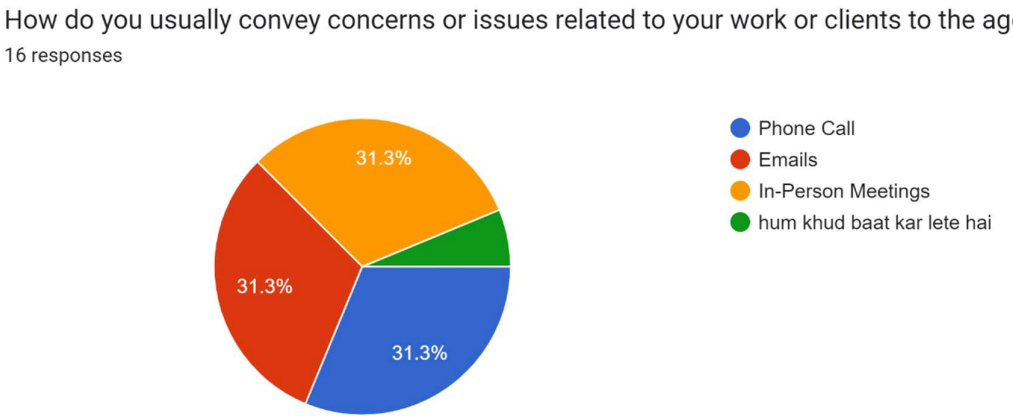
The responses are varied, with some caregivers comfortable with traveling, some sometimes comfortable, and others not comfortable. This suggests a need for a more personalized approach to assigning clients, considering individual preferences regarding travel.



Generally, caregivers seem to have a moderate level of trust in the security measures in place, with room for improvement to reinforce caregiver confidence in the system's security protocols.

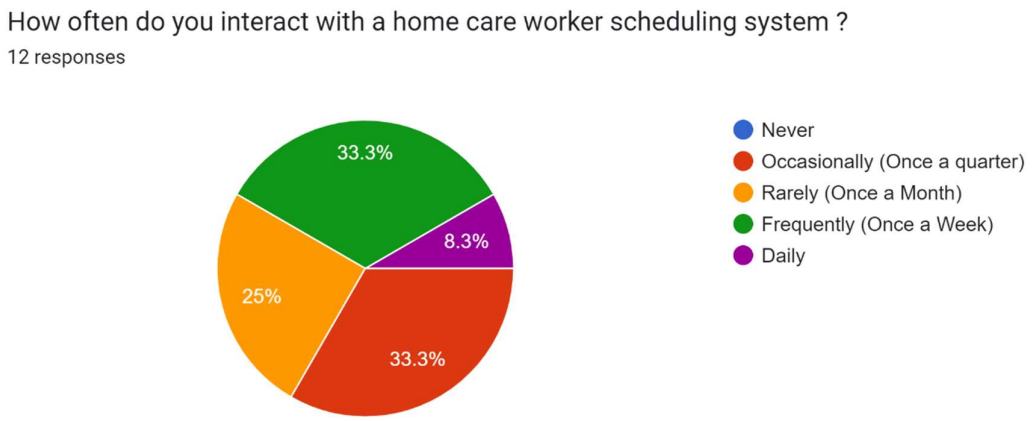


A significant number of caregivers felt that their shift preferences are often accommodated, but some rarely find flexibility in scheduling. This indicates a need to enhance scheduling flexibility to accommodate individual preferences and needs.

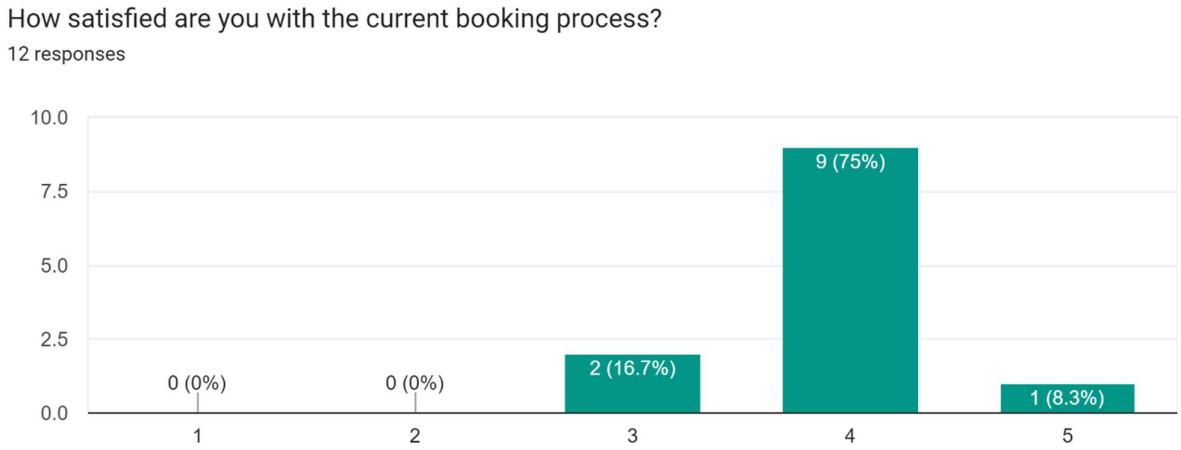


Caregivers use various methods to convey their concerns, with in-person meetings and emails being the most common. This suggests that multiple channels of communication should be maintained, but also streamlined, to ensure effective communication of concerns and issues.

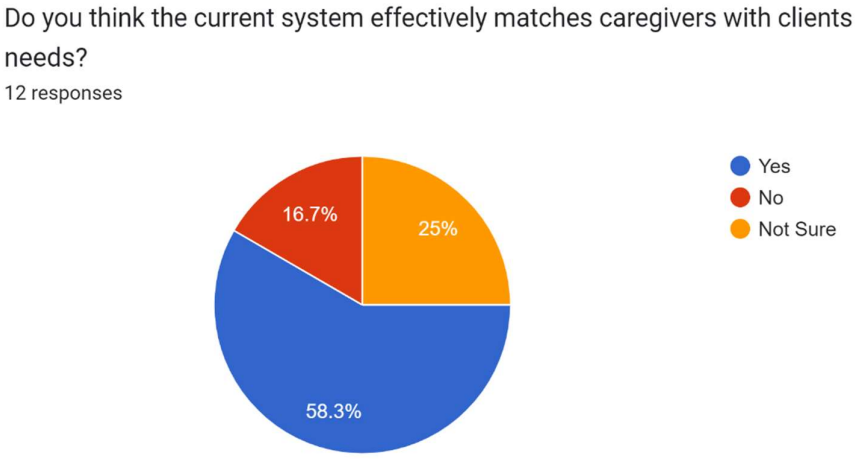
2.3.2 Client Questionnaire:



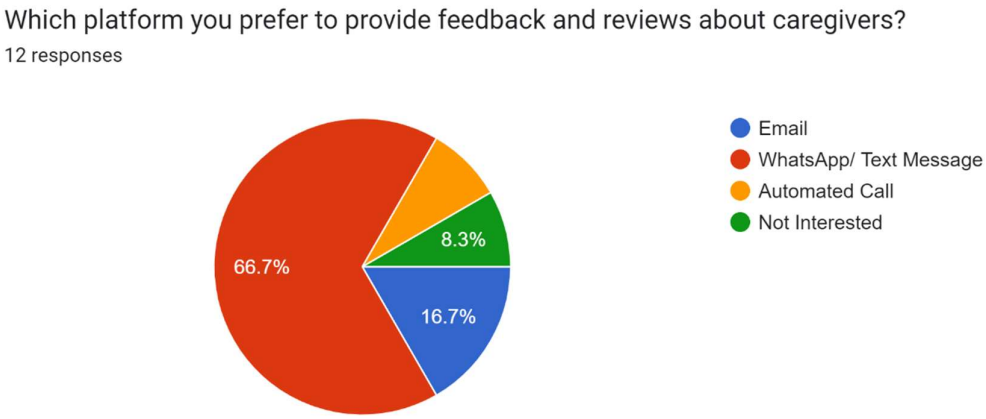
The frequency of interaction with the home care worker scheduling system varies among clients. Some interact daily or weekly, while others use it rarely or occasionally. This implies a diverse range of needs and preferences among clients in terms of scheduling frequency.



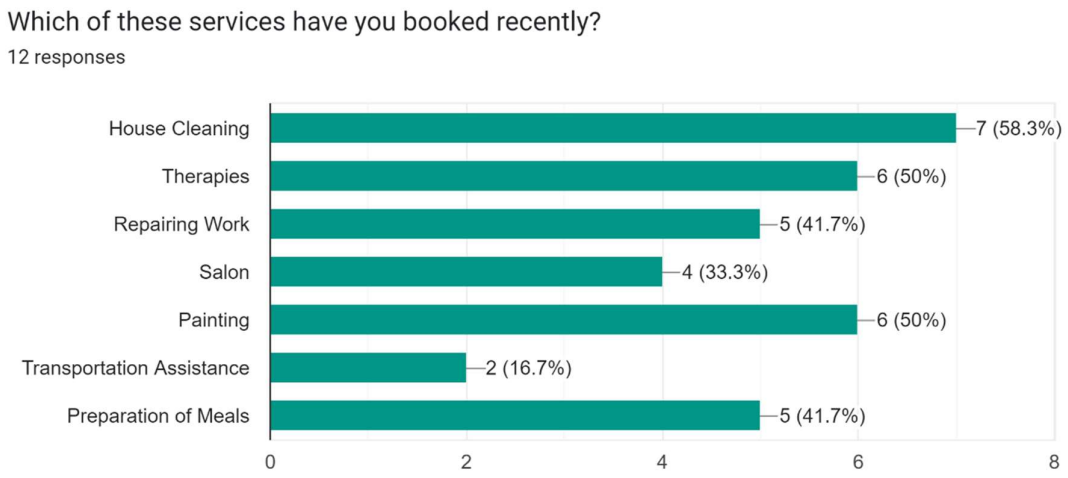
Most clients seem to be satisfied with the current booking process, but improvements could enhance user experience. This suggests a need to continually refine and optimize the booking process based on user feedback.



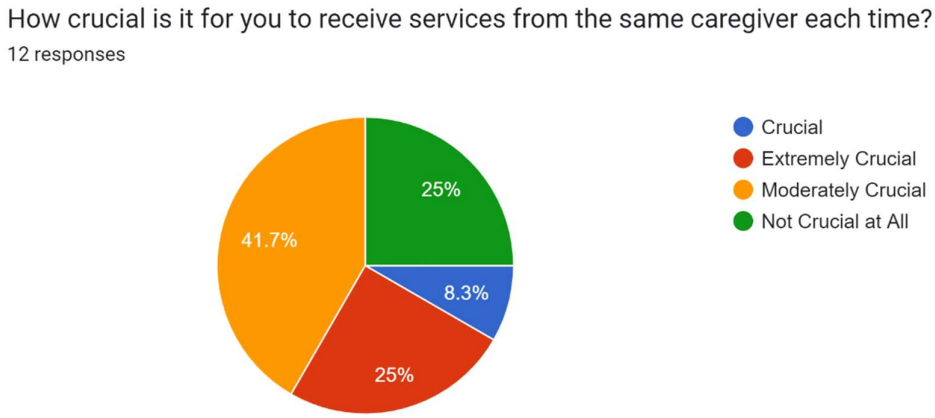
Responses are mixed, with some clients uncertain or unsatisfied with how effectively the system matches caregivers with clients. This highlights a potential area for enhancement in the matching algorithm to better align with client needs and preferences.



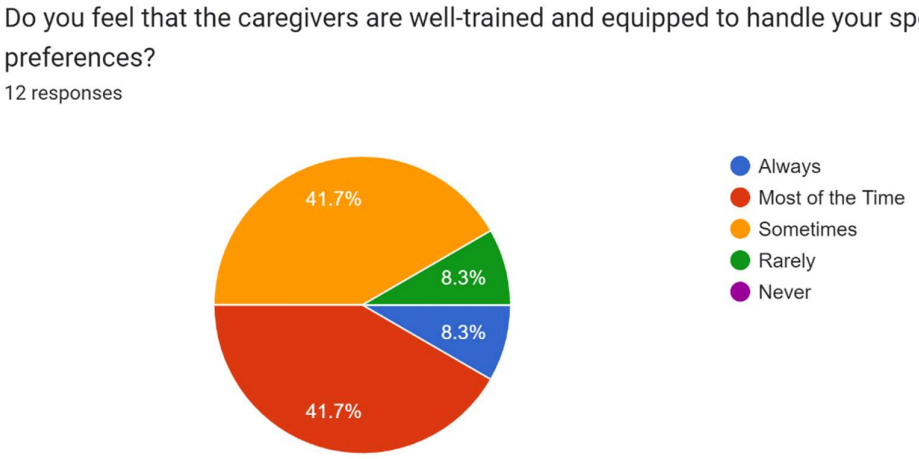
Email and WhatsApp/Text Message are the preferred platforms for providing feedback and reviews about caregivers. This indicates that digital and instant communication platforms are favoured for feedback provision.



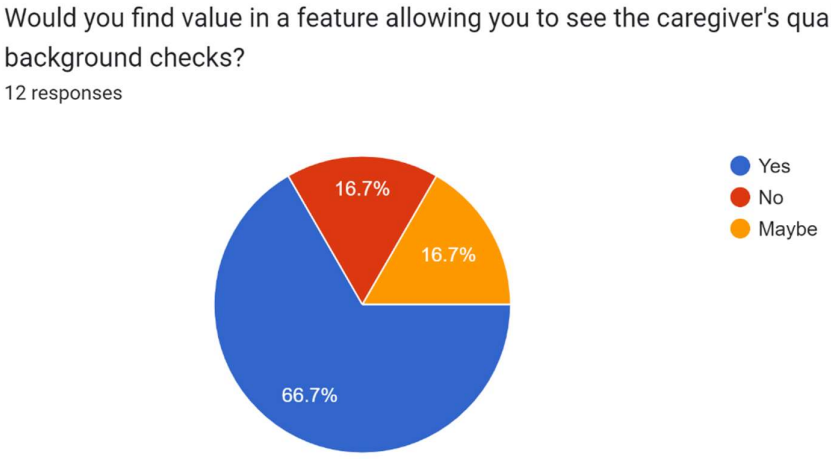
Clients have booked a variety of services, ranging from house cleaning and therapies to painting and meal preparation. This suggests diverse service needs among clients, necessitating a versatile service offering.



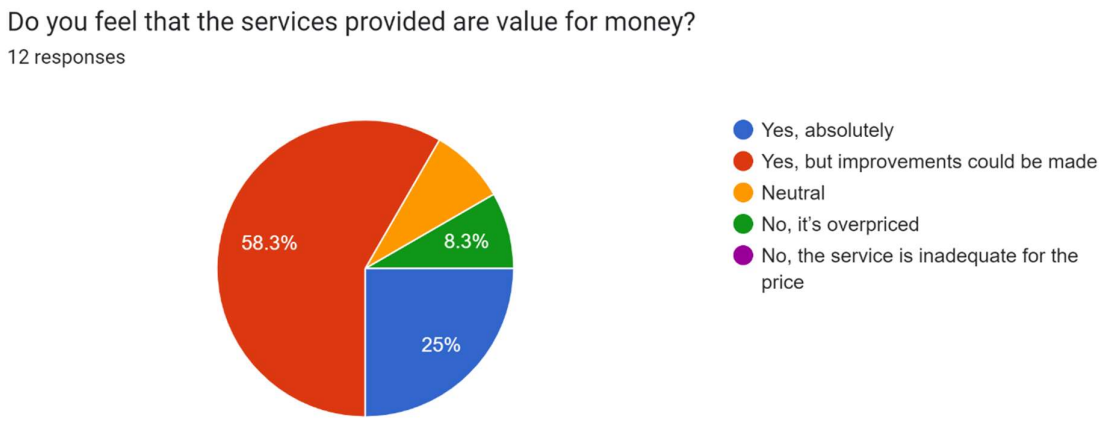
The importance of receiving services from the same caregiver each time varies, with some clients finding it extremely crucial while others not crucial at all. This implies a need for flexible scheduling options to accommodate individual preferences.



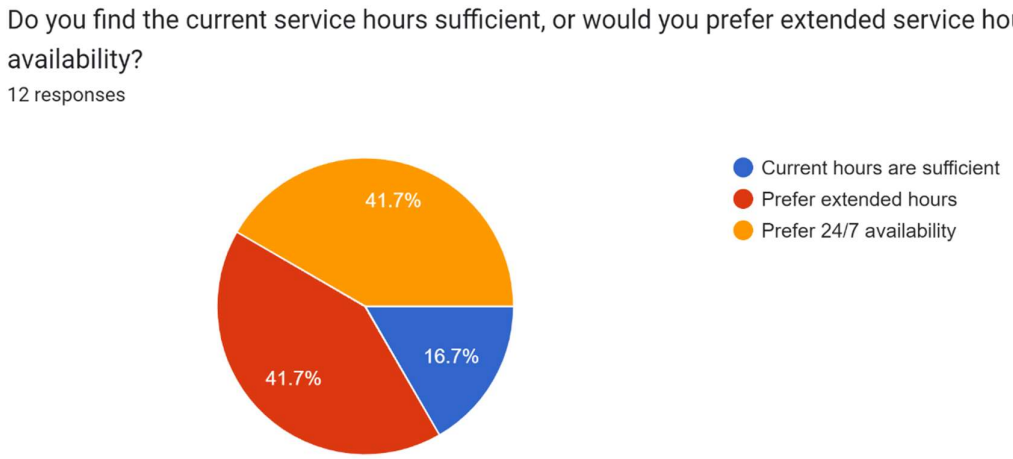
Most clients feel that caregivers are well-trained and can handle their specific needs and preferences, but there are instances of dissatisfaction. Continuous training and development initiatives can help in maintaining high competence levels among caregivers.



The majority find value in a feature allowing them to see the caregiver's qualifications, experience, and background checks. This implies that transparency in caregiver credentials can build trust and confidence among clients.



While most clients feel the services provided are value for money, there are concerns regarding overpricing. This suggests a need to ensure competitive pricing and clear communication of service value.



There is a preference for extended service hours or 24/7 availability among clients. This indicates a need for flexible and accommodating service hours to meet diverse client needs.

2.3.3 Requirements Gathered from the Questionnaire:

- A robust mechanism should be embedded to systematically track and analyze caregiver contentment with their working conditions, operational procedures, and client matching process, addressing caregiver concerns about the current system's effectiveness.

- The system must incorporate fields to document the duration and quality of experience each caregiver has in the home care industry, providing insight into their proficiency, expertise, and training needs.

- The database should be capable of logging the types of home care services that each caregiver is willing and able to provide, and it should facilitate efficient service allocation based on individual preferences, skills, and client needs.

- Caregivers should be given the flexibility to choose their preferred means of receiving schedules and updates, and this should align with the client's preferred platforms for providing feedback and reviews about caregivers.

- Enhanced security measures should be in place to ensure secure and streamlined access to clients' medical histories, care plans, and personal details, addressing the caregivers' and clients' needs for confidentiality and comprehensive information.

- The system should integrate advanced features to aid in improving job performance and client matching, based on feedback from both caregivers and clients regarding the effectiveness of the current matching process and the value of services provided.

- A comprehensive assessment of caregivers' comfort and proficiency with technology should be conducted to identify any potential need for additional training and support, ensuring that caregivers are well-equipped to utilize the system effectively.

- A feature to document the proportion of clients requiring personal care assistance is crucial, and it should be optimized based on client feedback regarding the importance of receiving services from the same caregiver each time.

- The system must allow caregivers and clients to efficiently report their activities, concerns, and receive updates, and it should integrate platforms preferred by clients for providing feedback and reviews about caregivers.

- A feature allowing caregivers and clients to evaluate the quality of services, training, and support provided by the agency is essential, enabling continual improvement of support services based on feedback and overall experience ratings.

- Given the preference for digital communication methods, the incorporation of a user-friendly mobile app is essential for managing tasks and receiving updates on the go, catering to the needs of users who find value in such platforms.

- Based on client opinions, robust security measures such as data secrecy, insurance, secure booking processes, and protection against third-party intrusion should be incorporated to protect client information and ensure safety.

- The system should facilitate seamless communication between caregivers and clients and should document the frequency of such interactions to aid in maintaining high levels of client engagement and satisfaction.

- The system development should prioritize features deemed most crucial by caregivers and clients for improving job performance, user satisfaction, and efficiency, ensuring that the system is well-rounded and caters to the needs of both user groups.

2.4 Observations:

2.4.1 Summary of observation/s:

- The system will be used by a diverse range of users, including caregivers, clients, and administrative staff, each with different needs and preferences, necessitating a user-centered design approach.

- Efficient and accurate service allocation is crucial, given the variability in caregiver service preferences, experience levels, and client needs.

- There is a pronounced emphasis on caregiver and client satisfaction, highlighting the need for a user-friendly, intuitive interface and efficient operational workflows within the system.

- The security and confidentiality of client and caregiver information are paramount, necessitating robust security measures and data protection mechanisms.

- The system requires the integration of advanced features such as real-time location tracking, efficient scheduling, and seamless communication to enhance job performance and user experience.

- There is a significant preference for mobile app usage among users for managing tasks and receiving updates, indicating the necessity for a responsive and mobile-friendly design.

- Qualitative feedback from both caregivers and clients is vital for continuous improvement and prioritization of feature development, requiring effective feedback mechanisms and analytical tools within the system.

- The varying levels of technology proficiency among caregivers underscore the importance of incorporating comprehensive training and support evaluation features.

- The diversity in preferred communication channels among users necessitates the incorporation of flexible communication options such as emails, text messages, and in-app notifications.

- The development of features should be prioritized based on the needs and preferences of the end-users, ensuring the system is well-rounded and caters to the needs of both caregivers and clients.

- The database design must facilitate holistic recording of all service interactions, preferences, and feedback to optimize service allocation and enhance user satisfaction.

- Efficient reporting of work hours, activities, and concerns is crucial, requiring streamlined reporting mechanisms and clear communication avenues within the system.

- The diverse user needs, preferences for digital communication, and emphasis on user satisfaction underscore the high importance of user experience design in the development of the system.

- The continuous evaluation and improvement of training, support, and services based on user feedback and experience ratings are essential for maintaining high levels of user satisfaction and system efficiency.

2.4.2 Combined requirements gathered from the observation:

- Develop a user-friendly, intuitive interface to accommodate the diverse user base including caregivers, clients, and administrative staff, ensuring ease of use and accessibility.

- Implement mechanisms for accurate and efficient service allocation, matching caregivers to clients based on service preferences, experience levels, and specific needs.

- Integrate robust security features to protect the confidentiality and integrity of client and caregiver information, addressing privacy concerns and ensuring data security.

- Incorporate advanced features like real-time location tracking and efficient scheduling, enhancing job performance, user experience, and operational efficiency.

- Develop a responsive and mobile-friendly app to cater to the preferences of users who manage tasks and receive updates through mobile platforms, enhancing user experience and accessibility.

- Implement effective feedback mechanisms and analytical tools, facilitating continuous improvement and prioritization of features based on user feedback, ensuring the system meets user needs and expectations.

- Incorporate features to assess and improve the training and support provided to users, identifying areas for enhancement, and ensuring users can effectively utilize the system.

- Implement streamlined reporting mechanisms for efficient reporting of work hours and activities and facilitate clear and effective communication within the system.

- Provide transparent displays of caregivers' qualifications, experience, and background checks, building trust and confidence among clients and ensuring informed decision-making.

2.5 Fact Finding Chart

Objective	Technique	Time Commitment
To get background of the industry and understand the requirements of the project. To provide appropriate allocation of resources.	Background Reading	1.5 days
To scrutinize and learn how a small-scale database is created, optimized, and maintained efficiently.	Case Study	1-2 days
To understand the operational mechanics and service provision methodologies of a home care agency.	Interview (Role Playing)	2-3 hours
To comprehend the challenges encountered by agency owners and identify plausible solutions.	Interview (Role Playing)	2-3 hours
To identify areas that require improvements and enhancements in the existing systems within the industry.	Group Discussion /Brainstorming	4-5 hours
To understand customers' preferences, needs, and expectations from the service providers.	Survey/Questionnaire	30 minutes
To gain insights into the preferences, expectations, and desires of service providers.	Survey/Questionnaire	30 minutes

To ascertain the requisite records and attributes that should be incorporated in the database.	Analysis of Questionnaire	3 hours
To understand the current working environment, operational dynamics, and prevalent business constraints.	Group Discussion	5-6 hours
To discern the software and hardware requirements and constraints pivotal for system development.	Case Study/Interview	6-7 hours

3. List of Requirements:

- Develop advanced algorithms for intelligent matching, considering individual skills, needs, and specializations to ensure optimal assignment and enhanced service quality.
- Implement mechanisms for accurate and efficient service allocation based on service preferences, experience levels, and specific needs.
- Integrate robust security features and stringent measures to safeguard sensitive caregiver and client information, ensuring data security, privacy, and compliance with relevant regulations.
- Develop a user-friendly, intuitive interface and mobile app to accommodate the diverse user base, ensuring ease of use, accessibility, and catering to user preferences for managing tasks and receiving updates through mobile platforms.
- Incorporate detailed reporting features, analytical tools, and formal mechanisms for collecting and analyzing feedback from users, enabling continuous improvement, informed decision-making, and prioritization of feature development.
- Design a robust system for efficient scheduling and conflict resolution, providing real-time updates, instant notifications, and facilitating direct communication between clients and caregivers.
- Maintain exhaustive worker profiles and implement strategies for training and development to balance the distribution of expertise among employees, focusing on areas where expertise is lacking.
- Implement an automated service booking feature integrated with a digital calendar system to manage bookings and allocate service providers accurately.

- Establish policies for providing insurance and safety provisions to employees in high-risk service roles, identifying high-risk roles, and determining the level of coverage to be provided.

- Develop a system for digitizing agency records efficiently, specifying the types of records to be digitized first based on their operational impact.

- Monitor care quality and collect feedback for improvements, focusing on areas that yield the most impact on user satisfaction and efficiency.

- Provide transparent displays of caregivers' qualifications, experience, and background checks to instill trust and confidence among clients.

4. User categories and privileges:

4.1 User Cases:

01. User Name: Admin
    Descriptions of Role:
    - Configure and maintain the system.
    - Manage user accounts and access permissions.
    - Update service catalogs and provider information.
    - Monitor system usage and performance.
    - Address and resolve system issues.

02. User Name: Client
    Descriptions of Role:
    - Register and manage personal profiles.
    - Search and book home care services.
    - Review caregiver profiles and service information.
    - Communicate with caregivers and the agency.
    - Provide feedback on received services.

03. User Name: Caregiver
    Descriptions of Role:
    - Register and manage professional profiles.
    - Update availability and service information.
    - Accept and manage service bookings.
    - Communicate with clients and the agency.
    - Record service details and issues.

04. User Name: Customer Support Representative
    Descriptions of Role:
    - Address and resolve user issues and concerns.
    - Communicate with clients, caregivers, and the admin.
    - Monitor user interactions and service delivery.
    - Provide information and support to users.
    - Record and escalate unresolved issues.

05. User Name: System Analyst
Descriptions of Role:
- Monitor system performance and user interactions.
- Analyze system data and user feedback.
- Identify and recommend system improvements.
- Ensure system integrity and user satisfaction.
- Report system status and issues to the admin.

4.2 Pre-Post Conditions of User Cases:

1. Client Registration

Description:
Prospective clients provide personal and, if applicable, medical information to create an account.
Pre-Condition:
The system is set up, configured, and accessible to prospective clients.
Post-Condition:
The client is successfully registered, and their details are securely stored in the system.

2. Service Catalog Management

Description:
Admin adds, updates, or removes services from the service catalog, ensuring accurate and comprehensive service information is available to users.
Pre-Condition:
The admin is logged in with sufficient permissions.
Post-Condition:
The service catalog is updated with the most current and accurate information.

3. Caregiver Profile Management

Description:
Caregivers create and manage their professional profiles, including qualifications, services offered, availability, and contact information.
Pre-Condition:
The caregiver is registered and logged in.
Post-Condition:
The caregiver's profile is updated, and the system reflects the most current and accurate information.

4. Service Booking

Description:
Clients search for services and caregivers, make bookings specifying preferences, and receive booking confirmations.
Pre-Condition:
The client is registered, logged in, and has access to the service catalog and caregiver profiles.
Post-Condition:
The service booking is confirmed, and relevant details are sent to the client and the selected caregiver.

5. Service Delivery and Documentation

Description:
Caregivers provide the booked services and document service details, duration, and any issues encountered.
Pre-Condition:
A service booking is confirmed, and the caregiver has all necessary information and access.
Post-Condition:
The service is provided, documented, and marked as complete or incomplete in the system.

6. Issue Resolution

Description:
Customer Support Representatives address and resolve user issues, communicating with involved parties and updating the system with resolution details.
Pre-Condition:
A user has reported an issue, and the representative has access to relevant information.
Post-Condition:
The issue is resolved, documented, and the involved parties are informed of the resolution.

7. System Performance Analysis

Description:
The System Analyst monitors and analyzes system performance, user interactions, and feedback to recommend improvements and optimizations.
Pre-Condition:
The system is operational and generates accurate data and logs.
Post-Condition:
The system is continuously optimized based on analysis findings, ensuring optimal performance and user satisfaction.

8. Feedback Management

Description:
Clients provide feedback on received services, and the system stores and analyzes the feedback for quality improvement.
Pre-Condition:
A service is completed, and the client is logged in.
Post-Condition:
Client feedback is recorded, analyzed, and used for service quality improvement.

9. Communication Management

Description:
The system facilitates secure and efficient communication between clients, caregivers, customer support representatives, and the admin.
Pre-Condition:
Users are registered and logged in.
Post-Condition:
Communication is facilitated, recorded, and managed efficiently and securely within the system.

5. List of Assumptions:

- The home care services will primarily be offered within a specific geographic area or set of zip codes, and only residents of these areas can register and request services.
- Each service area or zip code will have an assigned set of caregivers available to provide services, and all service requests within a specific area will be routed to the available caregivers in that area.
- Some interactions between caregivers and clients, such as service delivery and payment collection, might occur offline, and the system will rely on users to update the status and details of such interactions.
- Clients will have the ability to upload a limited number of documents or reports per service request, with a restriction on the total size of the uploaded files.
- A machine learning algorithm may be implemented to assist in optimizing caregiver-client matching, with the understanding that its predictions will improve over time as more data is available, reaching an estimated accuracy of 50-60% after one year.
- In the future, advanced analytics and predictive models might be developed to forecast service demand and optimize resource allocation based on demographic data and service history.
- The system will record service requests with preferred date/time but won't perform detailed analysis to validate caregiver availability or detect scheduling conflicts. Detailed caregiver scheduling and availability management are considered beyond the scope of the current project.
- The system will facilitate online payments through integration with a payment gateway, but the specifics of the payment gateway integration are beyond the scope of the current project.
- It is assumed that clients will have varying preferences and service history, and the system will need to accommodate these variations in service assignments and scheduling.
- The system is assumed to be used by elderly and people with varying levels of technological proficiency. Thus, user interfaces need to be intuitive, and navigational complexity should be minimized.
- It is assumed that the system will need to comply with applicable data protection laws and best practices to ensure the privacy and security of user data.
- The system will be designed to accommodate a diverse and evolving catalog of services, with the flexibility to add, modify, or remove services as needed.

6. Business Constraints:

a) Secure user authentication is imperative, with role-based access controls ensuring users can only access relevant features and information.

b) Precise management of each service and its associated caregivers and clients is crucial to ensure accurate service assignments and efficient utilization of resources.

c) The system must adapt to the evolving service catalog and caregiver qualifications, allowing caregivers the flexibility to offer multiple services.

d) Every client must have a unique, secure, and easily manageable profile within the system, containing all necessary information and service history.

e) The system must manage up to 20,000 service requests and bookings per day efficiently, preventing any conflicts and optimizing caregiver schedules.

f) Compliance with applicable laws and regulations, such as GDPR or HIPAA, is mandatory, ensuring legal adherence in data protection and user privacy.

Noun & Verb Analysis

Nouns: -	Verbs: -
Home care industry	Seek
Caregivers	Prefer
People	Receive
Daily activities	Maintain
Comfort	Turn
Homes	Acknowledges
Service	Want
Individuals	Rely
Elderly	Encounter
Disabilities	Feel
Illness	Expect
Caregiver	Seek
Assistance	Provide
Bathing	Appreciate
Cooking	Ensure
Medication reminders	Handle
Companionship	Appreciate
Management system	Value
Tool	Appreciate
Clients	Appreciate
Expectations	Value
Compassionate care	Appreciate
Physical needs	Appreciate
Emotional support	Look
Reliability	Require
Safety	Expect
Trustworthiness	Rely
Medications	Support
Medical equipment	Expect
Personalization	Educate
Dietary restrictions	Want
Cultural preferences	Take
Care routines	Provide
Effective communication	Manage
Concerns	Deliver
Questions	Offer
Changes	Encourage
Health	Support
Condition	Educate

Responsiveness	Respect
Requests	Encourage

Independence	Face
Expertise	Rely
Medical procedures	Result
Chronic conditions	Need
Rehabilitative care	Disrupt
Dignity	Need
Privacy	Explain
Flexibility	Cause
Circumstances	Experience
Empowerment	Decline
Involvement	Feel
Education	Neglected
Problems	Match
Inadequate Caregiver Match	Connect
Satisfaction	Convey
Well-being	Provide
Care quality	Ask
Care consistency	Address
Client-caregiver relationship	Automate
Misunderstandings	Enhance
Privacy concerns	Streamline
Scheduling	Communicate
Daily routine	Monitor
Anxiety	Protect
Punctuality	Safeguard
Caregiver burnout	Scale
Decline in care quality	Integrate
Neglect	Generate
Home care services	Simplify
High turnover rates	Manage
Client dissatisfaction	Configure
Skilled caregivers	Have access
Recruitment	Provide
Retention	Optimize
Complex regulations	Ensure
Compliance	Integrate
Scheduling complexities	Exchange
Data security	Navigate
Data breaches	Keeping up

Quality assurance	Ensuring
Training	Comply
Performance evaluations	Adhere

Feedback mechanisms	Operates
Insurance coverage	Meets
Liability issues	Protecting
Cost management	Enforces
Technology investments	Safeguards
Digital systems	Scale
Integration	Handle
Healthcare systems	Maintain
Healthcare providers	Ensure
Hospitals	Managing
Primary care physicians	Balancing
Reputational consequences	Implementing
Scalability	Maintaining
Workflow efficiency	Empower
Client information	Answer
Future needs	Keep
Privacy regulations	Expect
Data breach	Encourage
Legal consequences	Support
Financial consequences	Convey
Reputational consequences	Ask
	Respond
	Manage
	Configure
	Provide
	Optimize
	Ensure
	Recognizes
	Commitment
	Revolutionize
	Optimizing
	Enhancing
	Ensuring
	Anticipates

Table.0. All Extracted Nouns & Verbs from Problem Description

Noun:-	**Reason :-**
Client:	Represents individuals who require home care services.
Caregiver	Represents professionals providing care services.
Service	Describes the type of care services offered.
Schedule	Records scheduling information for caregiver-client assignments.
Messages	Represents communication between clients and caregivers.
Administrator	Represents system administrators overseeing the database
Agency	Represents the home care agency itself.

Table.1. Candidate Entity Set

Verbs :-	**Reasons :-**
Receive (Client):	Clients receive services from caregivers, making this verb crucial for defining the relationship between clients and caregivers.
Provide (Caregiver, Service):	Caregivers provide services to clients, and services are provided by caregivers. This verb captures the core of the relationship between caregivers and the services they offer.
Manage (Caregiver, Service):	Caregivers manage services, which implies a significant role in organizing and delivering care. This verb defines the responsibilities of caregivers in relation to the services they provide.
Deliver (Caregiver, Service):	Caregivers deliver services to clients, and services are delivered by caregivers. This verb establishes the essential action of delivering care.
Schedule (Client, Administrator, Agency):	Scheduling is a key activity involving clients, administrators (those managing the agency), and the agency itself. Clients schedule care services, administrators schedule caregivers, and agencies manage scheduling.

Communicate (Client, Caregiver, Service):	Communication is essential among clients, caregivers, and services. Clients communicate their needs, caregivers communicate with clients, and services
	communicate information to clients and caregivers.
Coordinate (Administrator, Agency):	Coordination is a fundamental task carried out by administrators within the agency to manage caregivers and clients efficiently. It ensures proper allocation and delivery of care services.
Manage (Administrator, Agency):	Administrators manage the agency, making decisions related to staffing, services, and client assignments.
Engage (Client, Caregiver, Service):	Engagement reflects active involvement, which is crucial for the relationship among clients, caregivers, and the services provided. Clients engage with caregivers and services to receive the care they need.
Administer (Administrator):	Administrators administer the agency's operations, which involves decision- making and oversight, playing a pivotal role in the relationship between the agency and its clients.

Noun	Likely Entity Set to be Assigned
Requirements	Management System
Preferences	Home Care Worker, Client
Skills	Home Care Worker
Quality	Services, Management System
Technologies	Management System
Concerns	Feedback Mechanisms, Home Care Worker, Client
Platform	Management System, Database
Tasks	Functions, Home Care Worker
Updates	Management System, Database, Services
Descriptions	Services, Product's Perspective
Purpose	Management System, Services
Objectives	Management System, Services
Descriptions	Management System, Services
Phase	Transformation, Requirements
Narrative	Management System, Services

Noun	Likely Entity Set to be Assigned
Refinement	Requirements, Services
Audience	Product's Perspective, Management System
State	Transformation, Management System
Consideration	Services, Requirements
Dependencies	Management System, Requirements
Problems	Feedback Mechanisms, Home Care Worker, Client
Depth	Analysis, Consideration
Understanding	Analysis, Consideration
Demographic	Client, Home Care Worker
Experience	Home Care Worker, Client
Duration	Services, Tasks
Specialization	Home Care Worker, Services
Communication Channels	Client, Home Care Worker, Administrative Staff
Training	Home Care Worker, Client
Certifications	Home Care Worker, Services
Billing Details	Client
Payment Information	Client
Shifts	Home Care Worker, Administrative Staff
Schedules	Home Care Worker, Client
Feedback	Client, Home Care Worker, Services
Instructions	Services, Home Care Worker
Care Plans	Client, Services
Safety Provisions	Home Care Worker, Agency
Insurance	Home Care Worker, Client
Records	Database, Agency
Activities	Home Care Worker, Client
Engagement	Client, Home Care Worker
Decisions	Agency, Administrative Staff
Concerns	Client, Home Care Worker

Table.2. Candidate Attributes Set

Noun	Reason for Non-Inclusion
Home care industry	While important, it's a broader concept rather than an entity for relationship definition.
People	General term, not a specific entity.
Daily activities	Abstract concept, not a tangible entity.
Comfort	Abstract concept, not a tangible entity.

Homes	While they are important, they are not entities in the context of an ER diagram.
Individuals	Too general, lacks specificity.
Elderly	May be represented through the "Clients" entity.
Disabilities	Specific cases may be addressed through "Clients" or "Services."
Illness	May be represented through "Clients" or "Services."
Medication reminders	An action or task, not an entity.
Management system	Not a core entity in the context of the Home Care Agency ER diagram.

Tool	Too general and non-specific to the context of the Home Care Agency ER diagram.
Expectations	An abstract concept, not an entity.
Compassionate care	A concept or quality of care, not an entity.
Physical needs	Can be represented through "Clients" or "Services."
Emotional support	Can be represented through "Clients" or "Services."
Trustworthiness	Qualitative attribute, not an entity.
Medications	Can be included as a component within the "Services" entity.
Medical equipment	Can be included as a component within the "Services" entity.
Personalization	Can be included as a feature of "Services" or "Communication."
Dietary restrictions	Can be included as a component within the "Services" entity.
Cultural preferences	Can be included as a component within the "Services" entity.
Care routines	Can be included as a component within the "Services" entity.
Effective communication	Can be included as a feature of "Communication."
Concerns	An abstract concept, not an entity.
Questions	An abstract concept, not an entity.
Changes	An abstract concept, not an entity.
Health	Can be represented through "Clients" or "Services."
Condition	An abstract concept, not an entity.
Responsiveness	Can be included as a feature of "Communication."

Requests	Can be included as a feature of "Communication."
Independence	Can be represented through "Clients."
Expertise	Can be included as a quality of "Caregivers."
Medical procedures	Can be included as a task performed by "Caregivers."
Chronic conditions	Can be included as a condition managed by "Caregivers."
Rehabilitative care	Can be included as a type of "Service" provided by "Caregivers."
Dignity	An abstract concept, not an entity.
Privacy	An abstract concept, not an entity.
Flexibility	An abstract concept, not an entity.
Circumstances	An abstract concept, not an entity.
Empowerment	An abstract concept, not an entity.
Involvement	An abstract concept, not an entity.
Education	An abstract concept, not an entity.
Problems	An abstract concept, not an entity.
Inadequate Caregiver Match	A specific issue, not a core entity for relationship definition.
Satisfaction	An abstract concept, not an entity.
Well-being	Can be represented through "Clients" or "Services."
Care quality	Can be represented through "Services."
Care consistency	Can be represented through "Services."
Client-caregiver relationship	A relationship itself, not a core entity.

Misunderstandings	A specific issue, not a core entity for relationship definition.
Privacy concerns	An abstract concept, not an entity.
Scheduling	Can be represented as a function of "Services" or "Communication."
Daily routine	Can be represented through "Clients" or "Services."
Anxiety	An abstract concept, not an entity.
Punctuality	A specific behaviour, not an entity.
Caregiver burnout	A specific issue, not a core entity for relationship definition.
Decline in care quality	A specific issue, not a core entity for relationship definition.
Neglect	A specific issue, not a core entity for relationship definition.
Home care services	Can be represented through "Services."
High turnover rates	A specific issue, not a core entity for relationship

	definition.
Client dissatisfaction	A specific issue, not a core entity for relationship definition.
Skilled caregivers	Qualitative attribute, not an entity.
Recruitment	A process, not an entity.
Retention	A process, not an entity.
Complex regulations	An abstract concept, not an entity.
Compliance	A concept related to processes, not an entity.
Scheduling complexities	A specific issue, not an entity.
Data security	A concept related to technology and processes, not an entity.
Data breaches	A specific issue, not an entity.
Quality assurance	A concept related to processes, not an entity.
Training	A process, not an entity.
Performance evaluations	A process, not an entity.
Feedback mechanisms	A process, not an entity.
Insurance coverage	An abstract concept, not an entity.
Liability issues	An abstract concept, not an entity.
Cost management	A process, not an entity.
Technology investments	An abstract concept, not an entity.
Digital systems	A concept related to technology, not an entity.
Integration	A concept related to technology, not an entity.
Healthcare systems	An abstract concept, not an entity.
Healthcare providers	An abstract concept, not an entity.
Hospitals	An abstract concept, not an entity.
Primary care physicians	An abstract concept, not an entity.
Reputational consequences	An abstract concept, not an entity.
Scalability	An abstract concept, not an entity.
Workflow efficiency	An abstract concept, not an entity.
Client information	Can be represented through "Clients."
Future needs	An abstract concept, not an entity.
Privacy regulations	An abstract concept, not an entity.

Data breach	A specific issue, not an entity.
Legal consequences	An abstract concept, not an entity.
Financial consequences	An abstract concept, not an entity.
Reputational consequences	An abstract concept, not an entity.

Table.3. Rejected Noun List

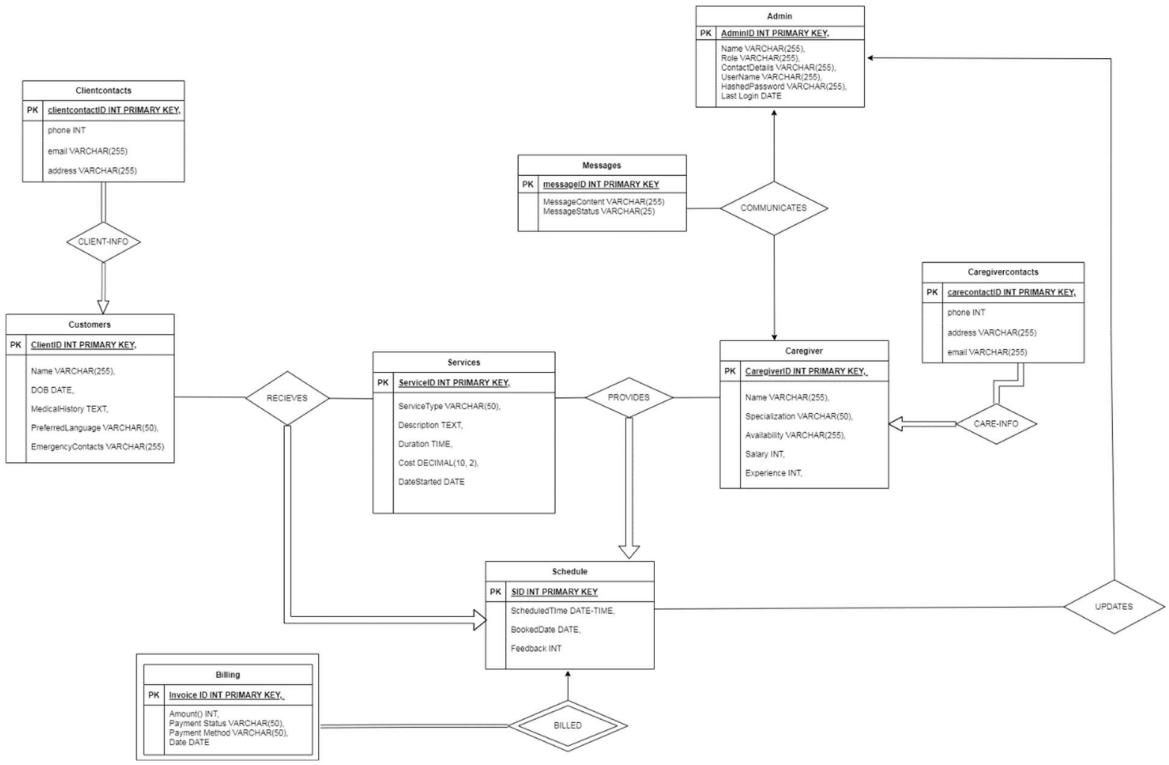
Final Entity Set

Client	ClientID INT PRIMARY KEY, Name VARCHAR(255), DateOfBirth DATE, MedicalHistory VARCHAR(255), PreferredLanguage VARCHAR(50), EmergencyContacts VARCHAR(100)
Caregiver	CaregiverID INT PRIMARY KEY, AgencyID INT (Foreign Key), Name VARCHAR(255), Specialization VARCHAR(50), Availability VARCHAR(255), Salary INT, Experience INT,
Service	ServiceID INT PRIMARY KEY, ServiceType VARCHAR(50), Description TEXT, Duration INT, Cost DECIMAL(10, 2),
Schedule	ScheduleID INT PRIMARY KEY, ClientID INT (Foreign key) CaregiverID INT (Foreign Key) ServiceID INT (Foreign key), DateAndTime DATETIME, Status VARCHAR(20)
Messages	MessageID INT PRIMARY KEY, Sender INT (Foreign key to Client, Caregiver, or Administrator), Receiver INT (Foreign key to Client, Caregiver, or Administrator), DateAndTime DATETIME, MessageContent TEXT, MessageStatus VARCHAR(20)
Administrator	AdministratorID INT PRIMARY KEY, Name VARCHAR(255), ContactInformation VARCHAR(255), Role VARCHAR(50), Responsibilities TEXT, Credentials VARCHAR(100), LoginInformation VARCHAR(255)

Billing	Invoice ID INT PRIMARY KEY, Client ID INT (Foreign key to Client), Amount INT, Payment Status VARCHAR (255), Payment Method VARCHAR (30), Date DATETIME

Agency	AgencyID INT PRIMARY KEY, Name VARCHAR(255), ContactInformation VARCHAR(255), Branches VARCHAR(255), Address VARCHAR(255), ServicesOffered TEXT, BillingInformation TEXT
CaregiverContacs	CaregivercontactID INT PRIMARY KEY, Phone INT, Address VARCHAR(255), Email VARCHAR(255)
ClientContacts	clientcontactID INT PRIMARY KEY, Phone INT, Address VARCHAR(255), Email VARCHAR(255)

ERD:



1. Mapping E-R Model to Relational Model:

Client(ClientID, Namse, DOB, MedicalHistory, PreferredLanguage, EmergencyContacts)

ClientContacts(clientcontactID, phone, email, address, ClientID FK)

ClientContacts(clientcontactID, phone, email, address, ClientID FK)

Services(ServiceID, ServiceType, Description, Duration, Cost, DateStarted)

Caregivers(CaregiverID, Name, Specialization, Availability, Salary, Experience)

CaregiverContacts(caregivercontactID, phone, address, email, CaregiverID FK)

Messages(messageID, MessageContent, MessageStatus, ClientID FK, CaregiverID FK, AdminID FK)

Admin(AdminID, Name, Role, ContactDetails, Username, HashedPassword, LastLogin)

Schedule(SID, ClientID FK, ServiceID FK, CaregiverID FK, ScheduledTime, BookedDate)

Billing(InvoiceID, SID FK, Amount, PaymentStatus, PaymentMethod, Date)

2. Schema Refinement Process:

1. First Normal Form (1NF)

Initial Design Considerations:

- Ensure that each table has a primary key that uniquely identifies its rows.
- Eliminate repeating groups or arrays. Ensure that each field contains only atomic values (no lists or sets).

Example Steps to Achieve 1NF:

If a client table has a field for Phones that stores multiple phone numbers, split this into separate records or a separate table.

2. Second Normal Form (2NF)

Prerequisites:
The table is already in 1NF.

Initial Design Considerations:

- Remove partial dependencies, where some non-key attributes depend only on part of a composite primary key.

Example Steps to Achieve 2NF:

If a Schedule table has a composite key (ClientID, ServiceID) and non-key attributes like ClientName and ServiceDescription that depend only on ClientID or ServiceID, respectively, move these to separate Clients or Services tables.

3. **Third Normal Form (3NF)**

Prerequisites:
The table is already in 2NF.

Initial Design Considerations:

- Remove transitive dependencies, where non-key attributes depend on other non-key attributes.

Example Steps to Achieve 3NF:

If a Billing table includes ClientAddress, which is dependent on ClientID (which in turn is a foreign key from Clients), remove ClientAddress from Billing and ensure it's only in Clients.

4. **Boyce-Codd Normal Form (BCNF)**

Prerequisites:
The table is already in 3NF.

Initial Design Considerations:

- Remove any remaining anomalies caused by functional dependencies. Every determinant must be a candidate key.

Example Steps to Achieve BCNF:

If a Caregivers table has a CaregiverID and LicenseNumber, where both uniquely identify a caregiver, but LicenseNumber determines CaregiverName, then separate into two tables: one with LicenseNumber and CaregiverName, and another linking LicenseNumber with CaregiverID and other attributes.

3. Normalized Schema:

Client(ClientID, Name, DOB, MedicalHistory, PreferredLanguage, EmergencyContacts)

ClientContacts(clientcontactID, phone, email, address, ClientID FK)

ClientContacts(clientcontactID, phone, email, address, ClientID FK)

Services(ServiceID, ServiceType, Description, Duration, Cost, DateStarted)

Caregivers(CaregiverID, Name, Specialization, Availability, Salary, Experience)

CaregiverContacts(caregivercontactID, phone, address, email, CaregiverID FK)

Messages(messageID, MessageContent, MessageStatus, ClientID FK, CaregiverID FK, AdminID FK)

Admin(AdminID, Name, Role, ContactDetails, Username, HashedPassword, LastLogin)

Schedule(SID, ClientID FK, ServiceID FK, CaregiverID FK, ScheduledTime, BookedDate)

Billing(InvoiceID, SID FK, Amount, PaymentStatus, PaymentMethod, Date)

1. Write DDL Scripts.

```
-- Customers table

CREATE TABLE Client (

    ClientID INT PRIMARY KEY,

    Name VARCHAR(255),

    DOB DATE,

    MedicalHistory TEXT,

    PreferredLanguage VARCHAR(50),

    EmergencyContacts VARCHAR(255)
```

```
);

-- ClientContacts table

CREATE TABLE ClientContacts (

    clientcontactID INT PRIMARY KEY,

    phone VARCHAR(255),

    email VARCHAR(255),

    address VARCHAR(255),

    ClientID INT REFERENCES Client(ClientID)

);

-- Services table

CREATE TABLE Services (

    ServiceID INT PRIMARY KEY,

    ServiceType VARCHAR(50),

    Description VARCHAR(255),

    Duration VARCHAR(40),

    Cost DECIMAL(10, 2),

    DateStarted DATE
```

```
);

-- Caregivers table

CREATE TABLE Caregivers (

    CaregiverID INT PRIMARY KEY,

    Name VARCHAR(255),

    Availablity VARCHAR(255),

    Salary VARCHAR(10),

    Experience INT

);

-- CaregiverContacts table

CREATE TABLE CaregiverContacts (

    caregivercontactID INT PRIMARY KEY,

    phone VARCHAR(30),

    address VARCHAR(255),

    email VARCHAR(255),

    CaregiverID INT REFERENCES Caregivers(CaregiverID)

);
```

```
-- Admin table

CREATE TABLE Admin (

    AdminID INT PRIMARY KEY,

    Name VARCHAR(255),

    Role VARCHAR(255),

    ContactDetails VARCHAR(255),

    Username VARCHAR(255),

    HashedPassword VARCHAR(255),

    LastLogin DATE

);

-- Messages table

CREATE TABLE Messages (

    messageID INT PRIMARY KEY,

    MessageContent VARCHAR(200),

    MessageStatus VARCHAR(50),

    ClientID INT REFERENCES Client(ClientID),

    CaregiverID INT REFERENCES Caregivers(CaregiverID),
```

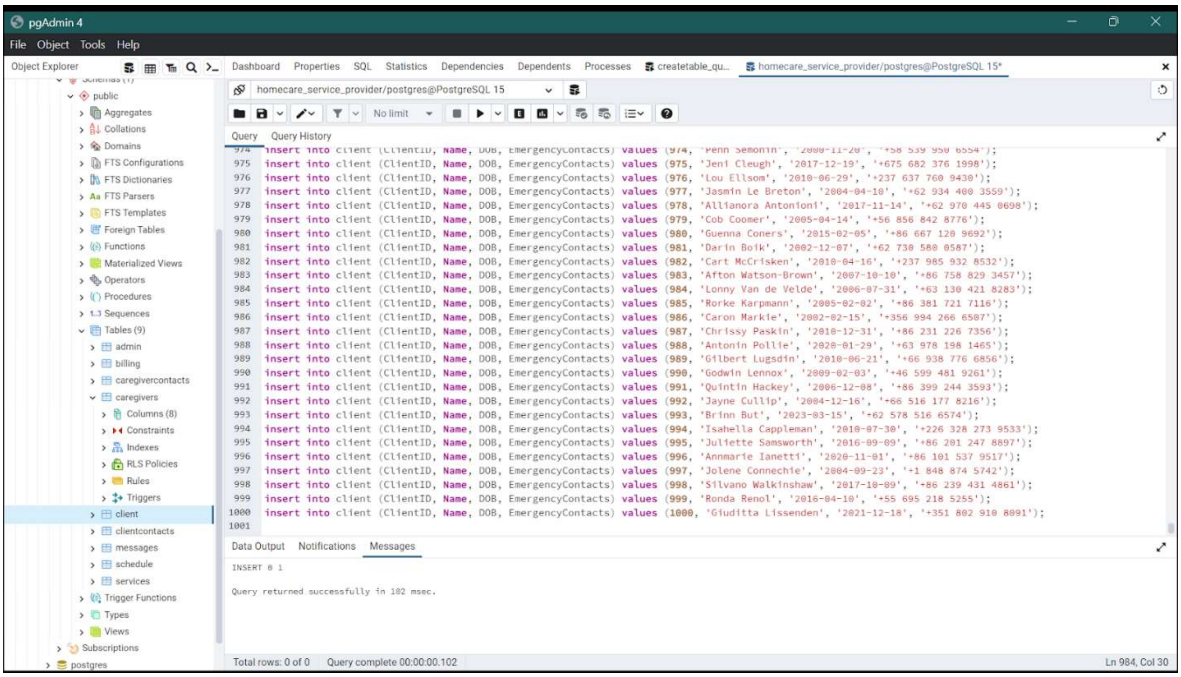
```
    AdminID INT REFERENCES Admin (AdminID)
);
-- Schedule table
CREATE TABLE Schedule (
    SID INT PRIMARY KEY,
    ClientID INT REFERENCES Client(ClientID),
    ServiceID INT REFERENCES Services(ServiceID),
    CaregiverID INT REFERENCES Caregivers(CaregiverID),
    ScheduledTime VARCHAR(20),
    BookedDate VARCHAR(25)
);
-- Billing table
CREATE TABLE Billing (
    InvoiceID INT PRIMARY KEY,
    SID INT REFERENCES Schedule(SID),
    Amount DECIMAL(10, 2),
    PaymentStatus VARCHAR(50),
```

PaymentMethod VARCHAR(50),

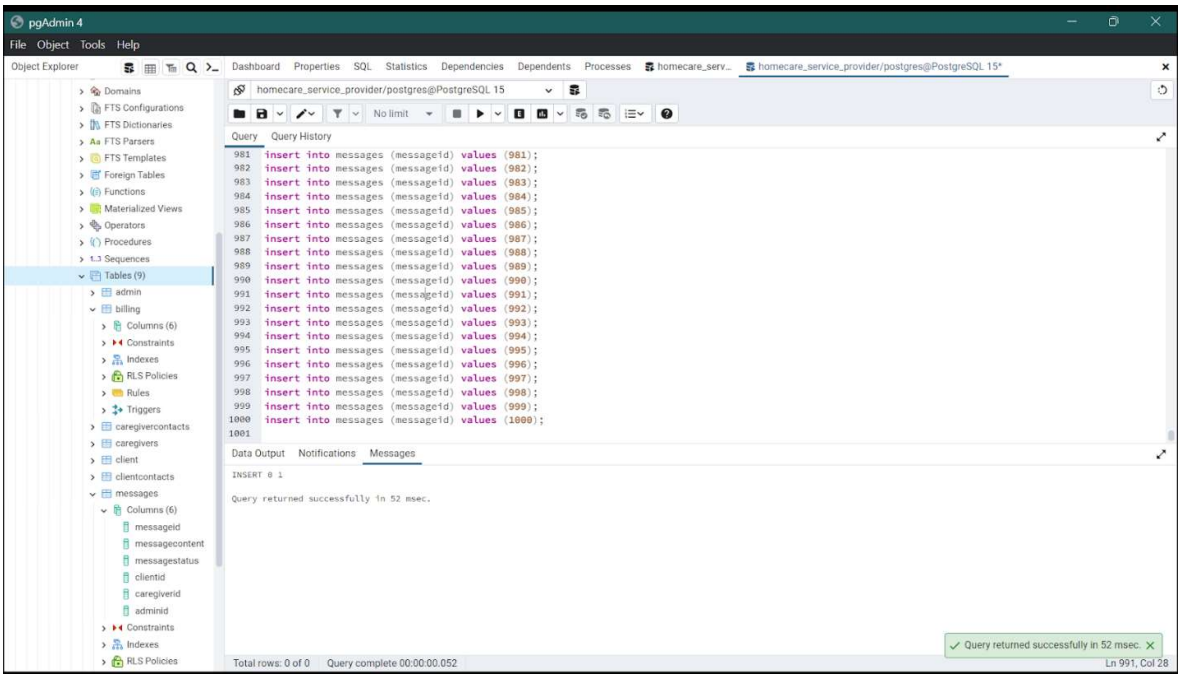
Date VARCHAR(20));

Populating the Tables:

Client Table:



Message Table:


pgAdmin 4
File Object Tools Help
Object Explorer
Dashboard Properties SQL Statistics Dependencies Dependents Processes homecare_serv... homecare_service_provider/postgres@PostgreSQL 15*
homecare_service_provider/postgres@PostgreSQL 15
No limit
Query Query History
981 insert into messages (messageid) values (981);
982 insert into messages (messageid) values (982);
983 insert into messages (messageid) values (983);
984 insert into messages (messageid) values (984);
985 insert into messages (messageid) values (985);
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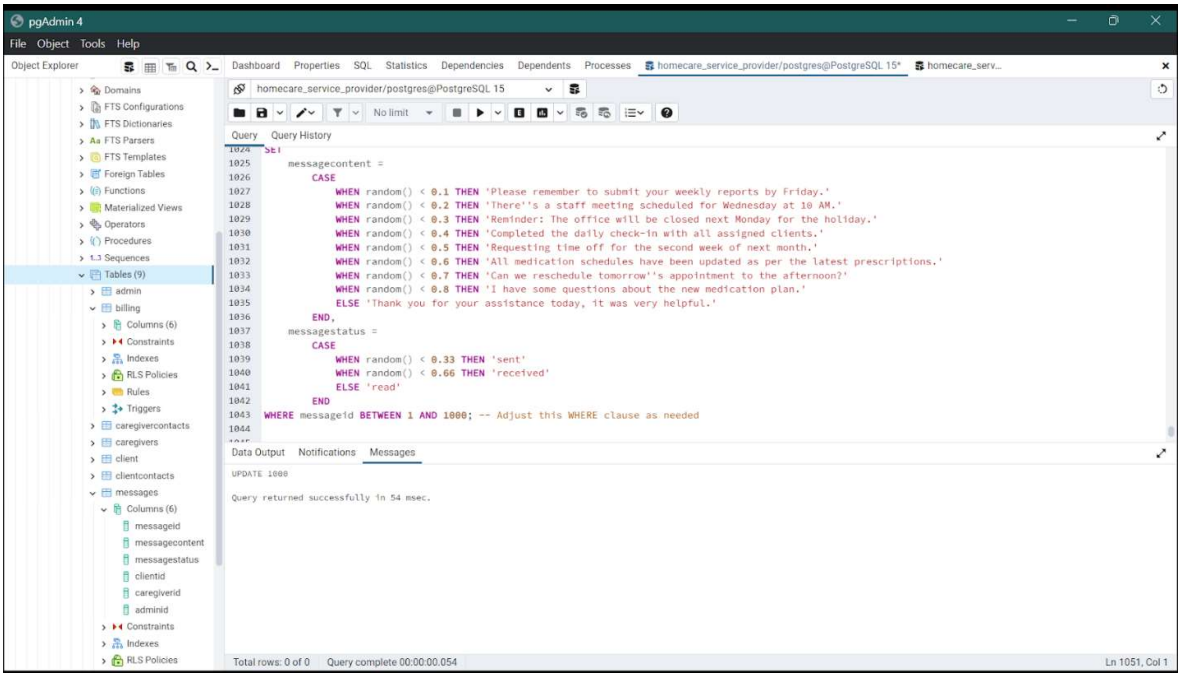
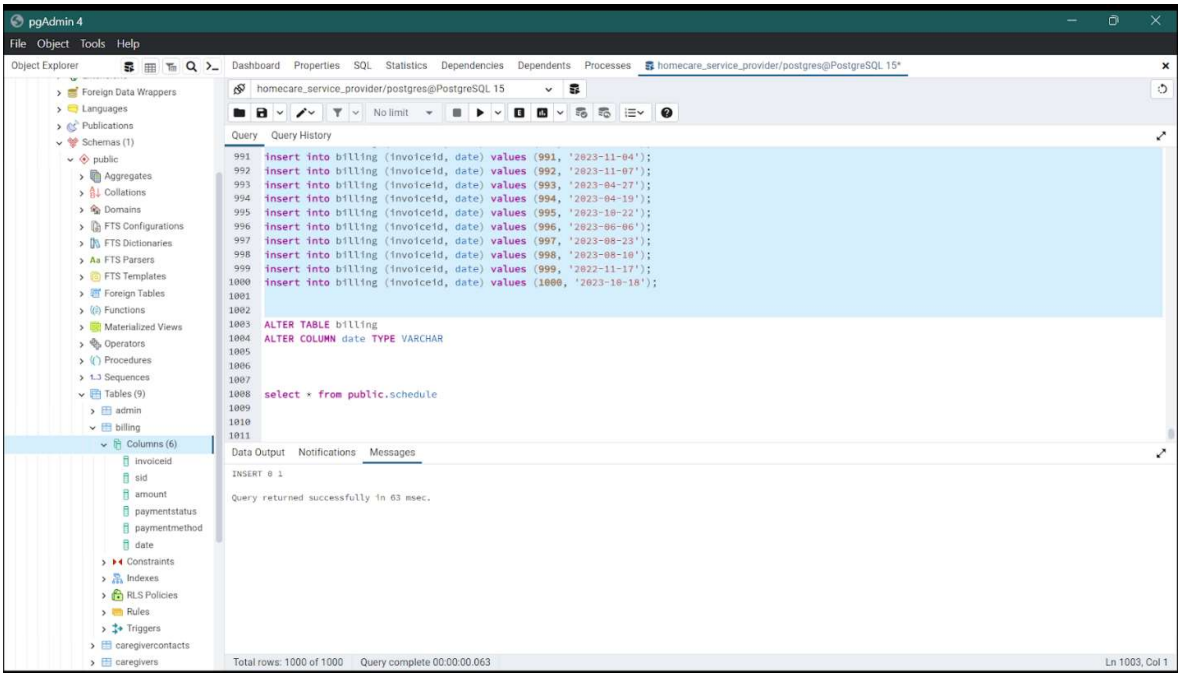
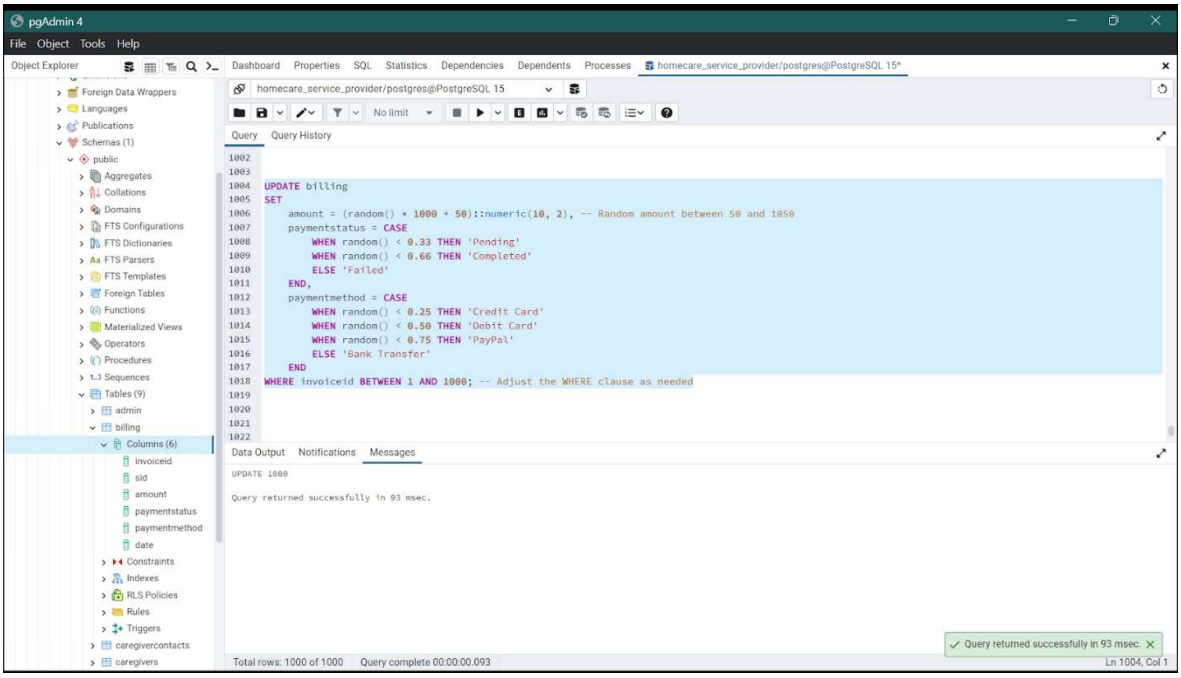
996 insert into messages (messageid) values (996);
997 insert into messages (messageid) values (997);
998 insert into messages (messageid) values (998);
999 insert into messages (messageid) values (999);
1000 insert into messages (messageid) values (1000);
1001
Data Output Notifications Messages
INSERT 0 1
Query returned successfully in 52 msec.
Query returned successfully in 52 msec.
Total rows: 0 of 0 Query complete 00:00:00.052
Ln 991, Col 28

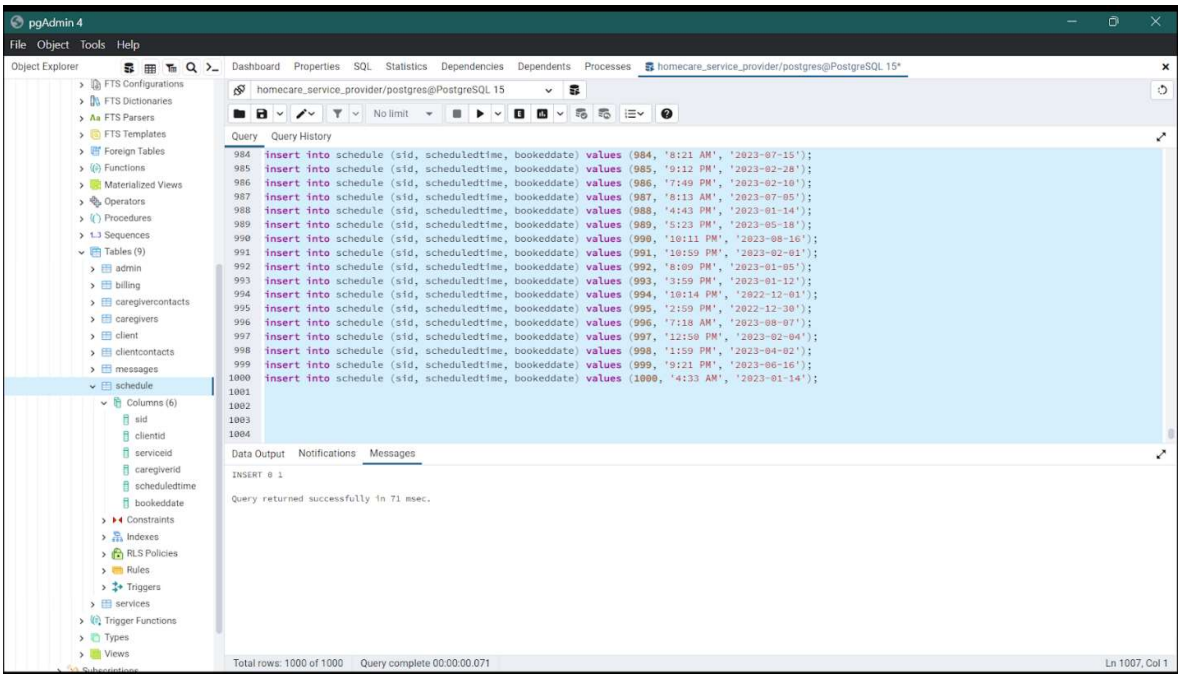

pgAdmin 4
File Object Tools Help
Object Explorer
Dashboard Properties SQL Statistics Dependencies Dependents Processes homecare_service_provider/postgres@PostgreSQL 15* homecare_serv...
homecare_service_provider/postgres@PostgreSQL 15
No limit
Query Query History
1024 SET
1025 messagecontent =
1026 CASE
1027 WHEN random() < 0.1 THEN 'Please remember to submit your weekly reports by Friday.'
1028 WHEN random() < 0.2 THEN 'There''s a staff meeting scheduled for Wednesday at 10 AM.'
1029 WHEN random() < 0.3 THEN 'Reminder: The office will be closed next Monday for the holiday.'
1030 WHEN random() < 0.4 THEN 'Completed the daily check-in with all assigned clients.'
1031 WHEN random() < 0.5 THEN 'Requesting time off for the second week of next month.'
1032 WHEN random() < 0.6 THEN 'All medication schedules have been updated as per the latest prescriptions.'
1033 WHEN random() < 0.7 THEN 'Can we reschedule tomorrow''s appointment to the afternoon?'
1034 WHEN random() < 0.8 THEN 'I have some questions about the new medication plan.'
1035 ELSE 'Thank you for your assistance today, it was very helpful.'
1036 END,
1037 messagestatus =
1038 CASE
1039 WHEN random() < 0.33 THEN 'sent'
1040 WHEN random() < 0.66 THEN 'received'
1041 ELSE 'read'
1042 END
1043 WHERE messageid BETWEEN 1 AND 1000; -- Adjust this WHERE clause as needed
1044
Data Output Notifications Messages
UPDATE 1000
Query returned successfully in 54 msec.
Total rows: 0 of 0 Query complete 00:00:00.054
Ln 1051, Col 1

Billing Table:

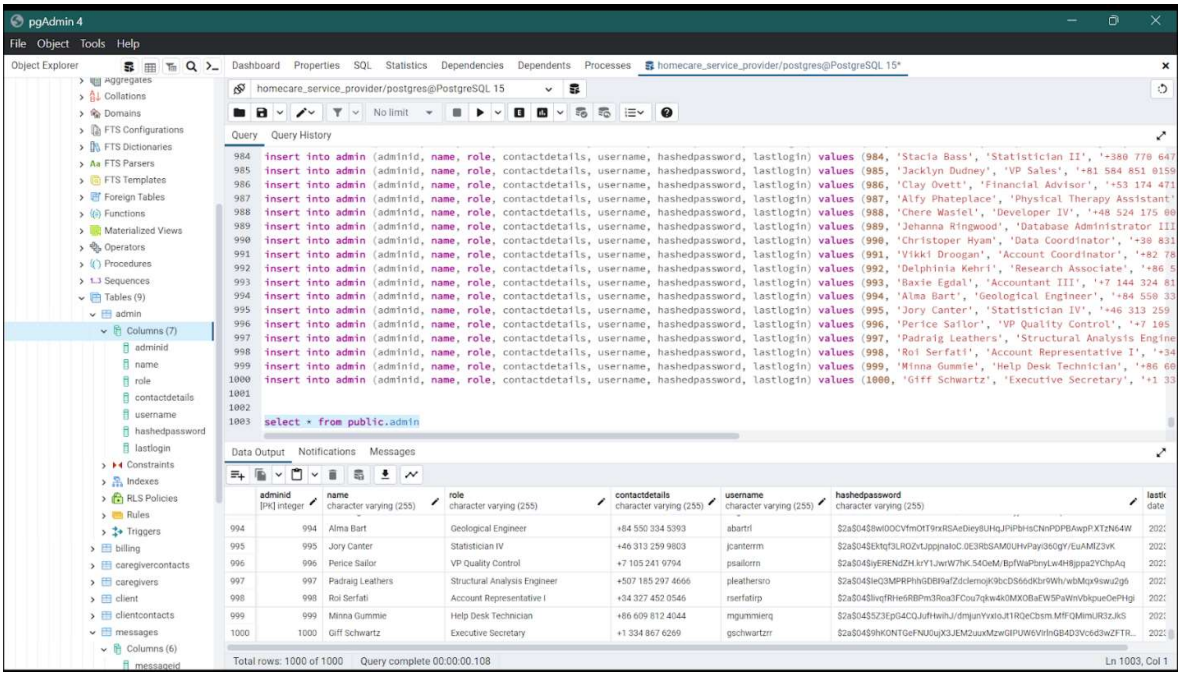




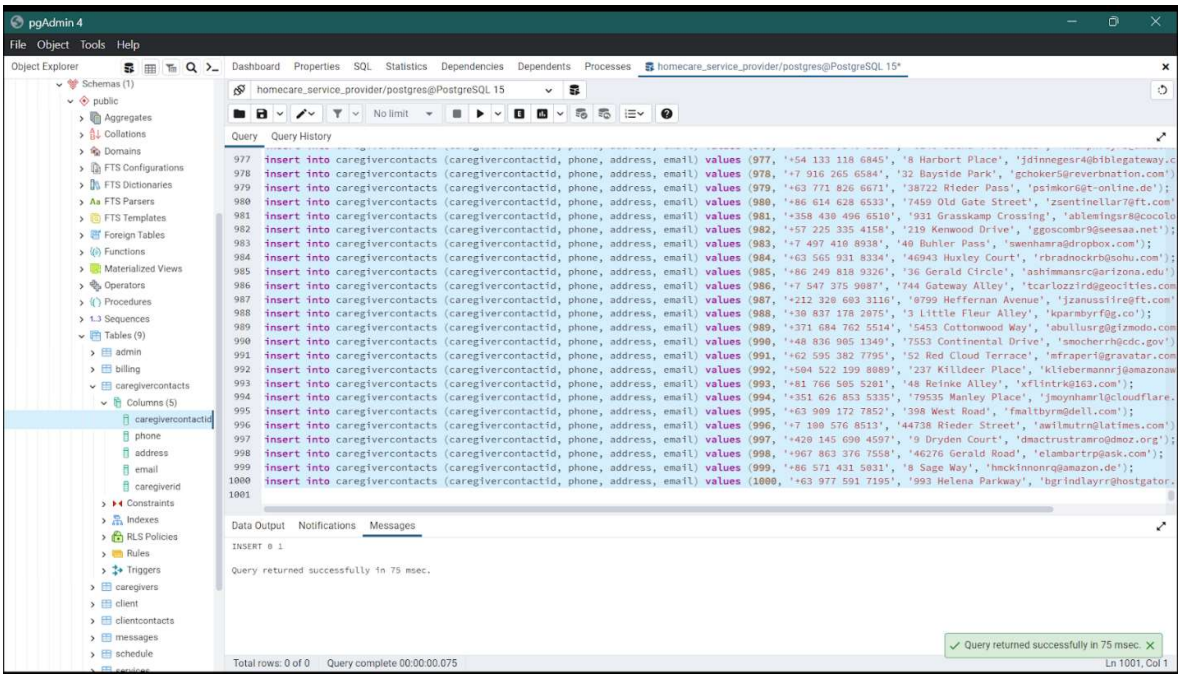
Schedule Table:



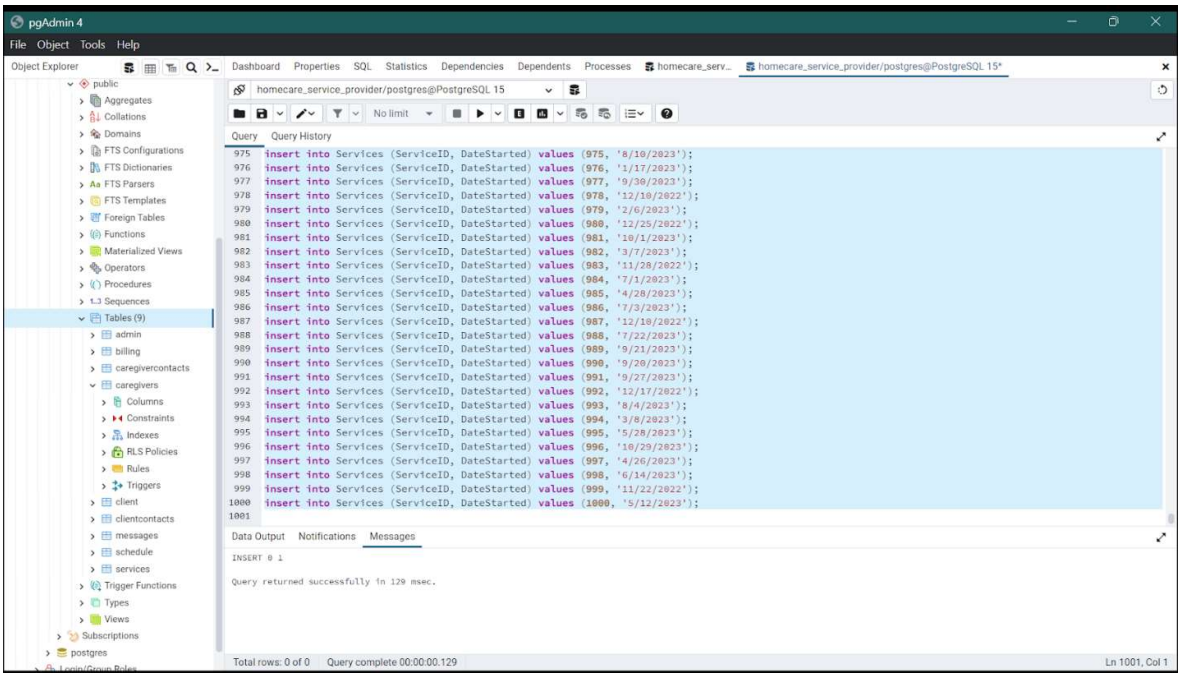
Admin Table:

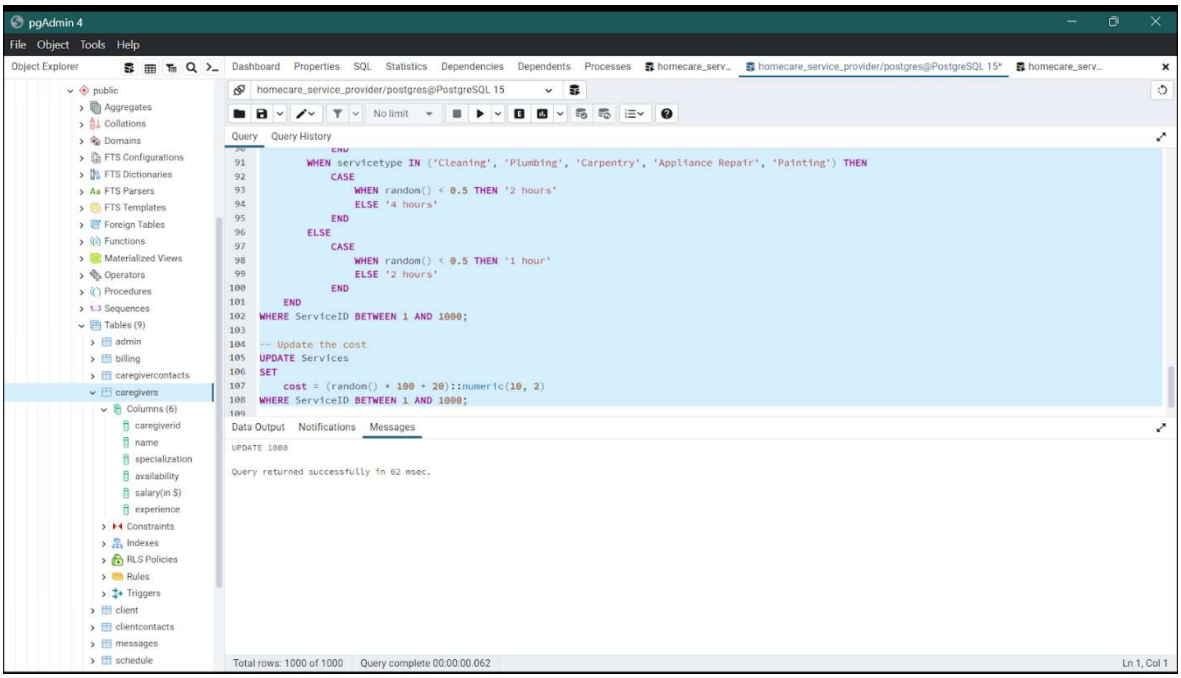


Caregivercontacts Table:

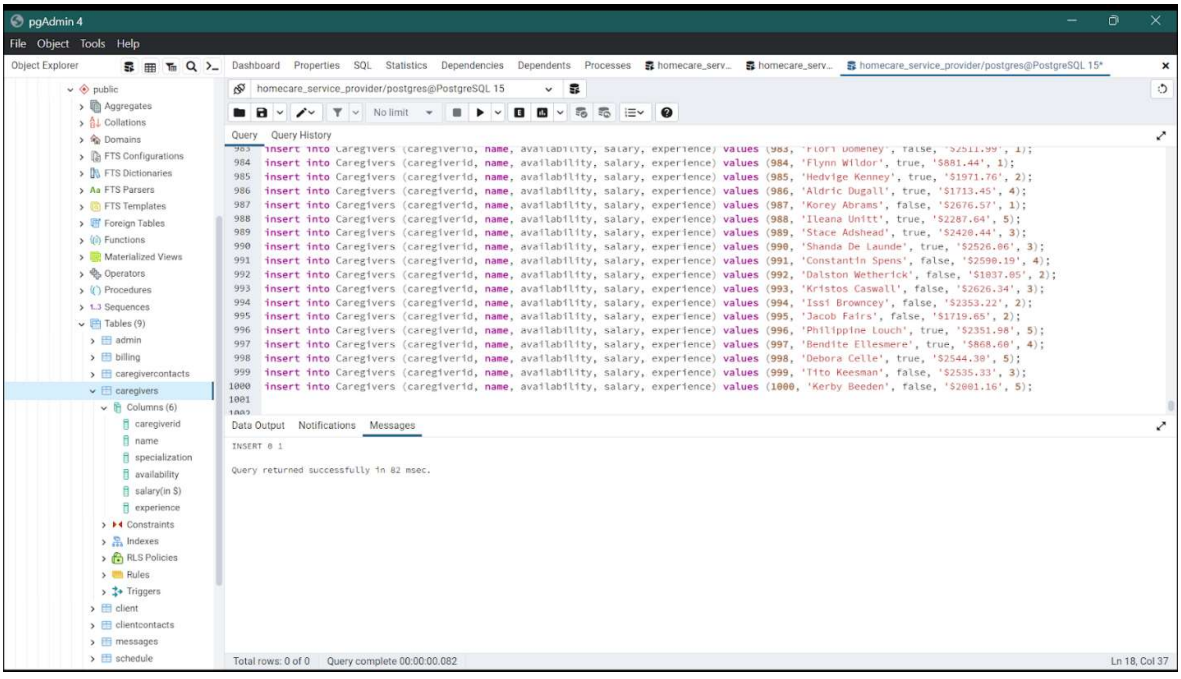


Services Table:

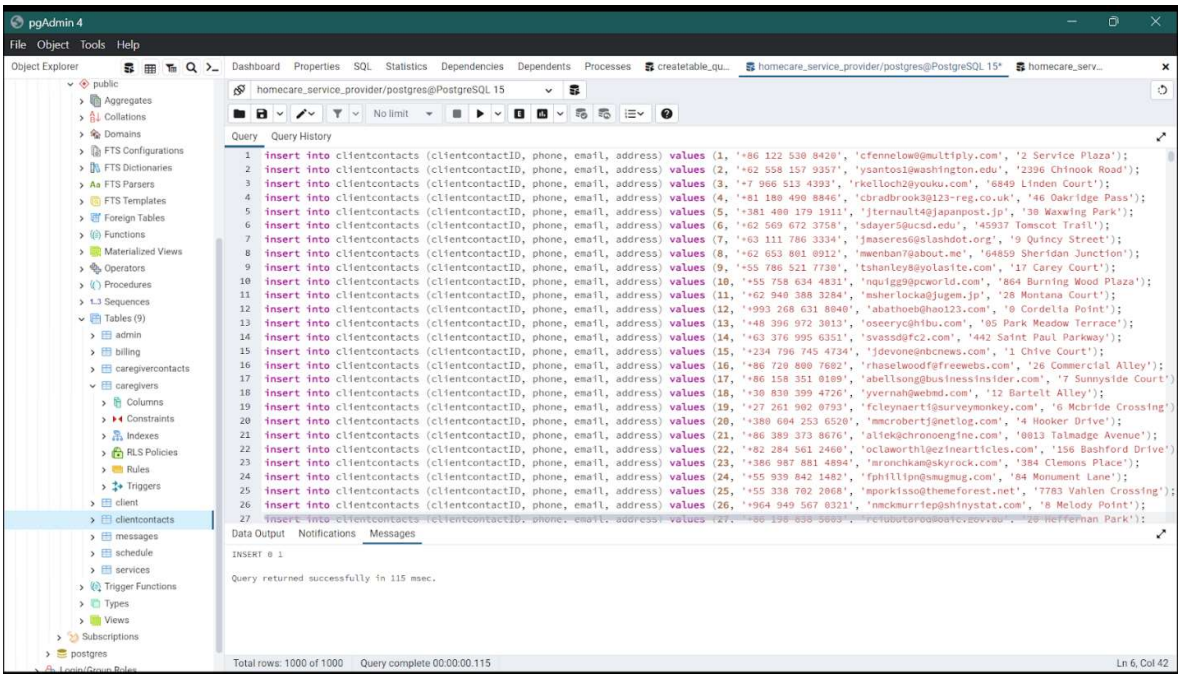




Caregiver Table:

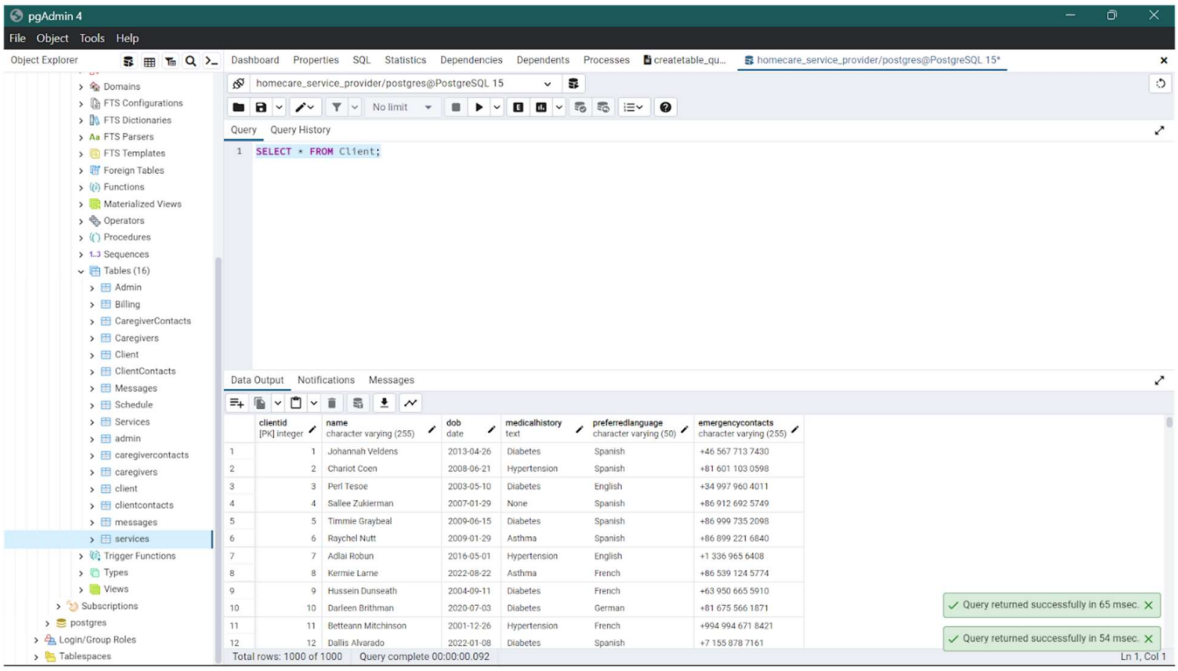


Clientcontacts Table:



2. SQL Queries

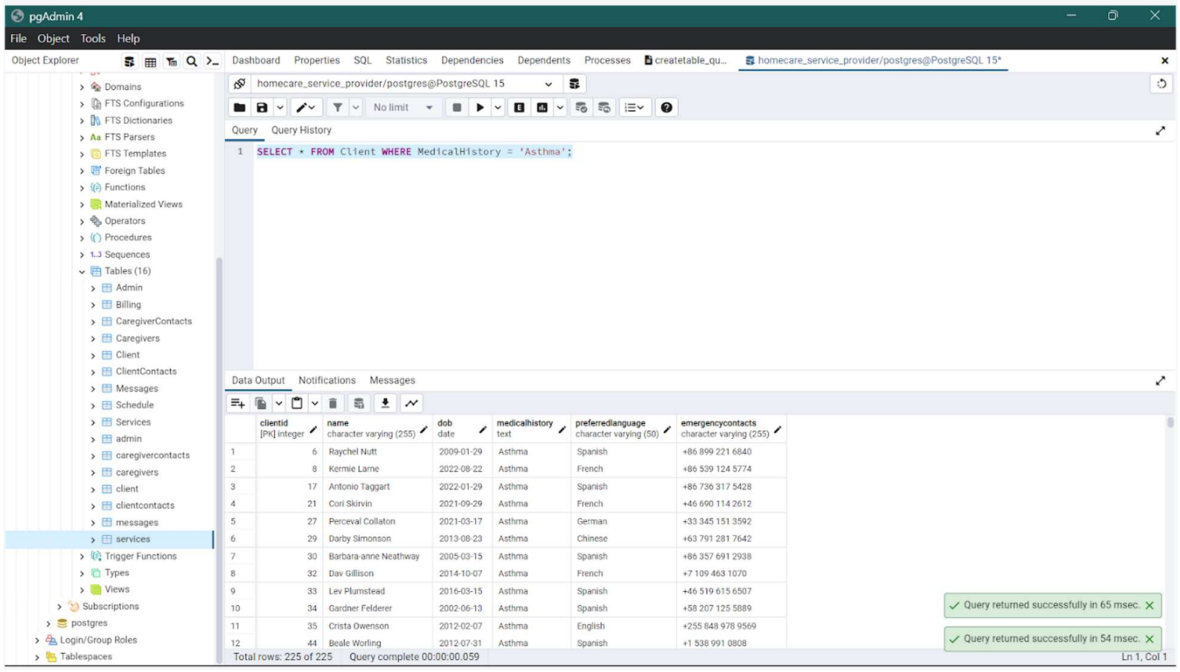
1. Simple Select: Retrieve all records from the Customers table.



SELECT * FROM Customers;

1. Filtering: Retrieve customers who have 'Asthma' in their medical history.

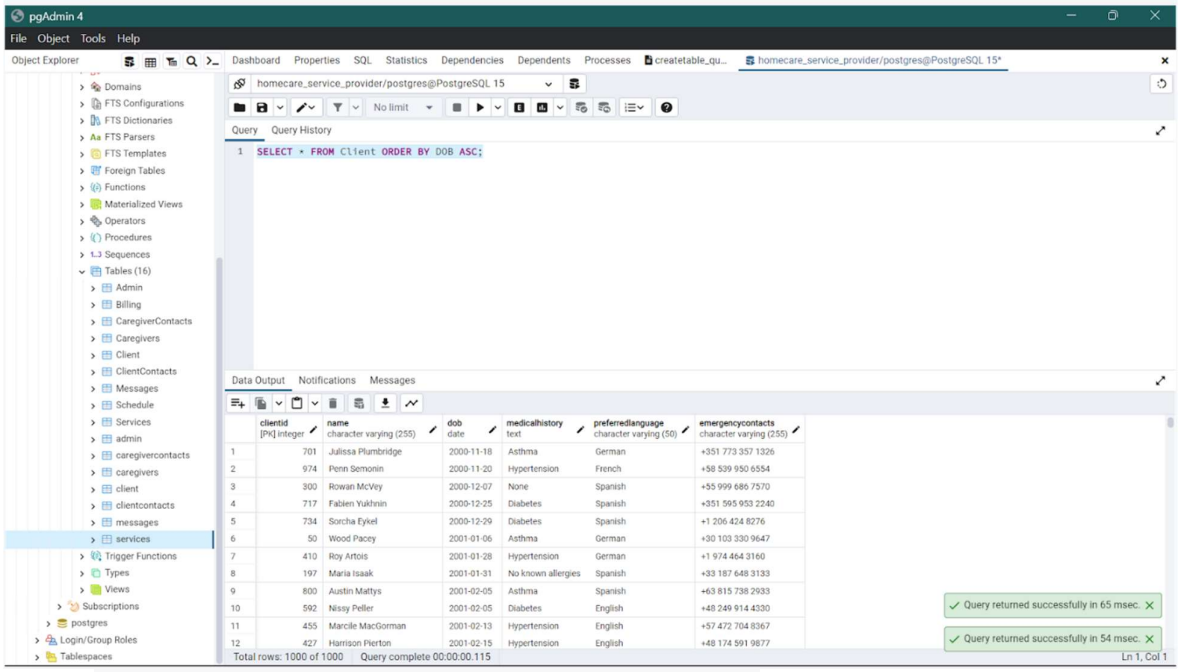
Ans :-



SELECT * FROM Customers WHERE MedicalHistory = 'Asthma';

2. Sorting: Retrieve customers sorted by their date of birth in ascending order.

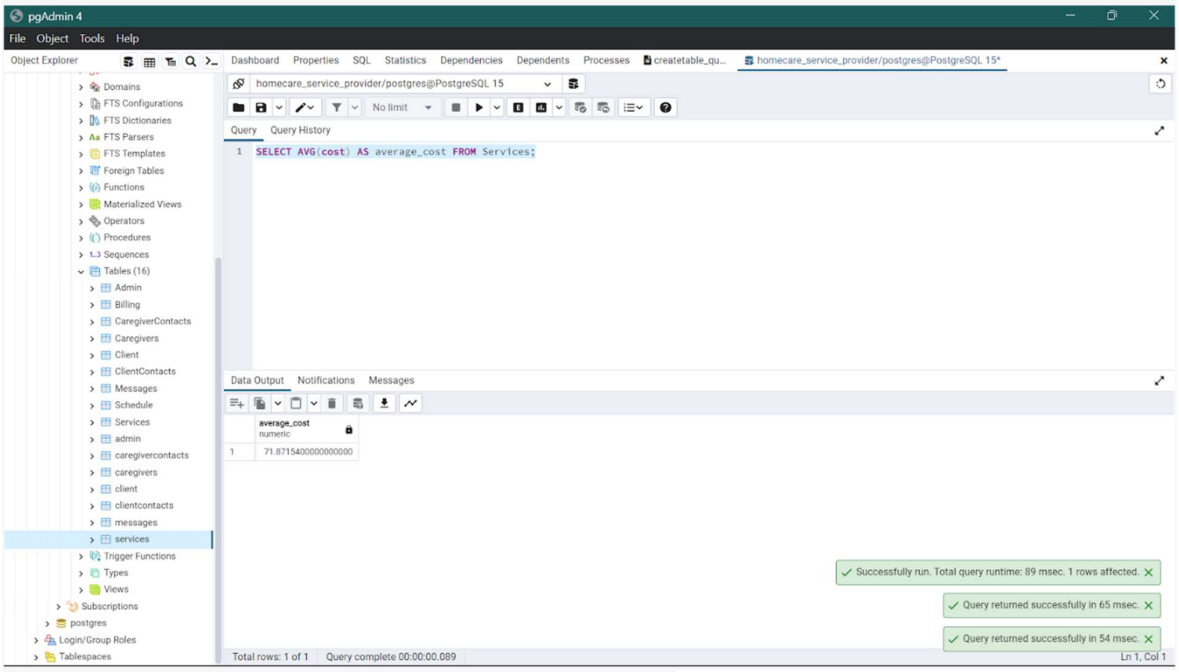
ANS :-



SELECT * FROM Customers ORDER BY DOB ASC;

3. Aggregation: Calculate the average cost of services from the Services table

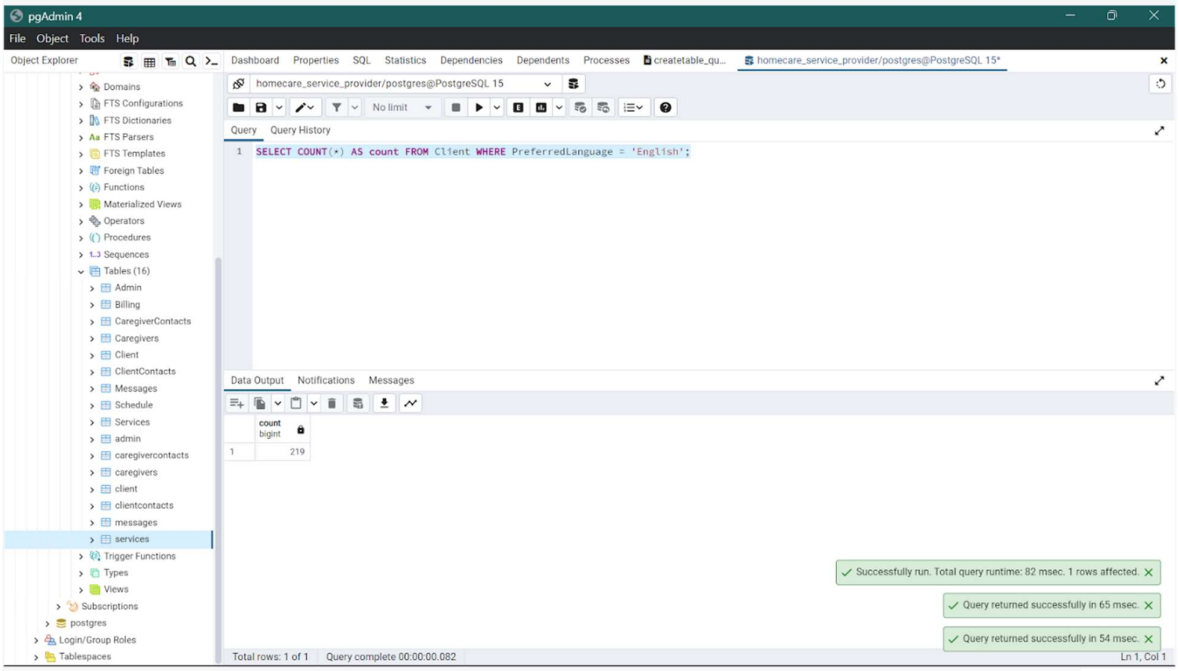
ANS:-



SELECT AVG(cost) AS average_cost FROM Services;

4. Counting: Count the number of customers who prefer 'French' as their language.

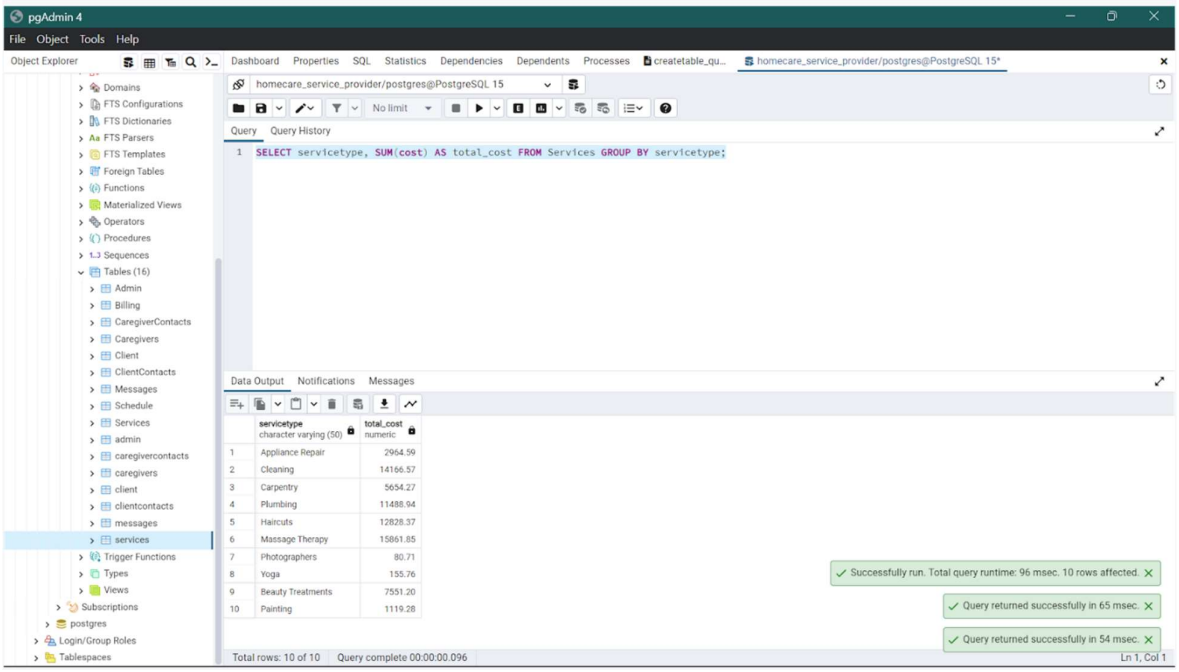
ANS:-



SELECT COUNT(*) AS count FROM Customers WHERE PreferredLanguage = 'Hindi';

5. Grouping: Group services by service type and calculate the total cost for each type.

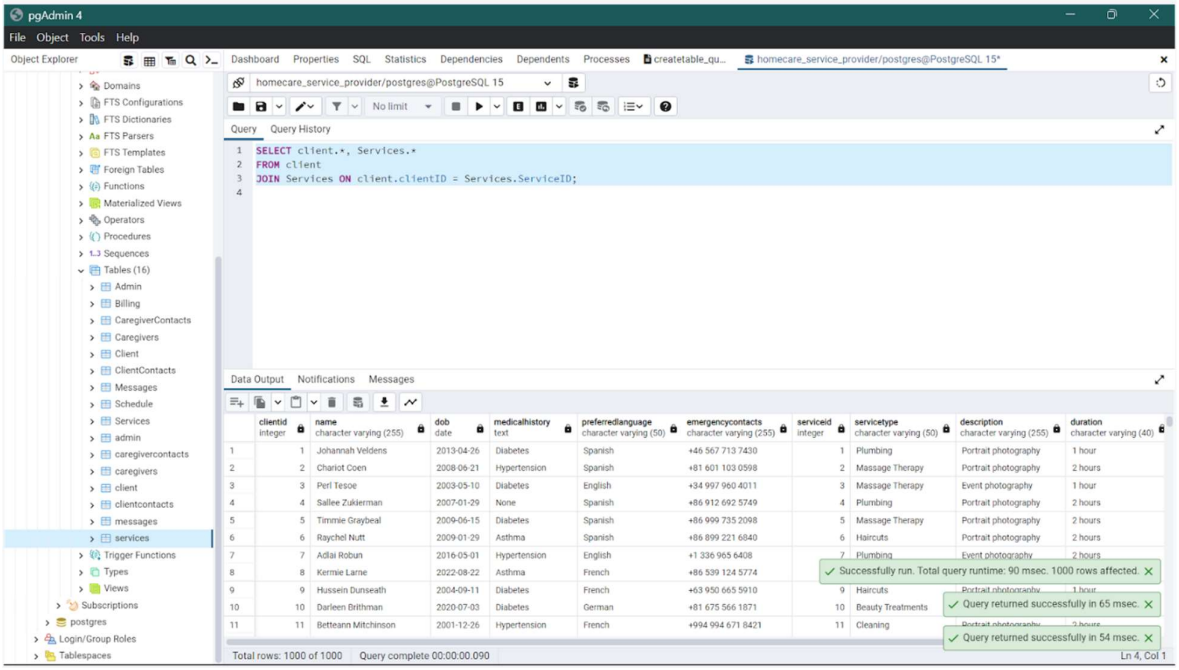
ANS :-



SELECT servicetype, SUM(cost) AS total_cost FROM Services GROUP BY servicetype;

6. Join: Retrieve a list of customers along with the services they have used.

ANS :-

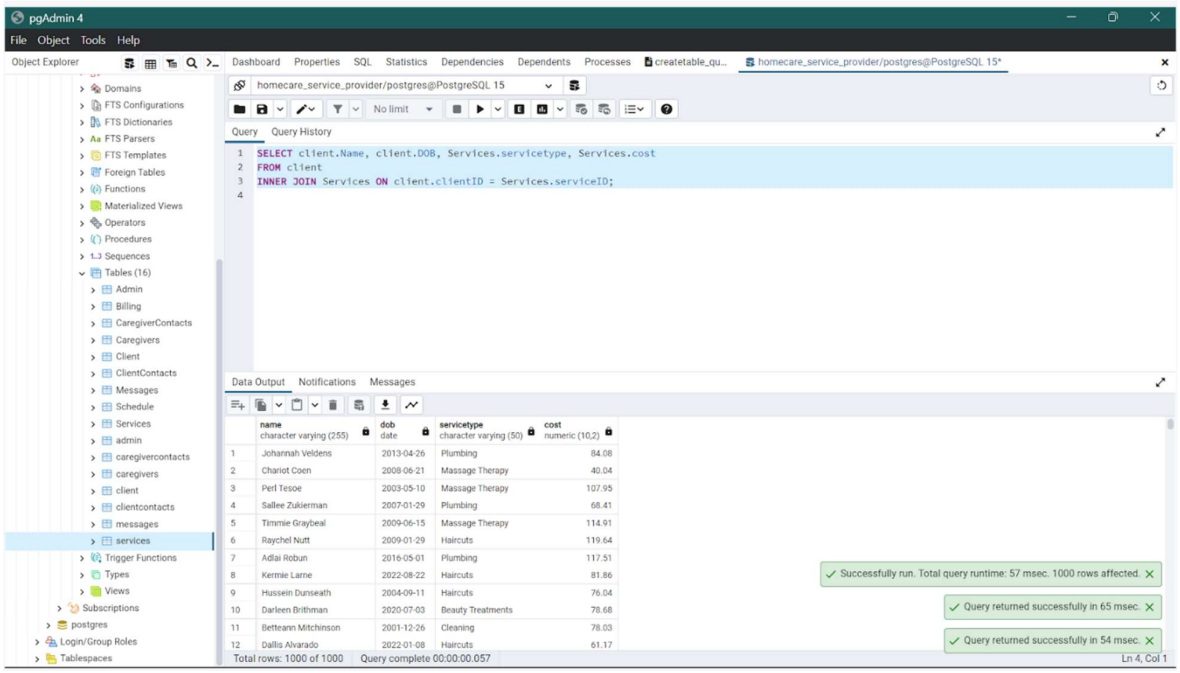


SELECT Customers.*, Services.*
FROM Customers

JOIN Services ON Customers.CustomerID = Services.CustomerID;

7. Inner Join: Retrieve customers who have used services and display their details along with the service details.

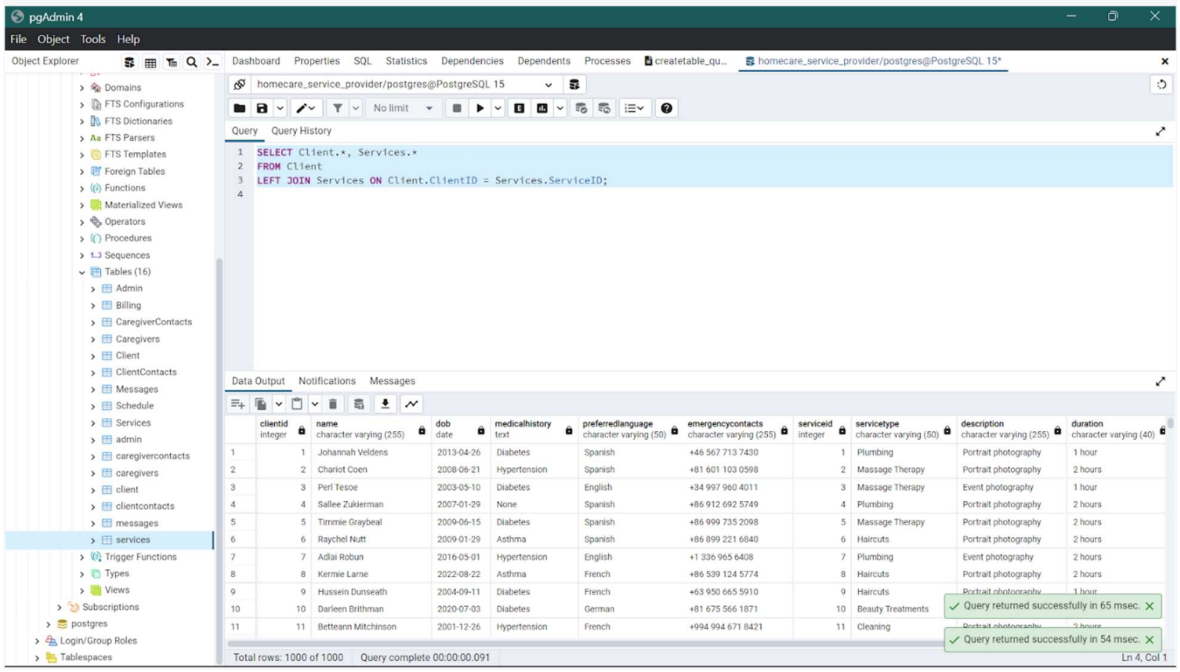
ANS :-



SELECT Customers.Name, Customers.DOB, Services.servicetype, Services.cost
FROM Customers
INNER JOIN Services ON Customers.CustomerID = Services.CustomerID;

8. Left Join: Retrieve all customers and their services, including those who haven't used any services.

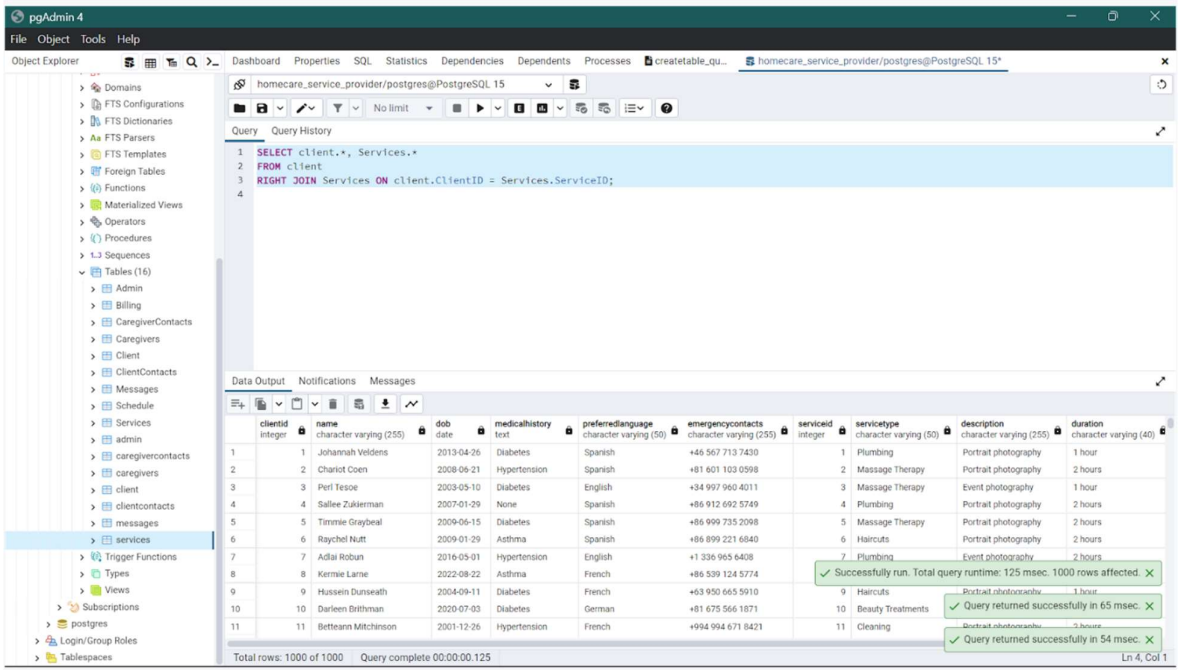
ANS :-




```
SELECT Client.*, Services.*
FROM Client
LEFT JOIN Services ON Client.ClientID = Services.CustomerID;
```

9. Right Join: Retrieve all services and the customers who have used them, including services without customers.

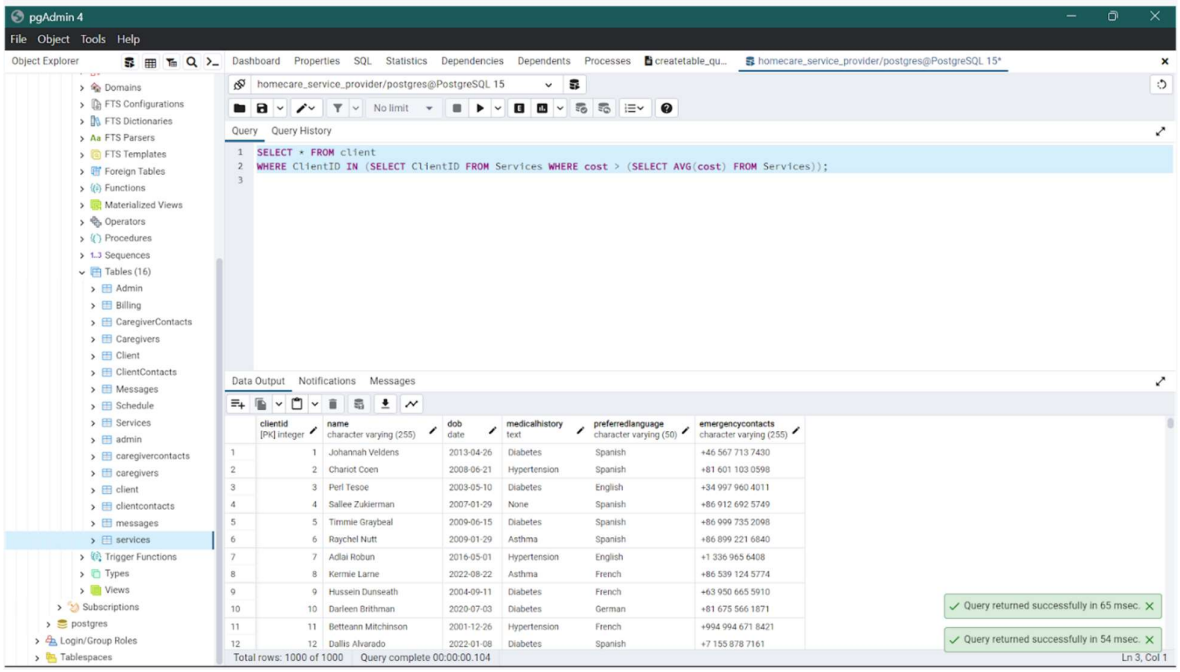
ANS :-




```
SELECT Customers.*, Services.*
FROM Customers
RIGHT JOIN Services ON Customers.CustomerID = Services.CustomerID;
```

10. Subquery: Find customers who have used services with a cost greater than the average cost.

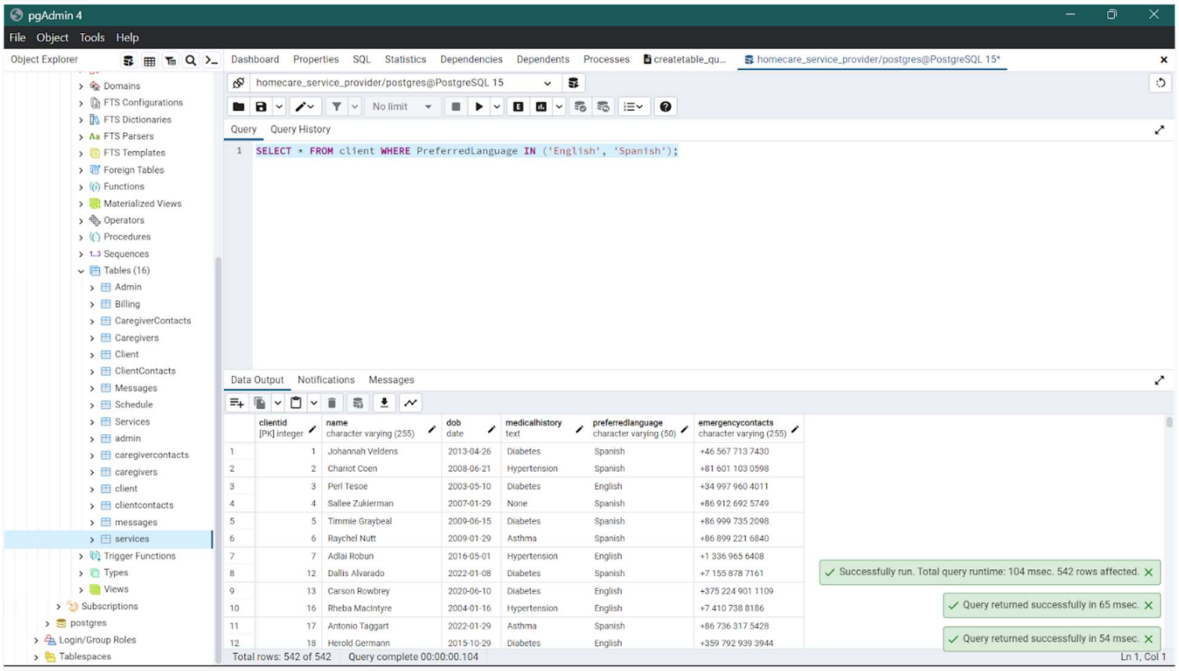
ANS :-




```
SELECT * FROM Customers
WHERE CustomerID IN (SELECT CustomerID FROM Services WHERE cost > (SELECT
AVG(cost) FROM Services));
```

11. IN Operator: Retrieve customers who prefer either 'English' or 'Hindi'.

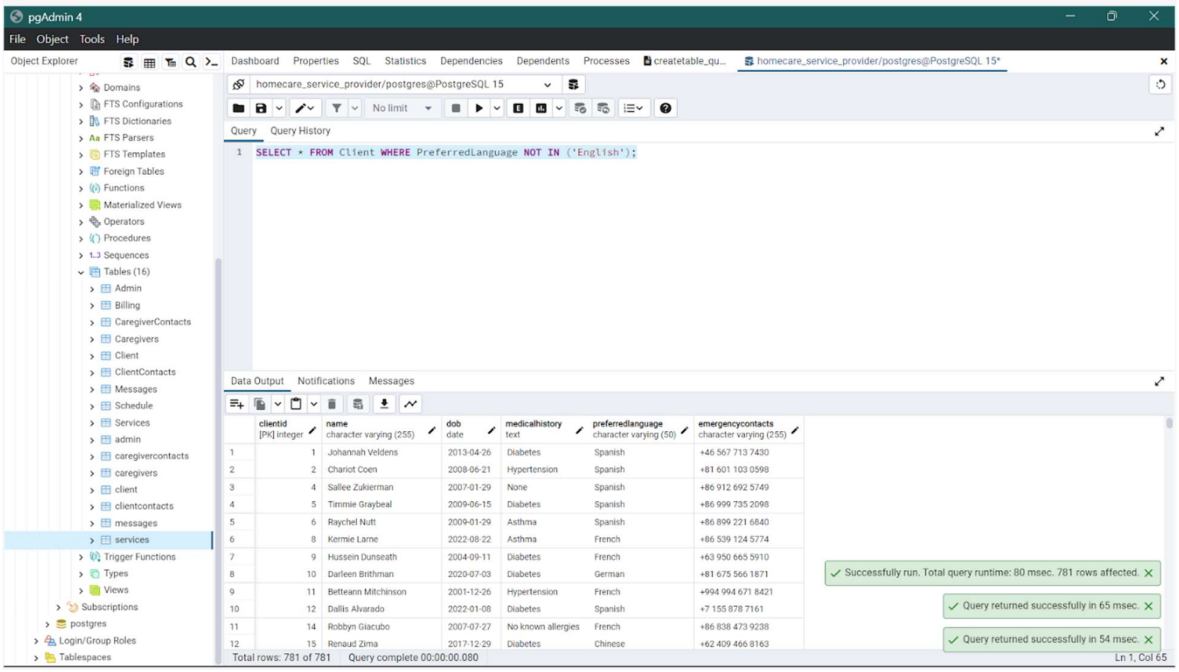
ANS :-



SELECT * FROM Client WHERE PreferredLanguage IN ('English', ‘Spanish’);

12. NOT IN Operator: Retrieve customers who don't prefer 'English’' as their language.

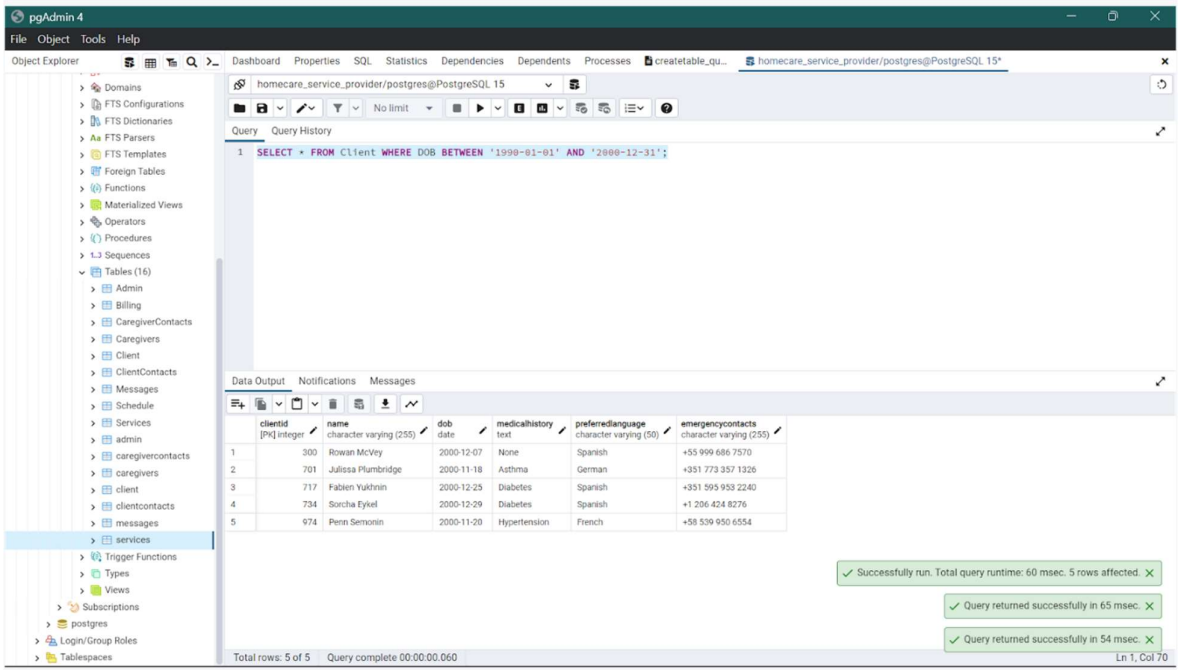
ANS :-



SELECT * FROM Customers WHERE PreferredLanguage NOT IN ('English');

13. Between Operator: Find customers born between '1990-01-01' and '2000-12-31'.

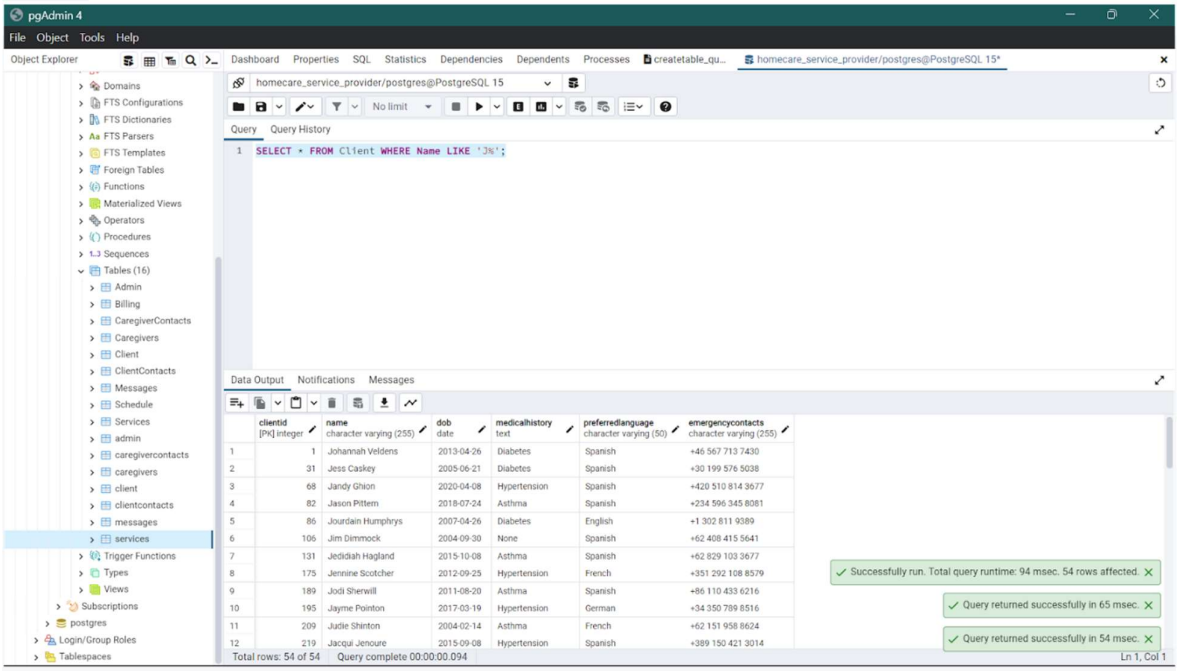
ANS :-



SELECT * FROM Customers WHERE DOB BETWEEN '1990-01-01' AND '2000-12-31';

14. Like Operator: Search for customers whose names start with 'J'.

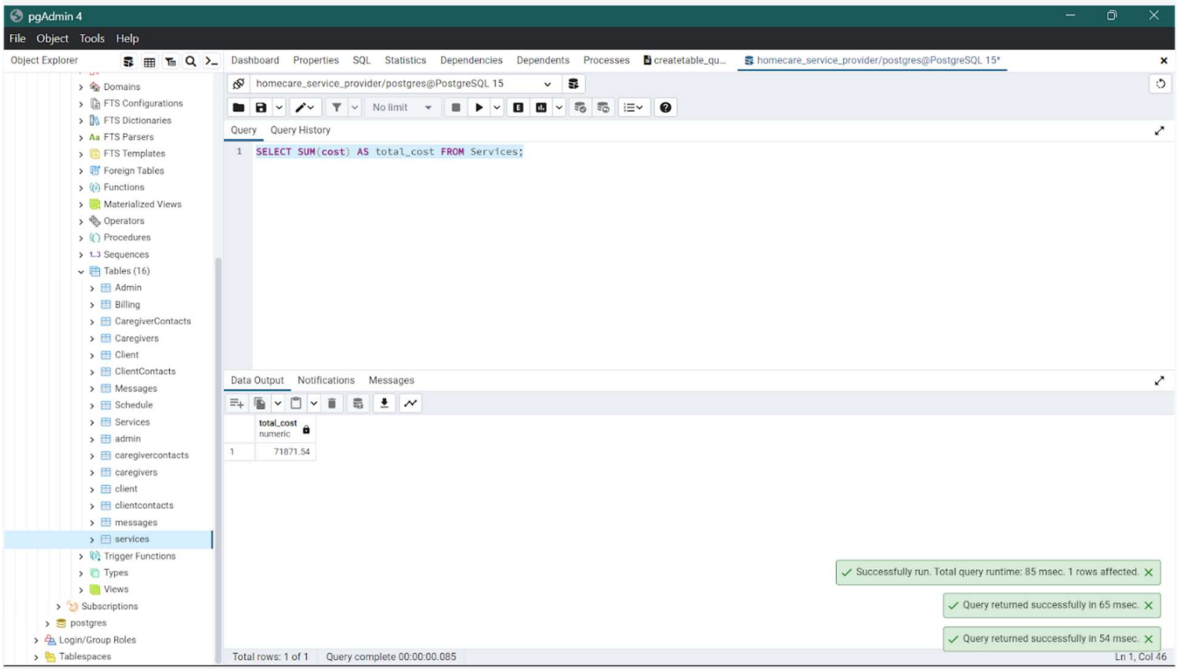
ANS :-



SELECT * FROM Customers WHERE Name LIKE 'J%';

15. Aggregate Functions: Calculate the total cost of all services.

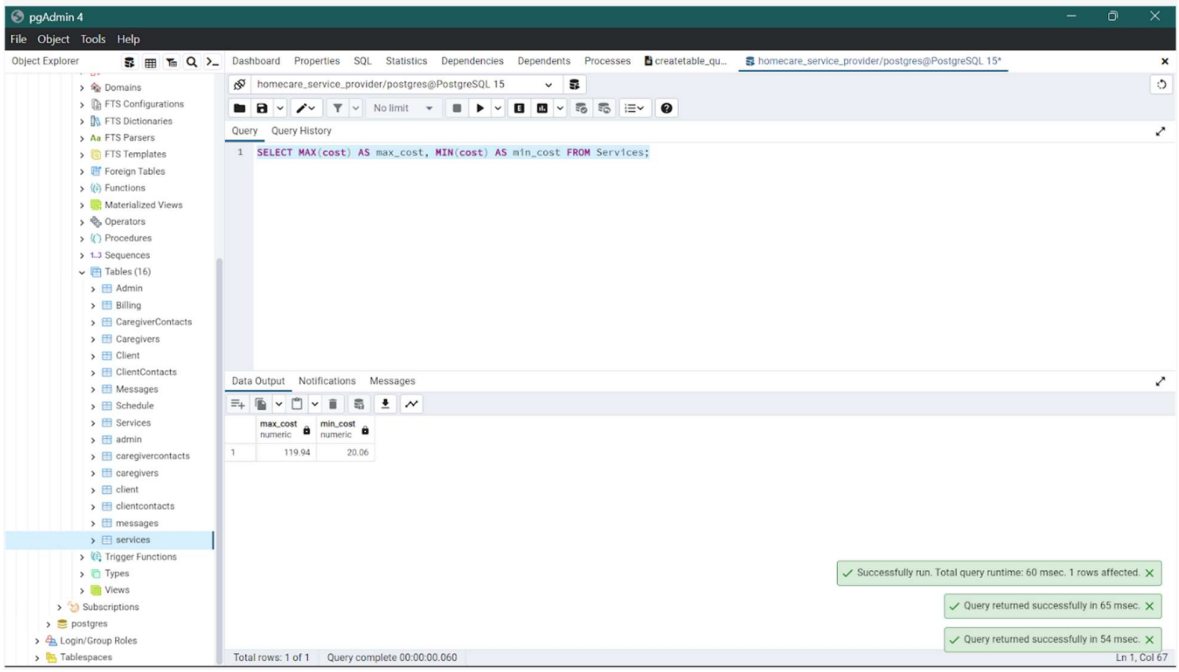
ANS :-



SELECT SUM(cost) AS total_cost FROM Services;

16. MAX() and MIN() Functions: Find the most expensive and least expensive services.

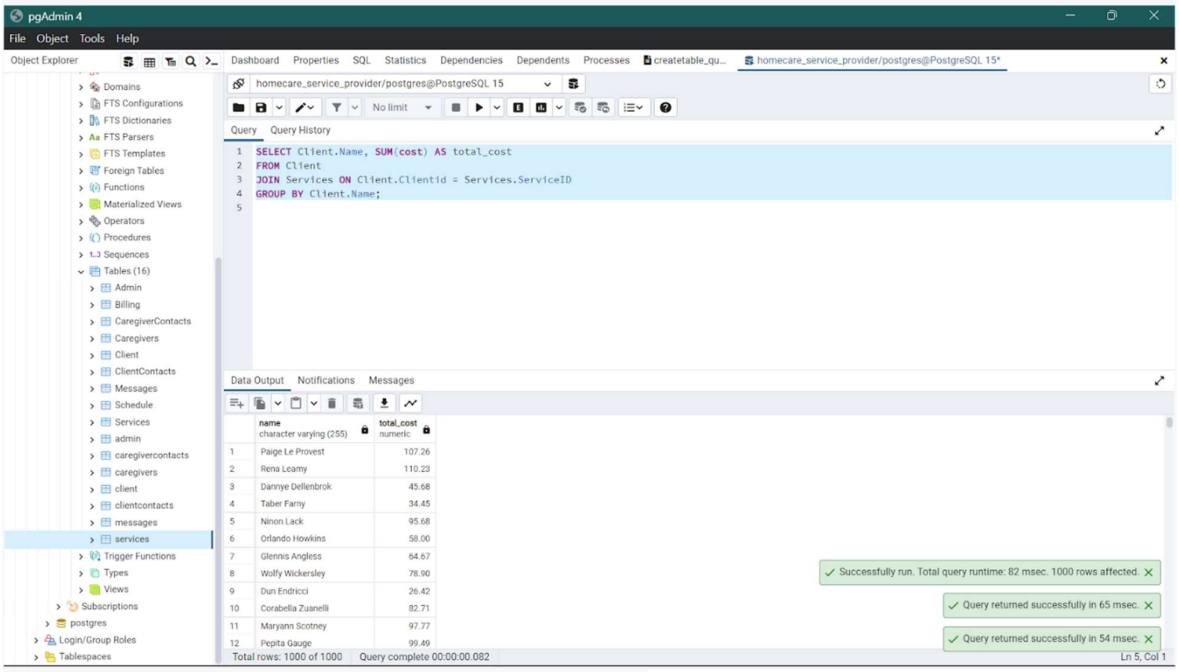
ANS :-



SELECT MAX(cost) AS max_cost, MIN(cost) AS min_cost FROM Services;

17. SUM() Function: Calculate the total cost of services for each customer.

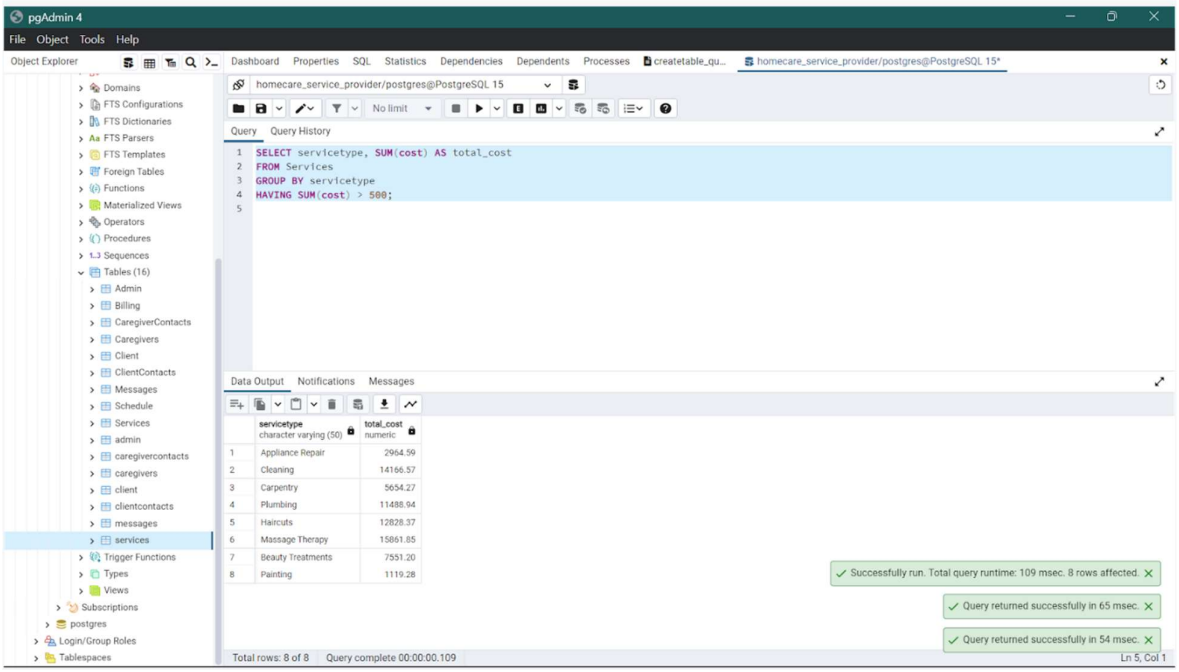
ANS :-




```
SELECT Customers.Name, SUM(cost) AS total_cost
FROM Customers
JOIN Services ON Customers.CustomerID = Services.CustomerID
GROUP BY Customers.Name;
```

18. HAVING Clause: Find service types with a total cost greater than 500.

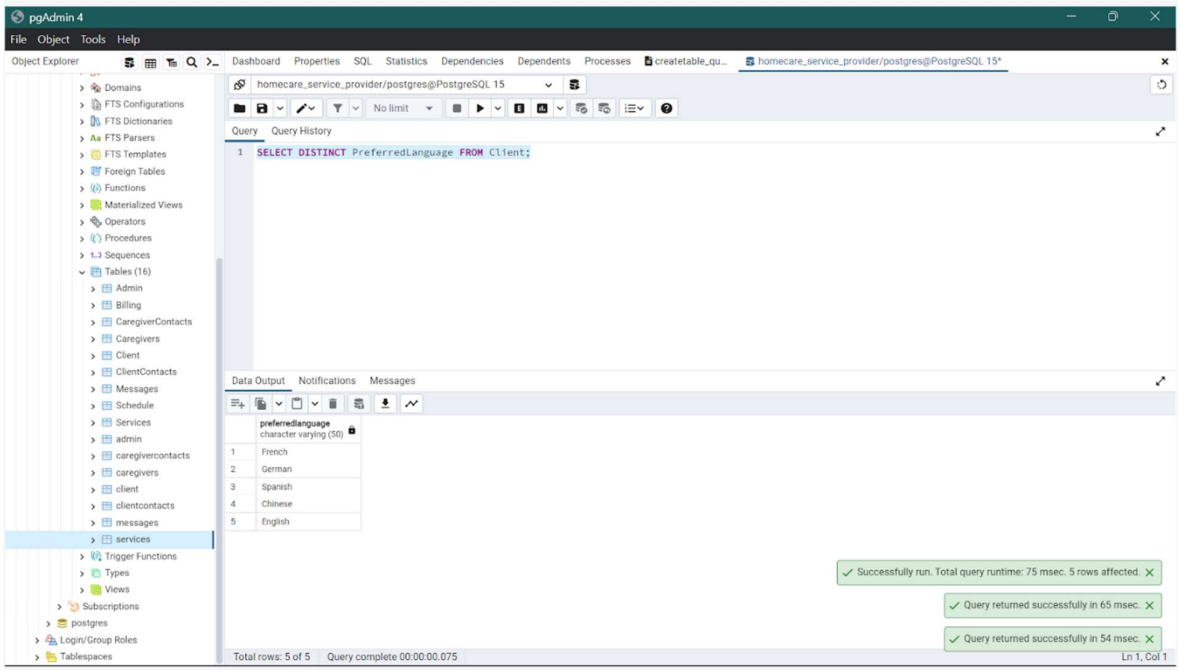
ANS :-



```
SELECT servicetype, SUM(cost) AS total_cost
FROM Services
GROUP BY servicetype
HAVING SUM(cost) > 500;
```

19. Distinct Values: List all unique preferred languages among customers.

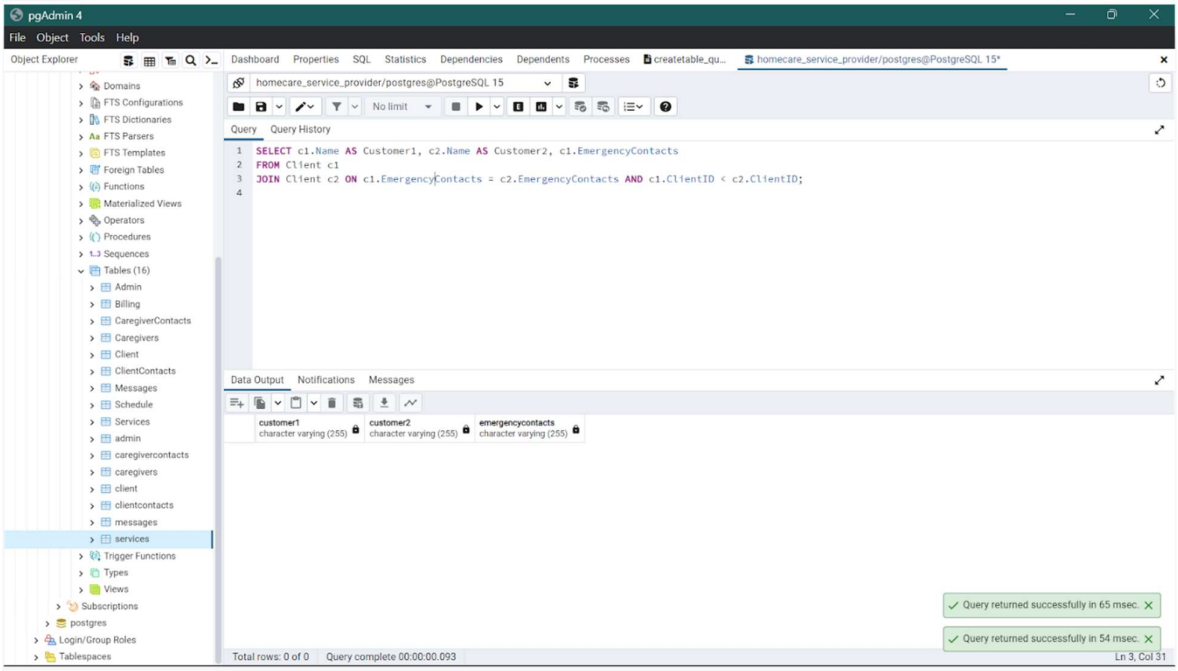
ANS:-




```
SELECT DISTINCT PreferredLanguage FROM Customers;
```

20. Self-Join: Find customers who share the same emergency contact.

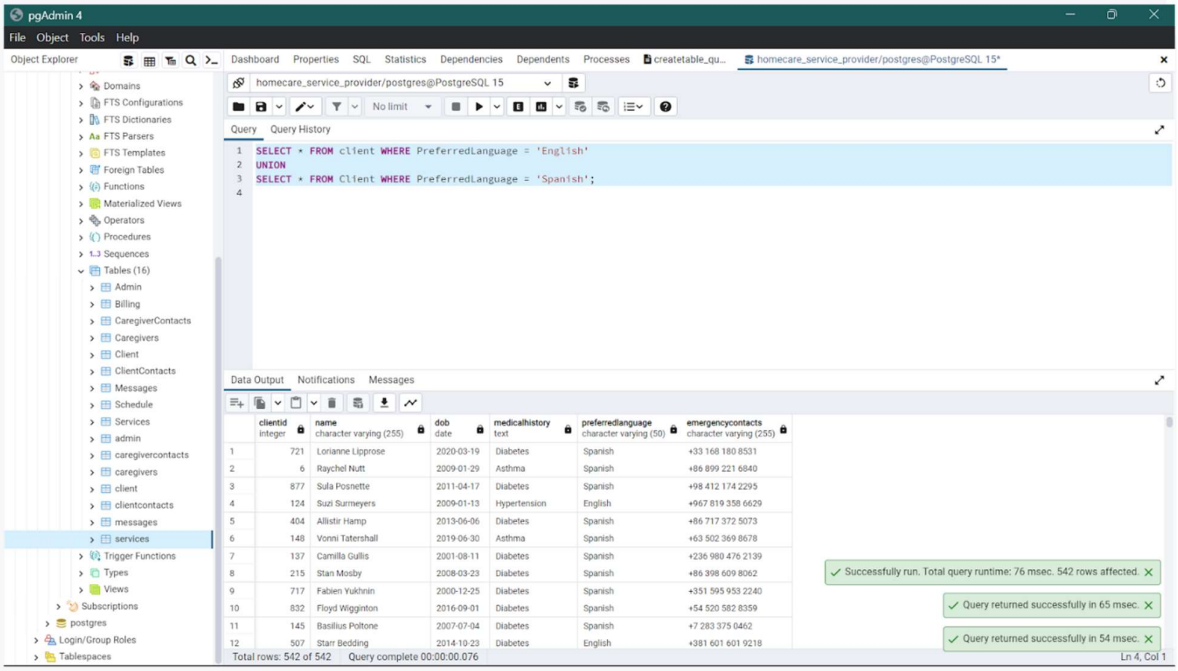
ANS:-




```
SELECT c1.Name AS Customer1, c2.Name AS Customer2, c1.EmergencyContacts
FROM Customers c1
JOIN Customers c2 ON c1.EmergencyContacts = c2.EmergencyContacts AND c1.CustomerID
< c2.CustomerID;
```

21. Union: Combine results of customers who prefer 'English' and those who prefer 'Spanish'.

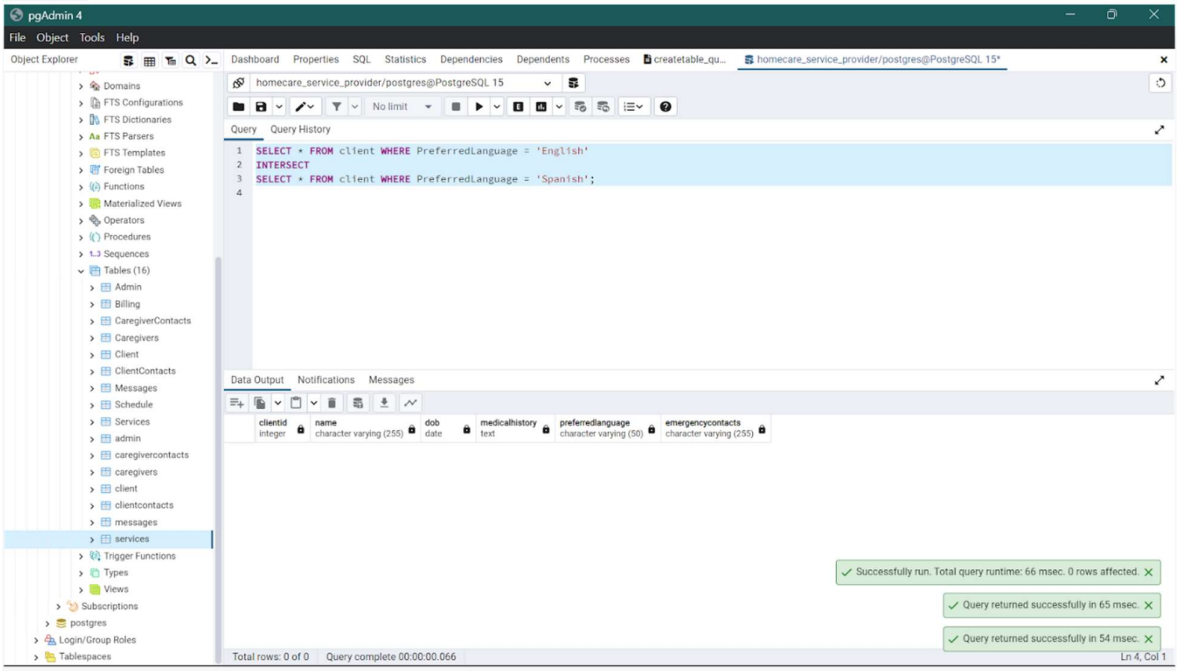
ANS :-




```
SELECT * FROM Customers WHERE PreferredLanguage = 'English'
UNION
SELECT * FROM Customers WHERE PreferredLanguage = 'Spanish';
```

22. Intersection: Find common customers between those who prefer 'English' and 'Spanish'.

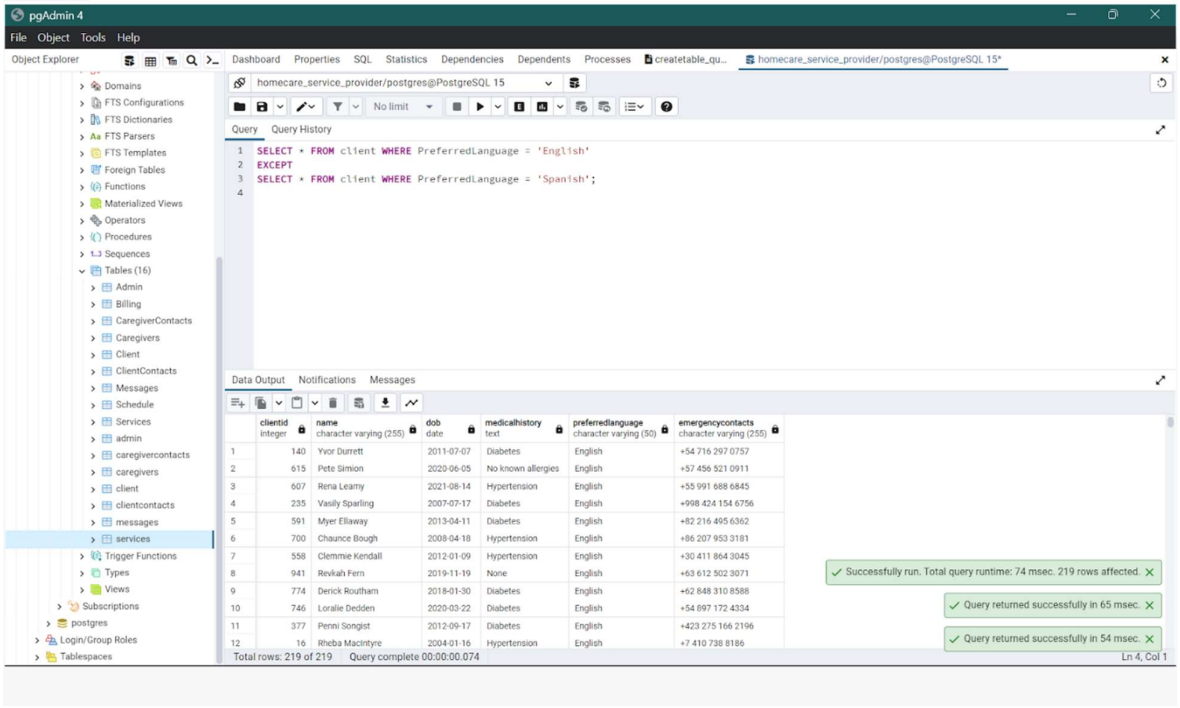
ANS :-




```
SELECT * FROM Customers WHERE PreferredLanguage = 'English'
INTERSECT
SELECT * FROM Customers WHERE PreferredLanguage = 'Spanish';
```

23. Except: Find customers who prefer 'English' but not 'Spanish'.

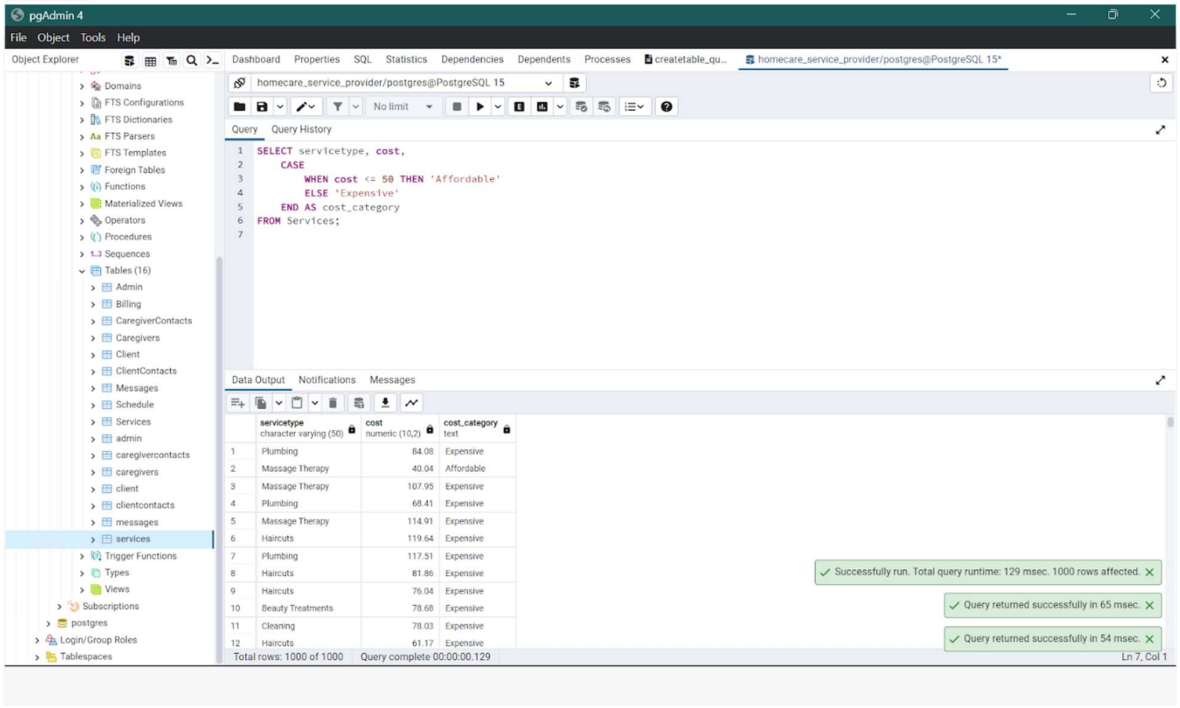
ANS :-




```
SELECT * FROM Customers WHERE PreferredLanguage = 'English'
EXCEPT
SELECT * FROM Customers WHERE PreferredLanguage = 'Spanish';
```

24. Case Statements: Categorize services into 'Affordable' or 'Expensive' based on cost.

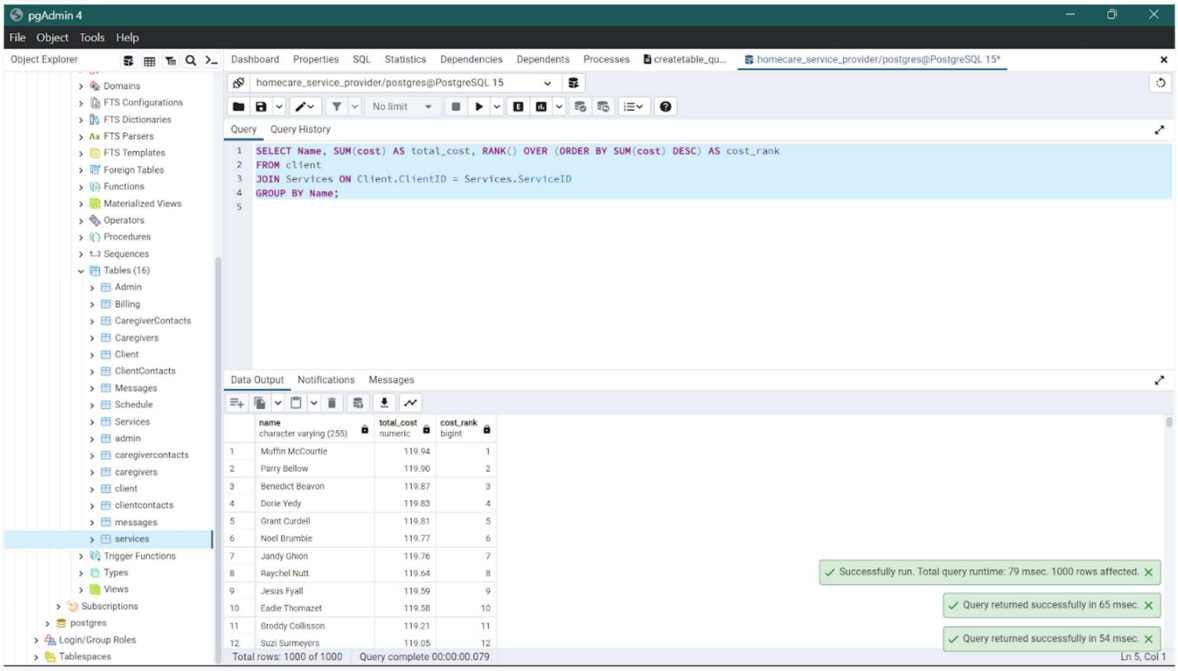
ANS :-




```
SELECT servicetype, cost,
   CASE
      WHEN cost <= 50 THEN 'Affordable'
      ELSE 'Expensive'
   END AS cost_category
FROM Services;
```

25. Window Functions: Rank customers by their total service cost.

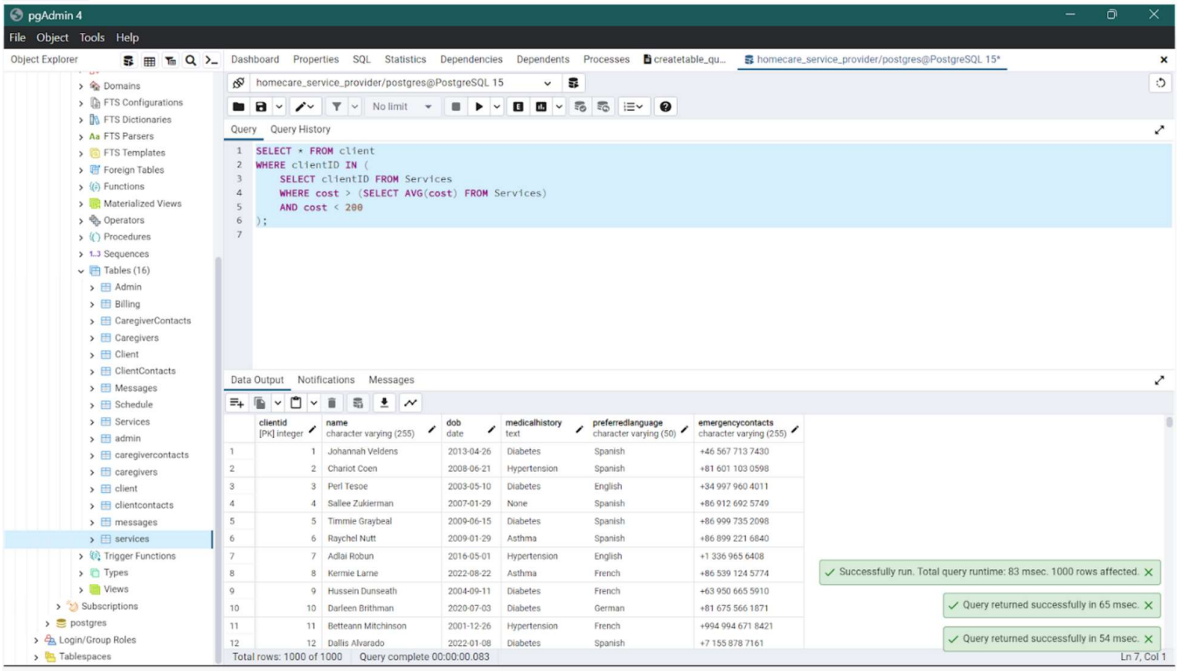
ANS :-




```
SELECT Name, SUM(cost) AS total_cost, RANK() OVER (ORDER BY SUM(cost) DESC)
AS cost_rank
FROM Customers
JOIN Services ON Customers.CustomerID = Services.CustomerID
GROUP BY Name;
```

26. Subquery with Multiple Conditions: Find customers who have used services with a cost greater than the average cost, but less than 200.

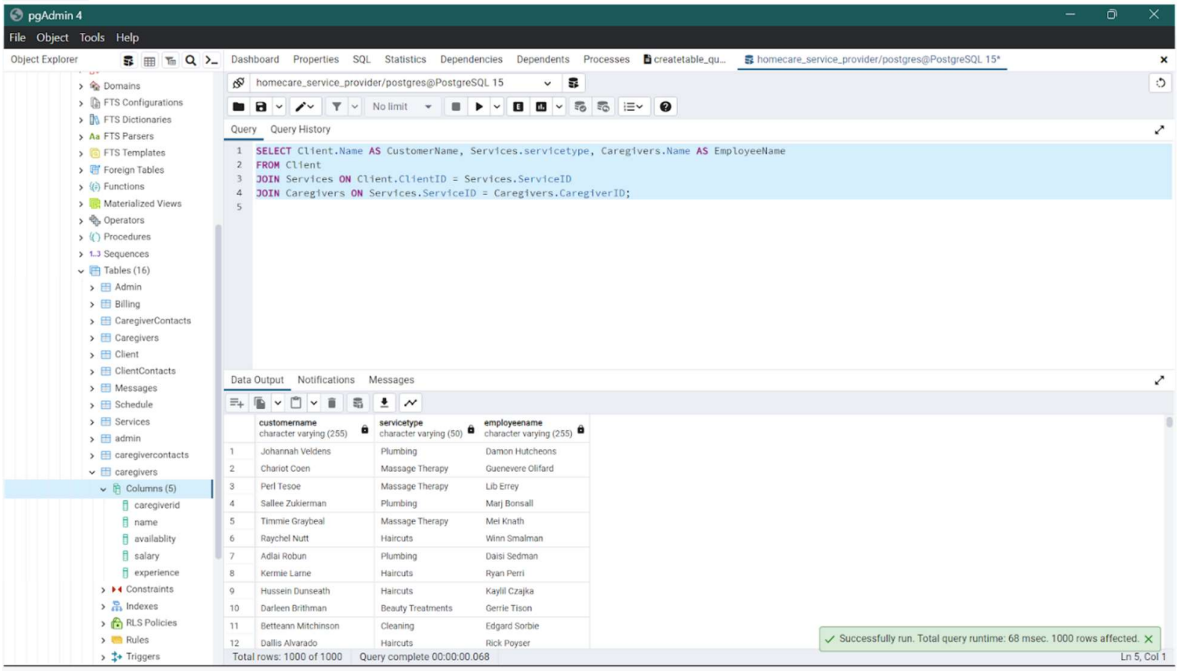
ANS :-




```
SELECT * FROM Customers
WHERE CustomerID IN (
    SELECT CustomerID FROM Services
    WHERE cost > (SELECT AVG(cost) FROM Services)
    AND cost < 200
);
```

27. Joins with Multiple Tables: Retrieve a list of customers, their services, and the employees who provided those services.

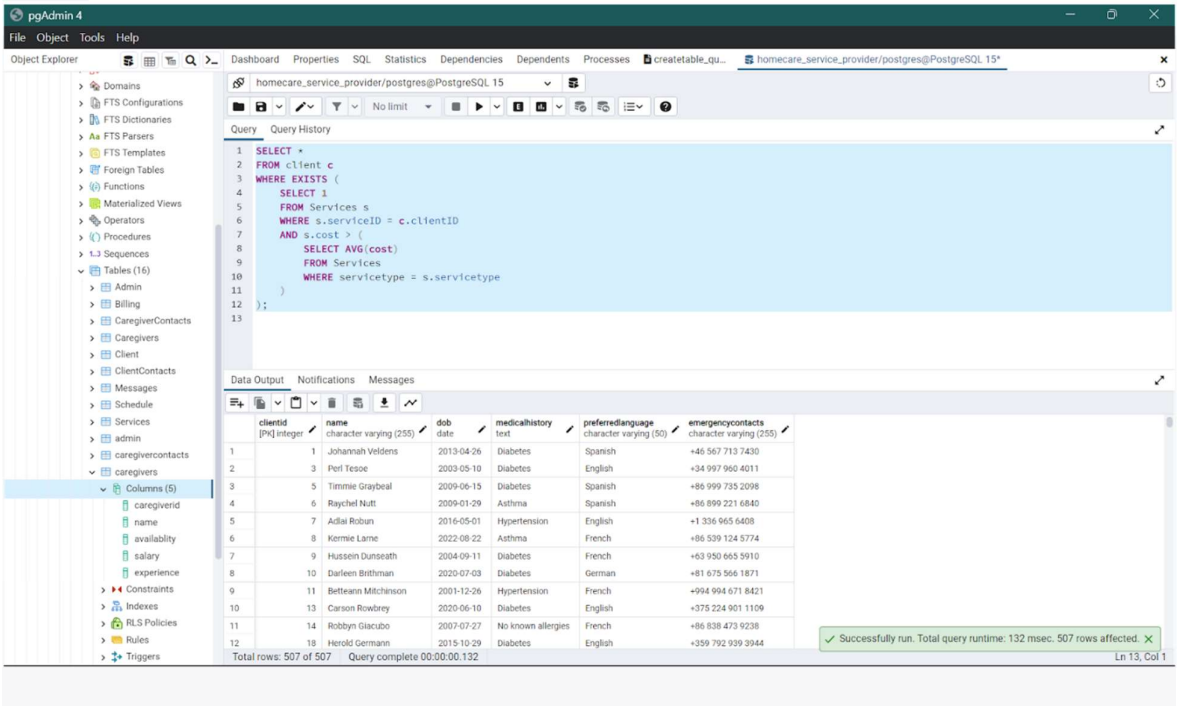
ANS :-




```
SELECT Client.Name AS CustomerName, Services.servicetype, Caregivers.Name AS
EmployeeName
FROM Client
JOIN Services ON Client.ClientID = Services.ServiceID
JOIN Caregivers ON Services.ServiceID = Caregivers.CaregiverID;
```

28. Correlated Subquery: Find customers who have used services that are more expensive than the average cost of their preferred service type.

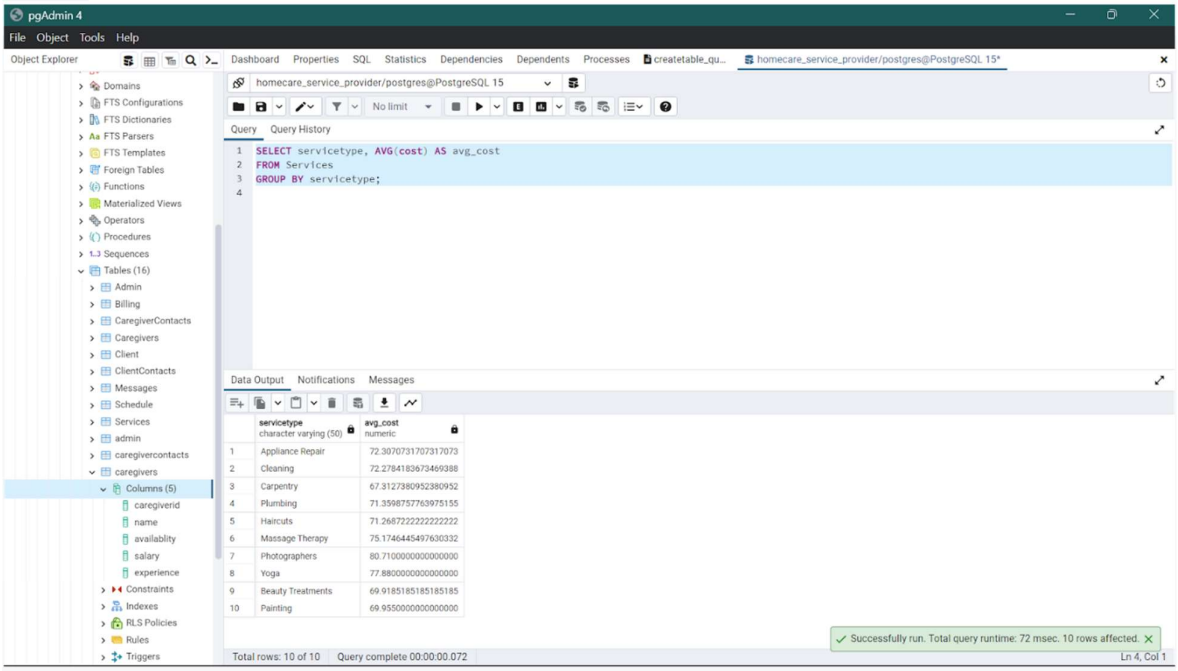
ANS :-




```
SELECT *
FROM Customers c
WHERE EXISTS (
   SELECT 1
   FROM Services s
   WHERE s.CustomerID = c.CustomerID
   AND s.cost > (
      SELECT AVG(cost)
      FROM Services
      WHERE servicetype = s.servicetype
   )
);
```

29. Aggregate Functions with Grouping: Calculate the average cost of services for each service type.

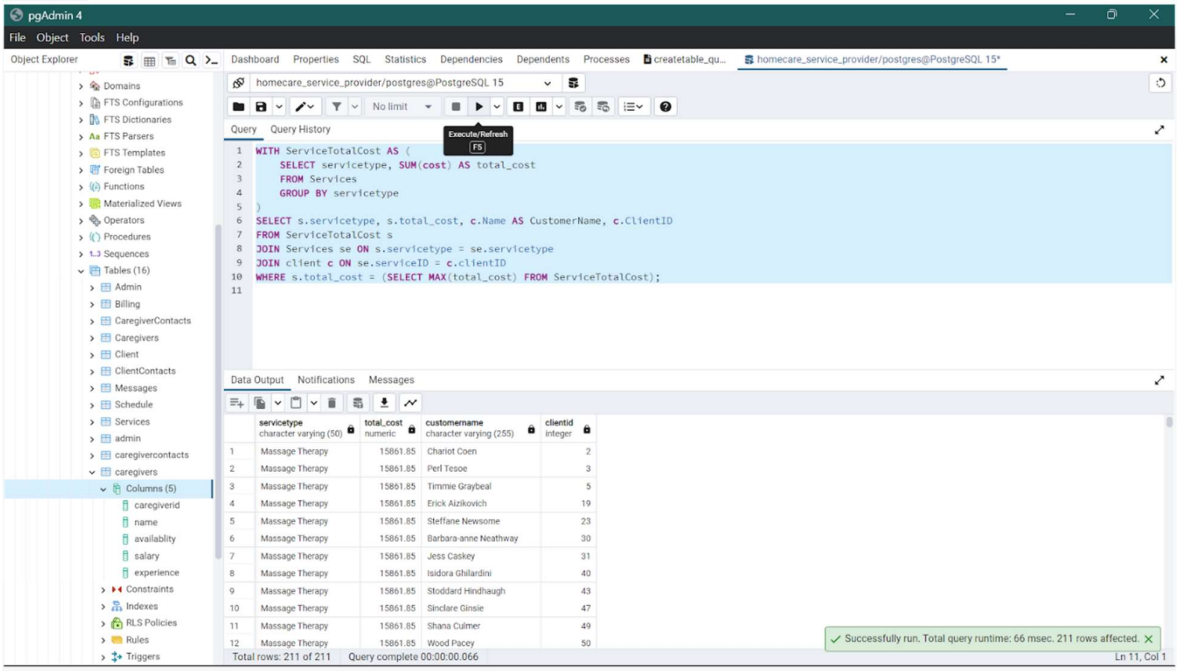
ANS :-




```
SELECT servicetype, AVG(cost) AS avg_cost
FROM Services
GROUP BY servicetype;
```

30. Combining Aggregations: Find the service type with the highest total cost and the customer who spent the most on that service type.

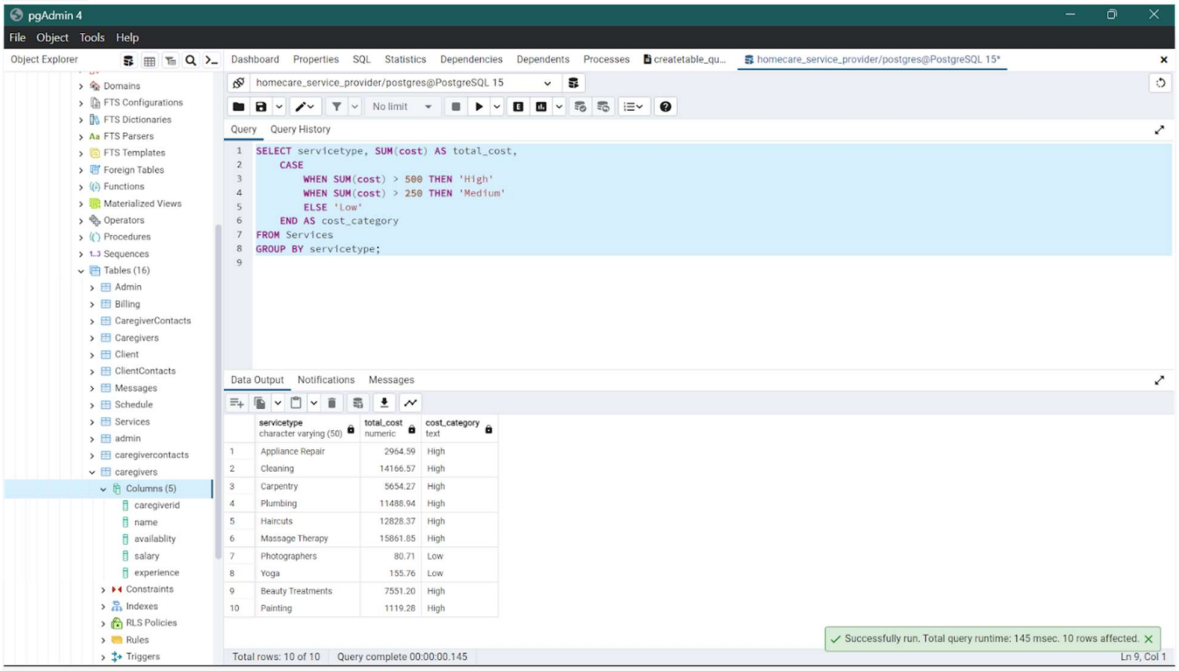
ANS :-




```
WITH ServiceTotalCost AS (
    SELECT servicetype, SUM(cost) AS total_cost
    FROM Services
    GROUP BY servicetype
)
SELECT s.servicetype, s.total_cost, c.Name AS CustomerName, c.CustomerID
FROM ServiceTotalCost s
JOIN Services se ON s.servicetype = se.servicetype
JOIN Customers c ON se.CustomerID = c.CustomerID
WHERE s.total_cost = (SELECT MAX(total_cost) FROM ServiceTotalCost);
```

31. Using CASE with Aggregation: Calculate the total cost for each service type and categorize them as 'High', 'Medium', or 'Low' cost.

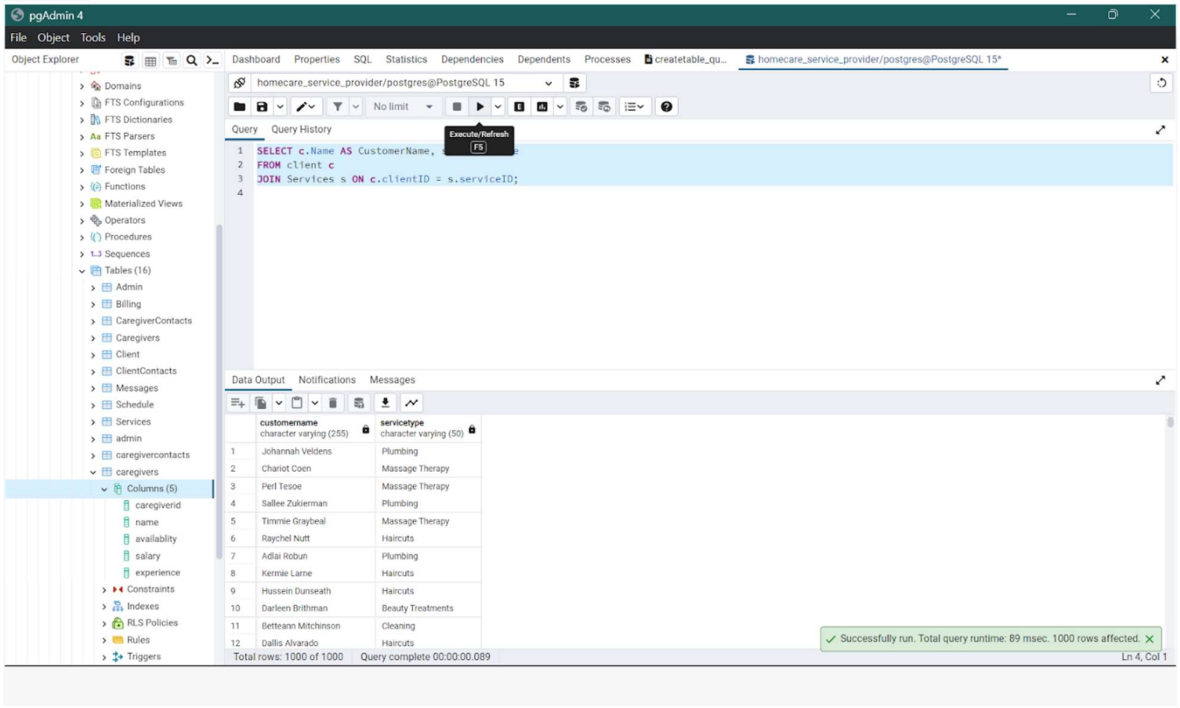
ANS :-




```
SELECT servicetype, SUM(cost) AS total_cost,
   CASE
      WHEN SUM(cost) > 500 THEN 'High'
      WHEN SUM(cost) > 250 THEN 'Medium'
      ELSE 'Low'
   END AS cost_category
FROM Services
GROUP BY servicetype;
```

32. Joins with Aliases: Retrieve a list of customers and their services, using table aliases.

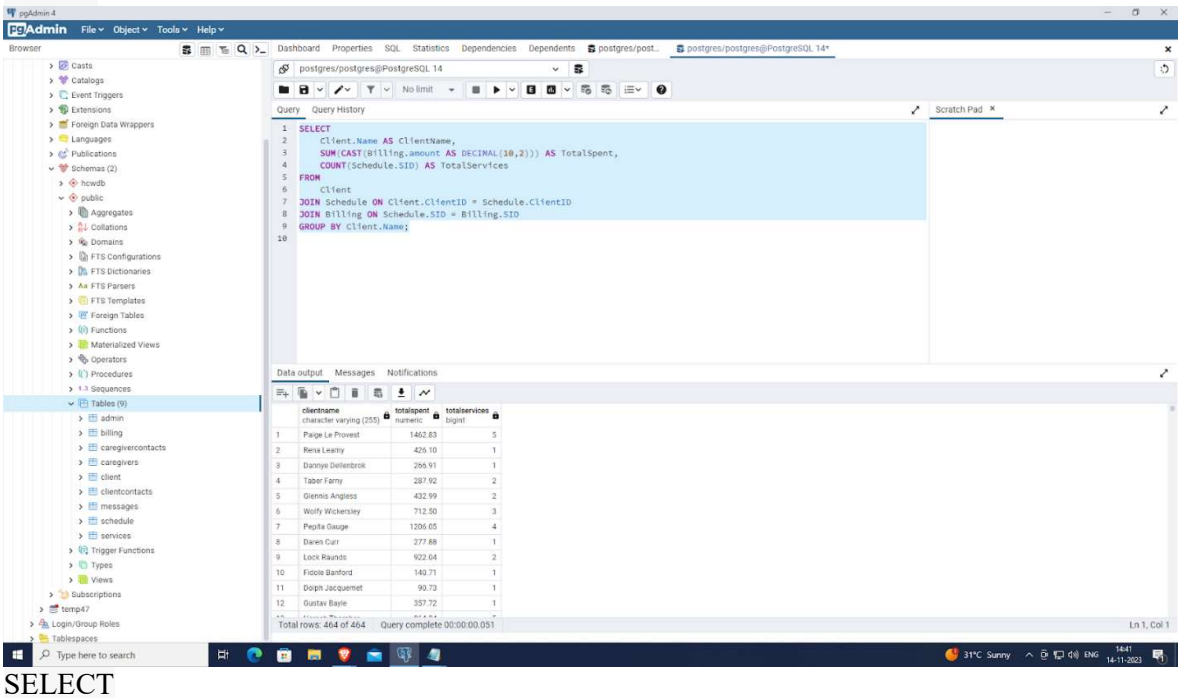
ANS :-



SELECT c.Name AS CustomerName, s.servicetype
FROM Customers c
JOIN Services s ON c.CustomerID = s.CustomerID;

33. The total amount spent by each client and the number of services they have availed.

ANS :-

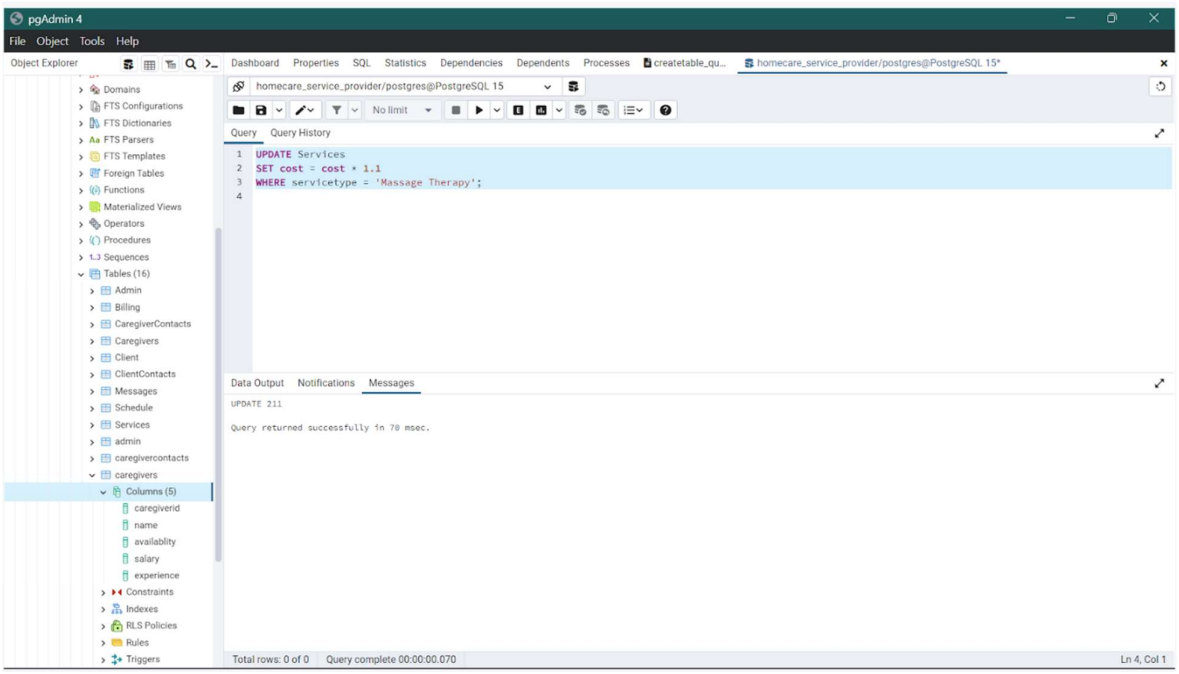


SELECT

```
    Client.Name AS ClientName,
    SUM(CAST(Billing.amount AS DECIMAL(10,2))) AS TotalSpent,
    COUNT(Schedule.SID) AS TotalServices
FROM
    Client
JOIN Schedule ON Client.ClientID = Schedule.ClientID
JOIN Billing ON Schedule.SID = Billing.SID
GROUP BY Client.Name;
```

34. Update Query: Increase the cost of all 'Massage Therapy' services by 10%.

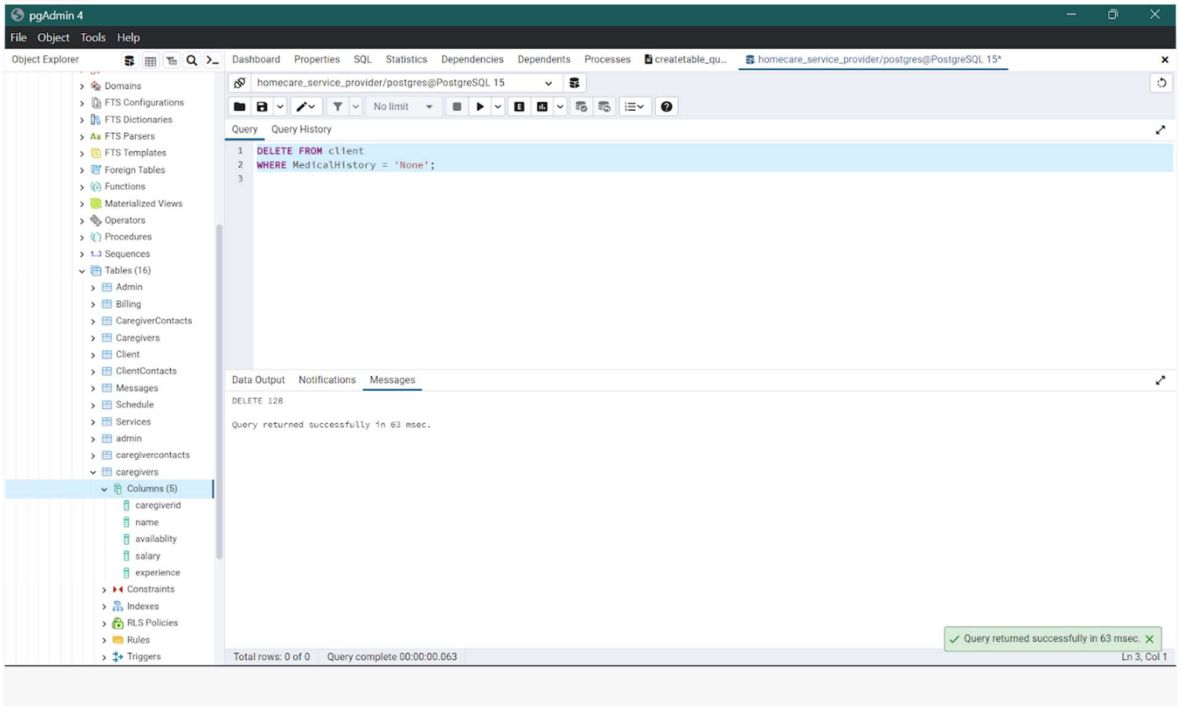
ANS :-




```
UPDATE Services
SET cost = cost * 1.1
WHERE servicetype = 'Massage Therapy';
```

35. Delete Query: Delete all customers who have 'None' as their medical history.

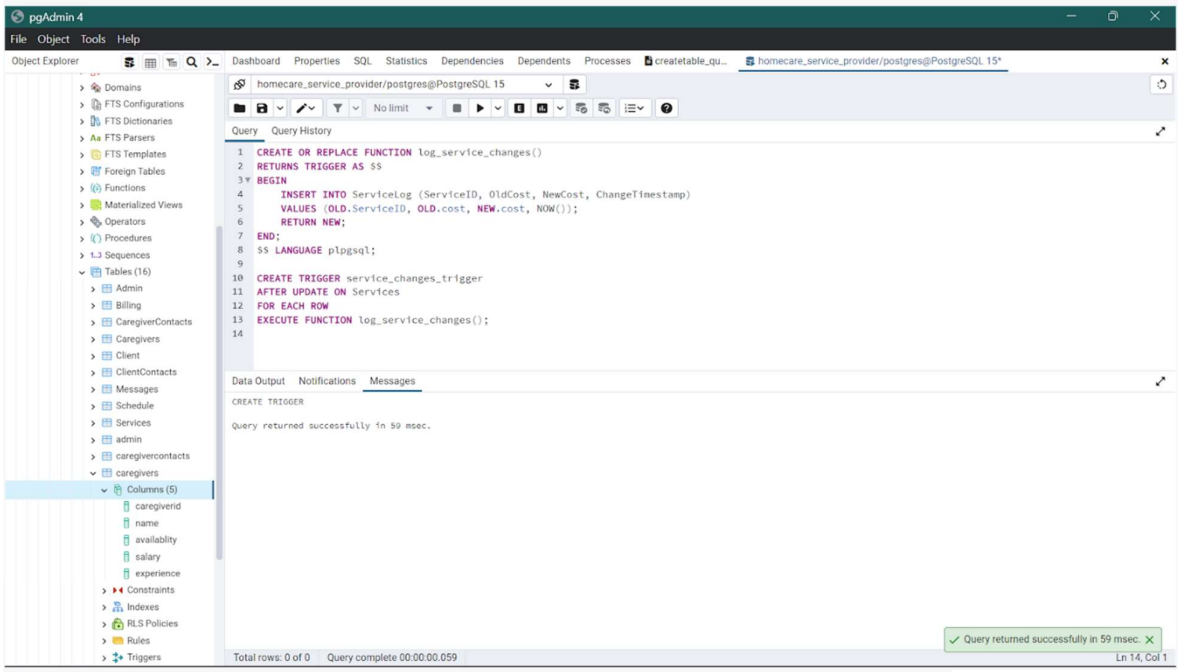
ANS :-



DELETE FROM Customers
WHERE MedicalHistory = 'None';

36. Triggers: Create a trigger to log changes to the Services table.

ANS :-



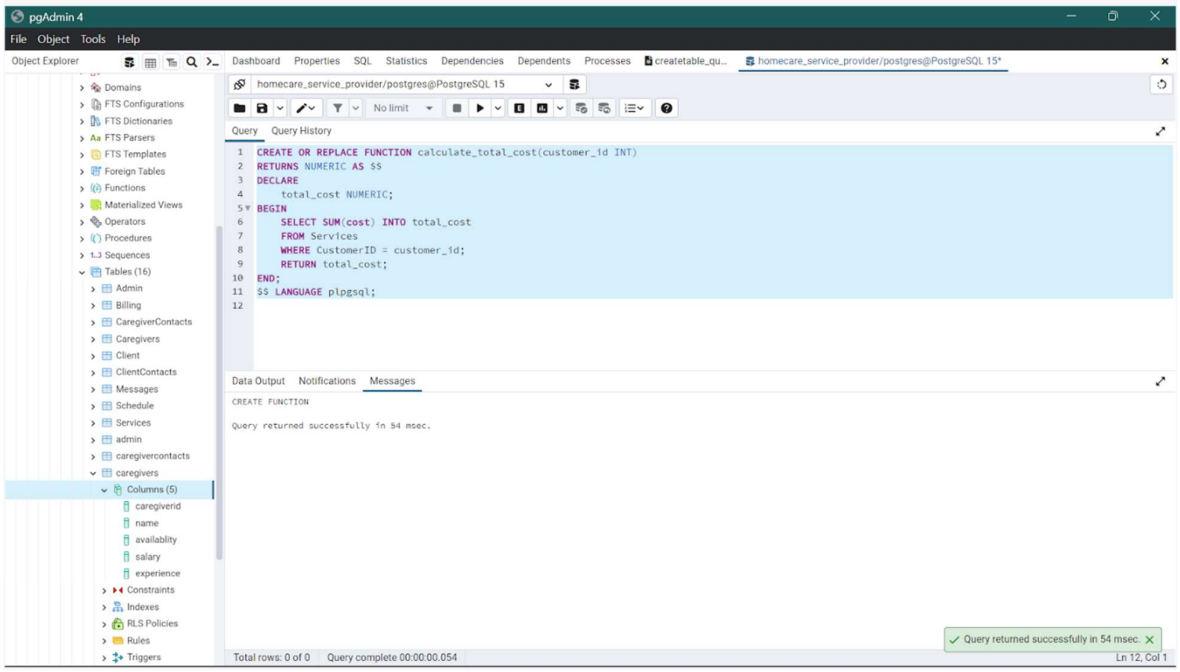
-- Assuming you have a log table named ServiceLog with appropriate columns

```
CREATE OR REPLACE FUNCTION log_service_changes()
RETURNS TRIGGER AS $$
BEGIN
   INSERT INTO ServiceLog (ServiceID, OldCost, NewCost, ChangeTimestamp)
   VALUES (OLD.ServiceID, OLD.cost, NEW.cost, NOW());
   RETURN NEW;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER service_changes_trigger
AFTER UPDATE ON Services
FOR EACH ROW
EXECUTE FUNCTION log_service_changes();
```

37. Stored Procedure: Create a stored procedure to calculate the total cost of services for a specific customer.

ANS :-

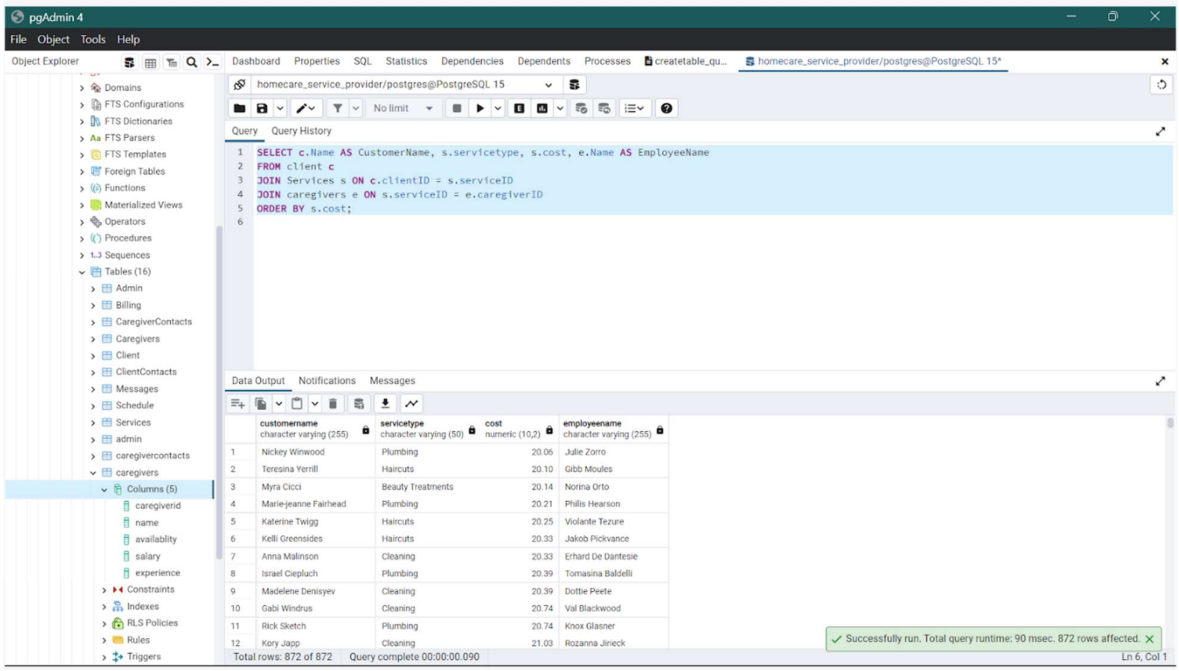



```
-- Assuming you have a parameterized stored procedure
CREATE OR REPLACE FUNCTION calculate_total_cost(customer_id INT)
RETURNS NUMERIC AS $$
DECLARE
   total_cost NUMERIC;
BEGIN
   SELECT SUM(cost) INTO total_cost
   FROM Services
```

```
    WHERE CustomerID = customer_id;
    RETURN total_cost;
END;
$$ LANGUAGE plpgsql;
```

40 .Advanced Joins: Retrieve a list of customers and the services they have used, along with the employees who provided those services, and sort them by the service cost.

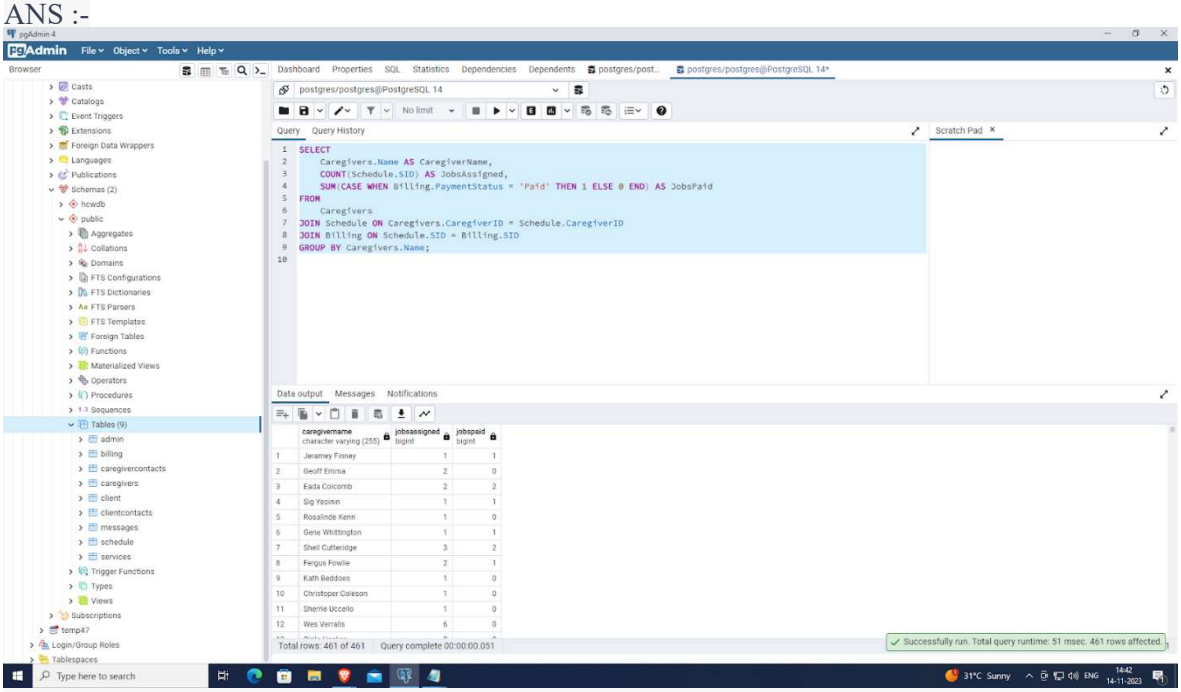
ANS :-




```
SELECT c.Name AS CustomerName, s.servicetype, s.cost, e.Name AS EmployeeName
FROM client c
JOIN Services s ON c.clientID = s.serviceID
JOIN caregivers e ON s.serviceID = e.caregiverID
ORDER BY s.cost;
```

41. Each caregiver's workload in terms of the number of jobs assigned and how many of those jobs have been paid for.

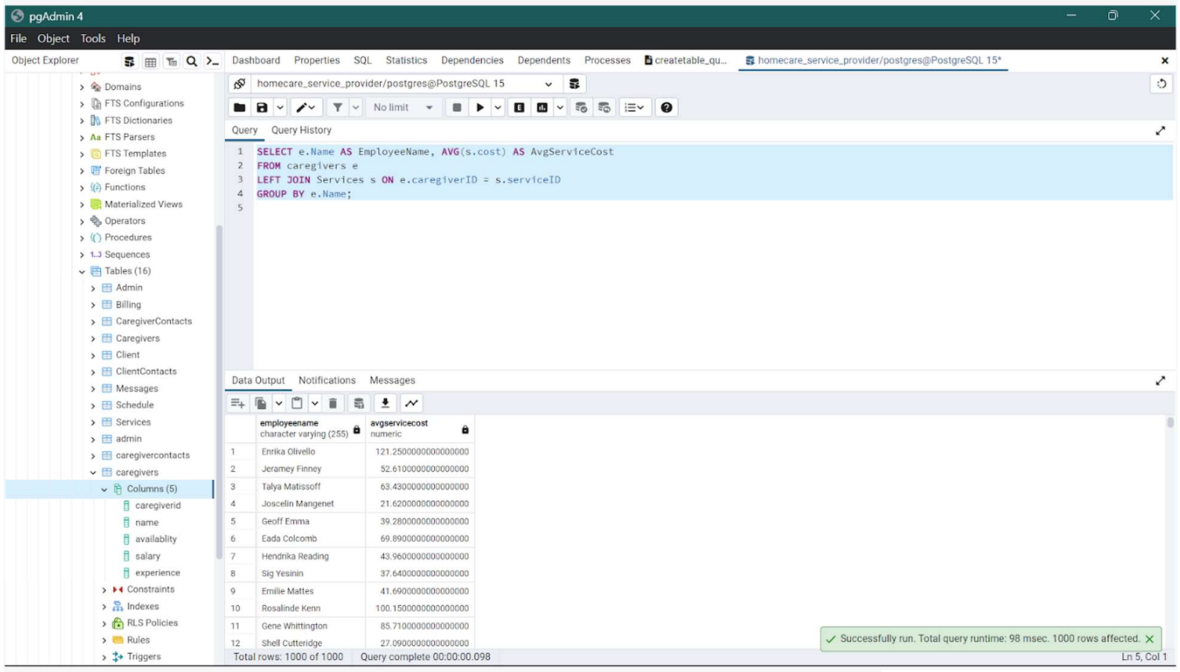
ANS :-




```
SELECT
    Caregivers.Name AS CaregiverName,
    COUNT(Schedule.SID) AS JobsAssigned,
    SUM(CASE WHEN Billing.PaymentStatus = 'Paid' THEN 1 ELSE 0 END) AS JobsPaid
FROM
    Caregivers
JOIN Schedule ON Caregivers.CaregiverID = Schedule.CaregiverID
JOIN Billing ON Schedule.SID = Billing.SID
GROUP BY Caregivers.Name;
```

42. Calculate Employee Average Service Cost: Calculate the average cost of services provided by each employee.

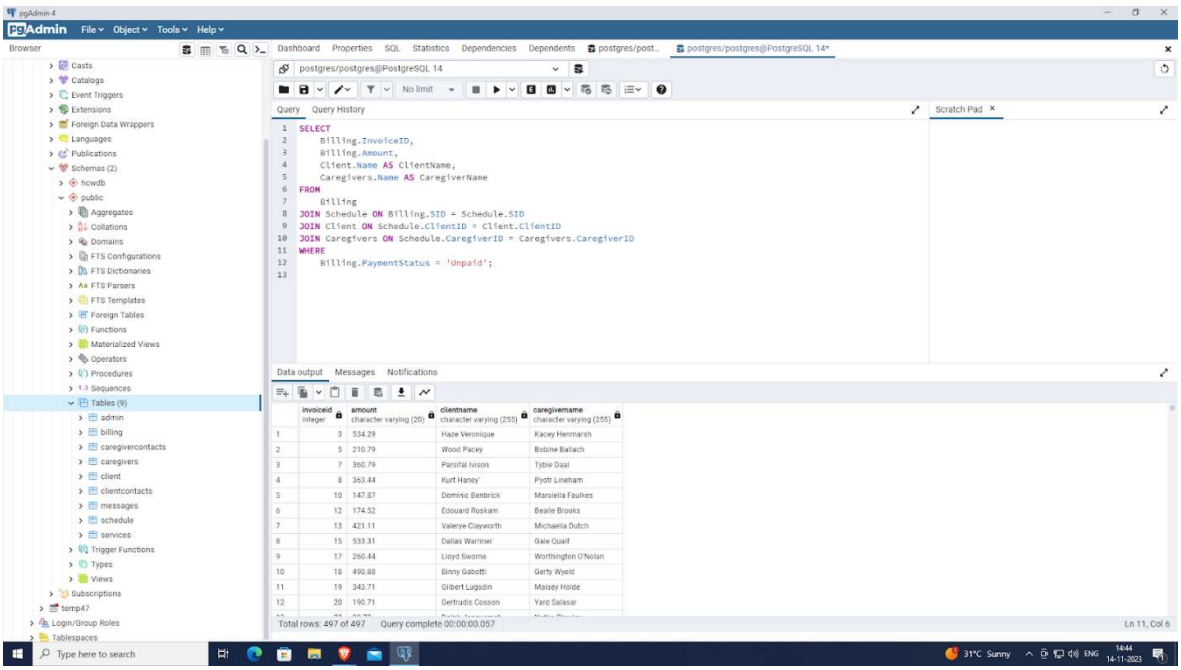
ANS:-




```
SELECT e.Name AS EmployeeName, AVG(s.cost) AS AvgServiceCost
FROM Employees e
LEFT JOIN Services s ON e.EmployeeID = s.EmployeeID
GROUP BY e.Name;
```

43. Identifies unpaid invoices and provides details of the involved clients and caregivers.

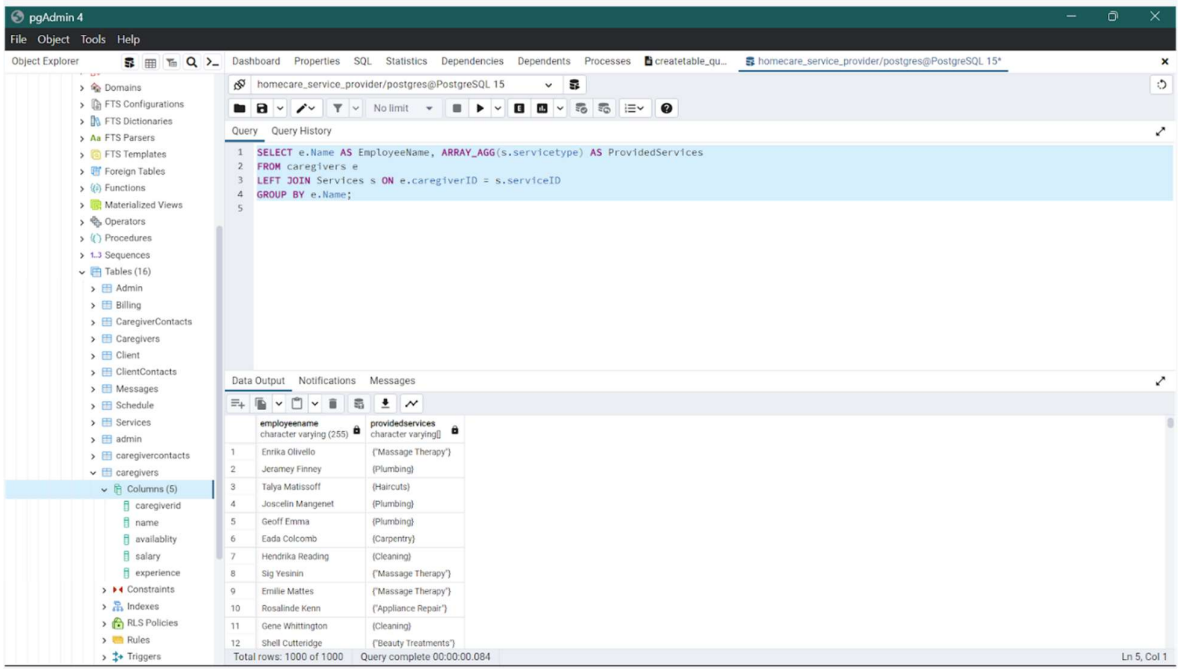
ANS :-



```
SELECT
    Billing.InvoiceID,
    Billing.Amount,
    Client.Name AS ClientName,
    Caregivers.Name AS CaregiverName
FROM
    Billing
JOIN Schedule ON Billing.SID = Schedule.SID
JOIN Client ON Schedule.ClientID = Client.ClientID
JOIN Caregivers ON Schedule.CaregiverID = Caregivers.CaregiverID
WHERE
    Billing.PaymentStatus = 'Unpaid';
```

44. Services Provided by Employee: List services provided by each employee.

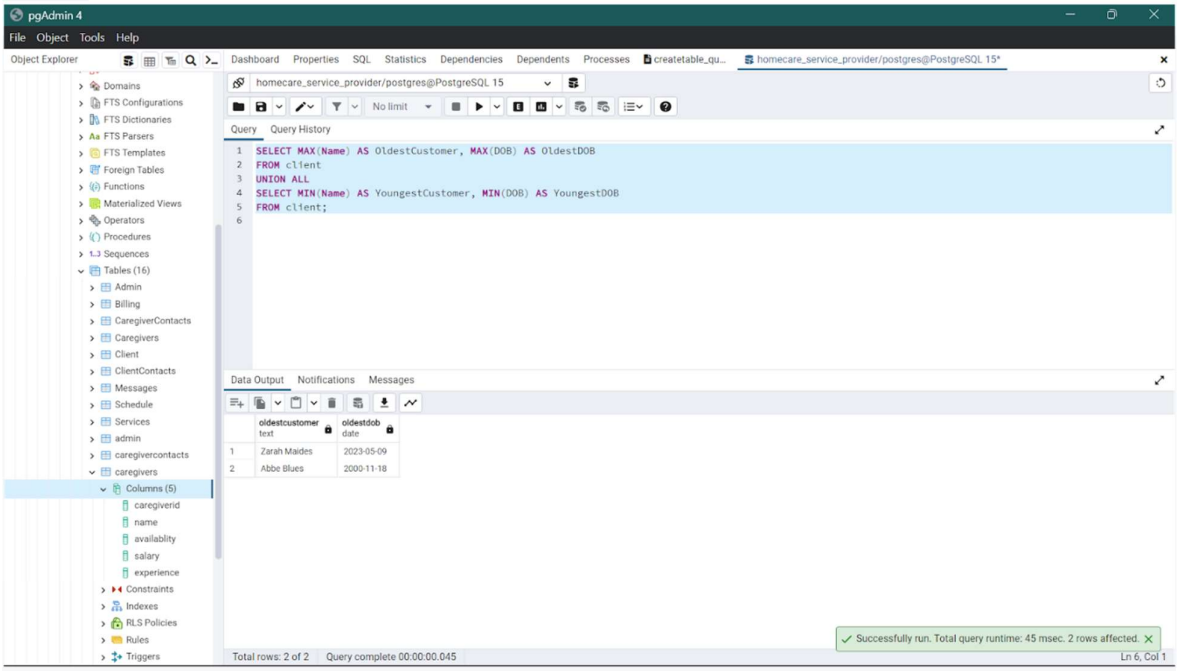
ANS :-




```
SELECT e.Name AS EmployeeName, ARRAY_AGG(s.servicetype) AS ProvidedServices
FROM Employees e
LEFT JOIN Services s ON e.EmployeeID = s.EmployeeID
GROUP BY e.Name;
```

45. Find the Oldest and Youngest Customers: Identify the oldest and youngest customers.

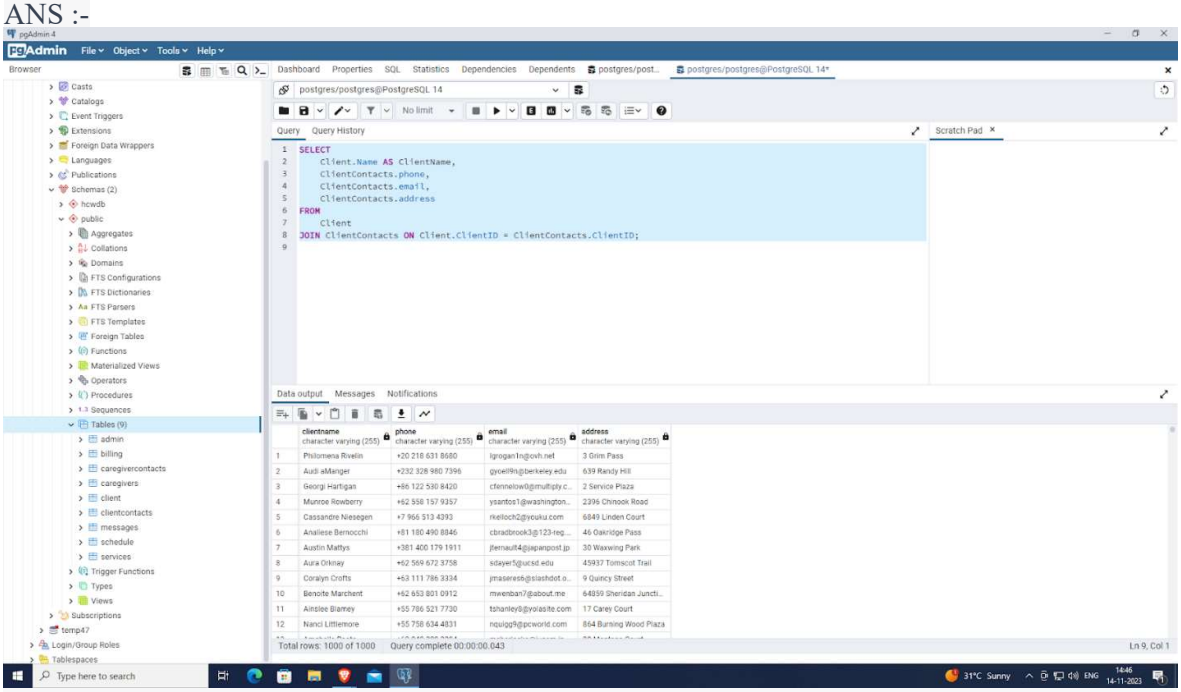
ANS :-




```
SELECT MAX(Name) AS OldestCustomer, MAX(DOB) AS OldestDOB
FROM Customers
UNION ALL
SELECT MIN(Name) AS YoungestCustomer, MIN(DOB) AS YoungestDOB
FROM Customers;
```

46. Provides contact details for each client, including phone, email, and address.

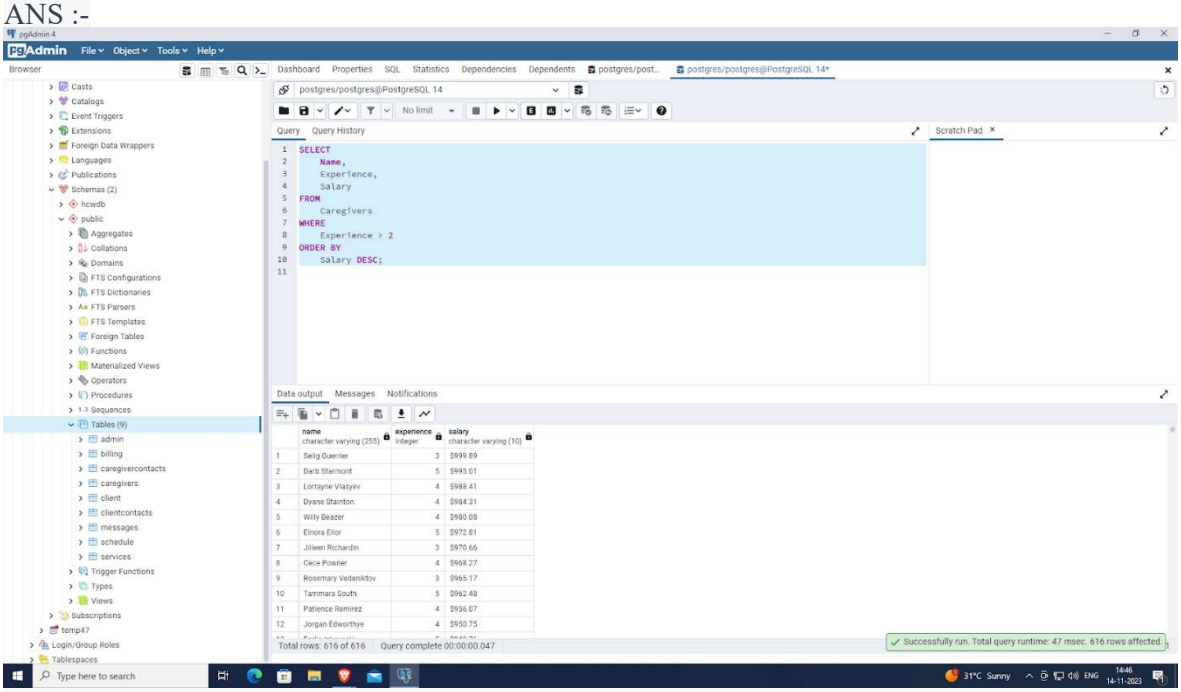
ANS :-




```
SELECT
    Client.Name AS ClientName,
    ClientContacts.phone,
    ClientContacts.email,
    ClientContacts.address
FROM
    Client
JOIN ClientContacts ON Client.ClientID = ClientContacts.ClientID;
```

47. Lists caregivers with more than 2 years of experience, sorted by their salary in descending order.

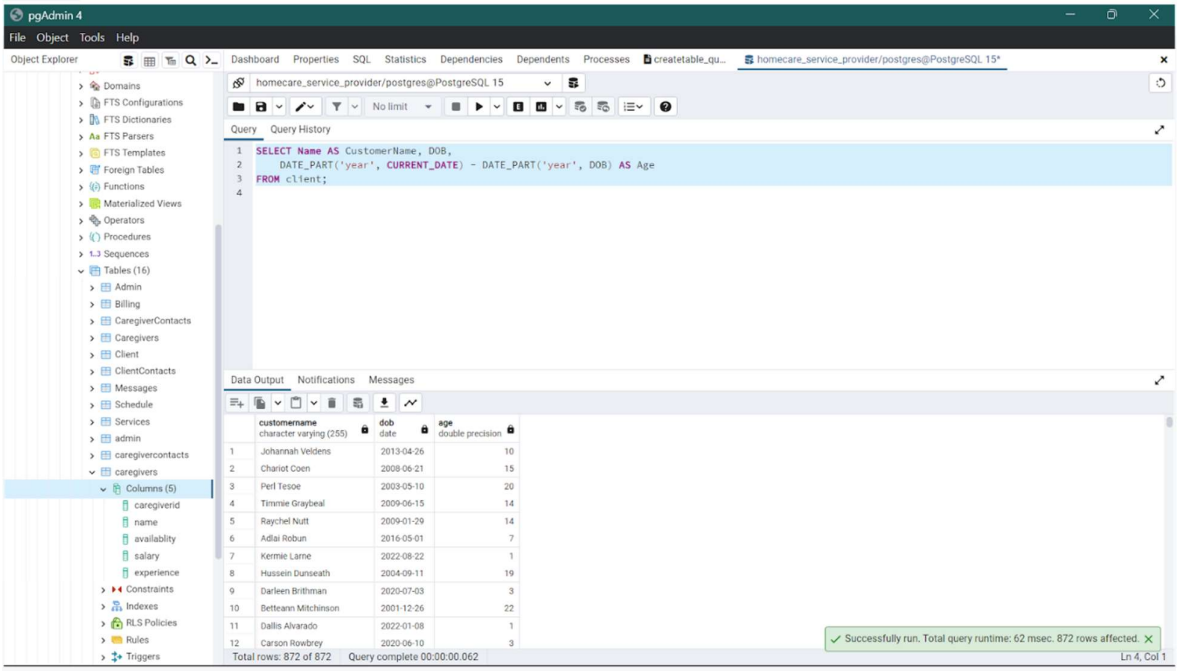
ANS :-




```
SELECT
    Name,
    Experience,
    Salary
FROM
    Caregivers
WHERE
    Experience > 2
ORDER BY
    Salary DESC;
```

48.Calculate Age from Date of Birth: Calculate the age of each customer based on their date of birth.

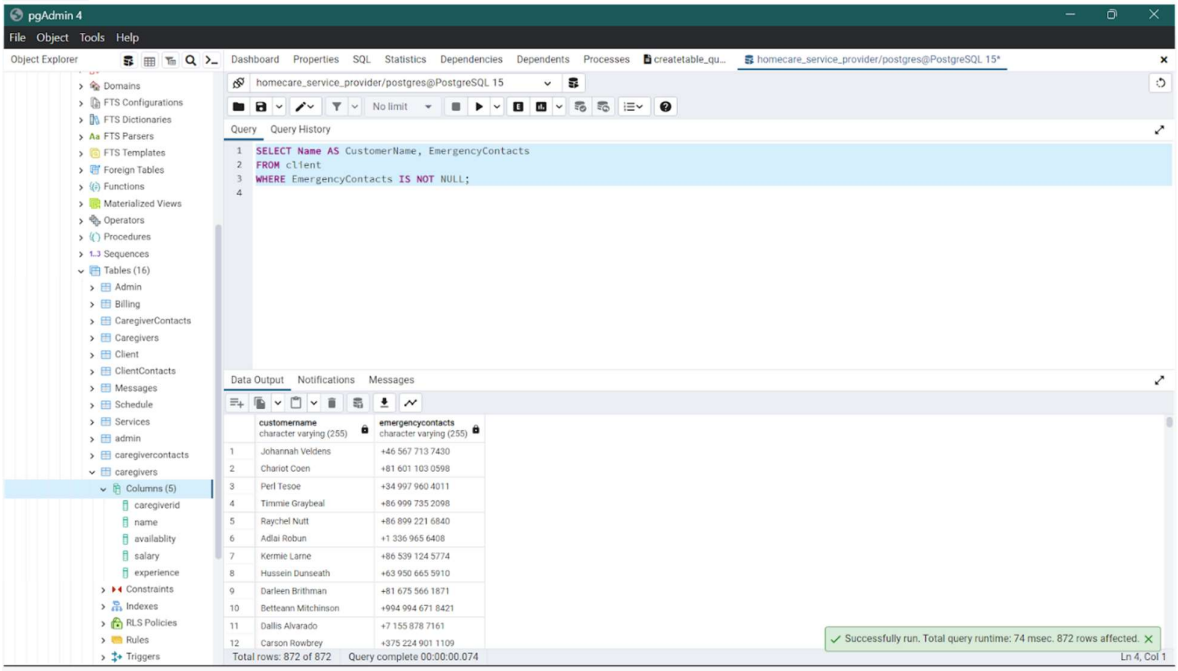
ANS:-




```
SELECT Name AS CustomerName, DOB,
    DATE_PART('year', CURRENT_DATE) - DATE_PART('year', DOB) AS Age
FROM Customers;
```

49. Find Customers with Emergency Contacts: Retrieve customers who have specified emergency contacts.

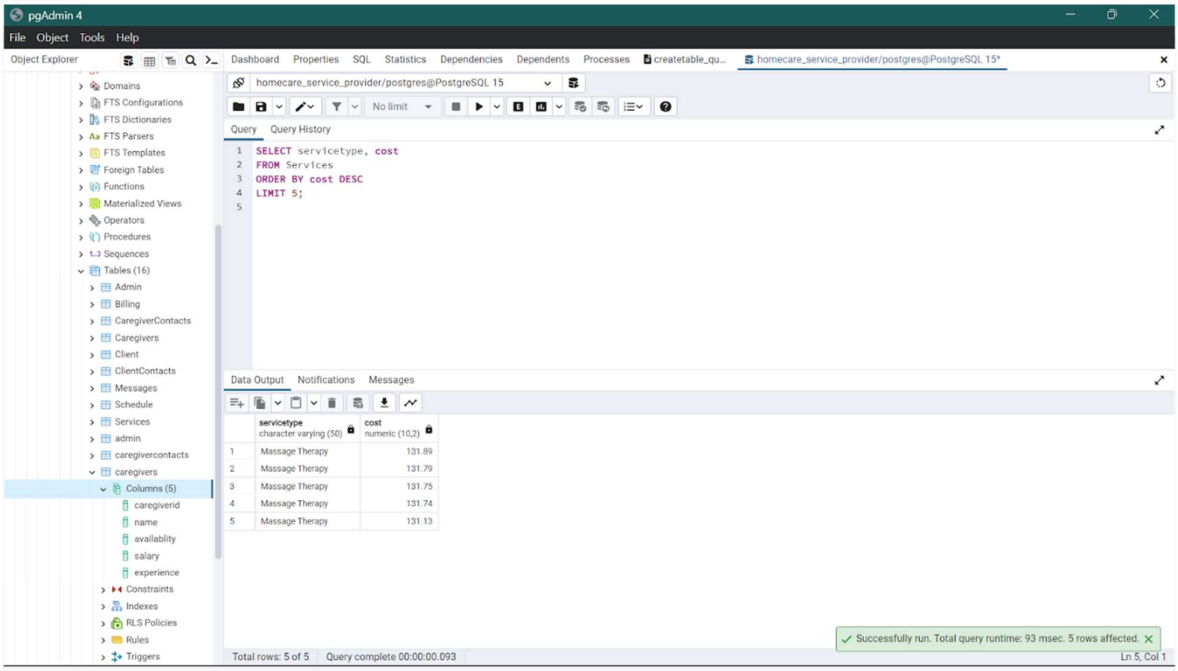
ANS :-




```
SELECT Name AS CustomerName, EmergencyContacts
FROM Customers
WHERE EmergencyContacts IS NOT NULL;
```

50. Top N Most Expensive Services: Retrieve the top 5 most expensive services.

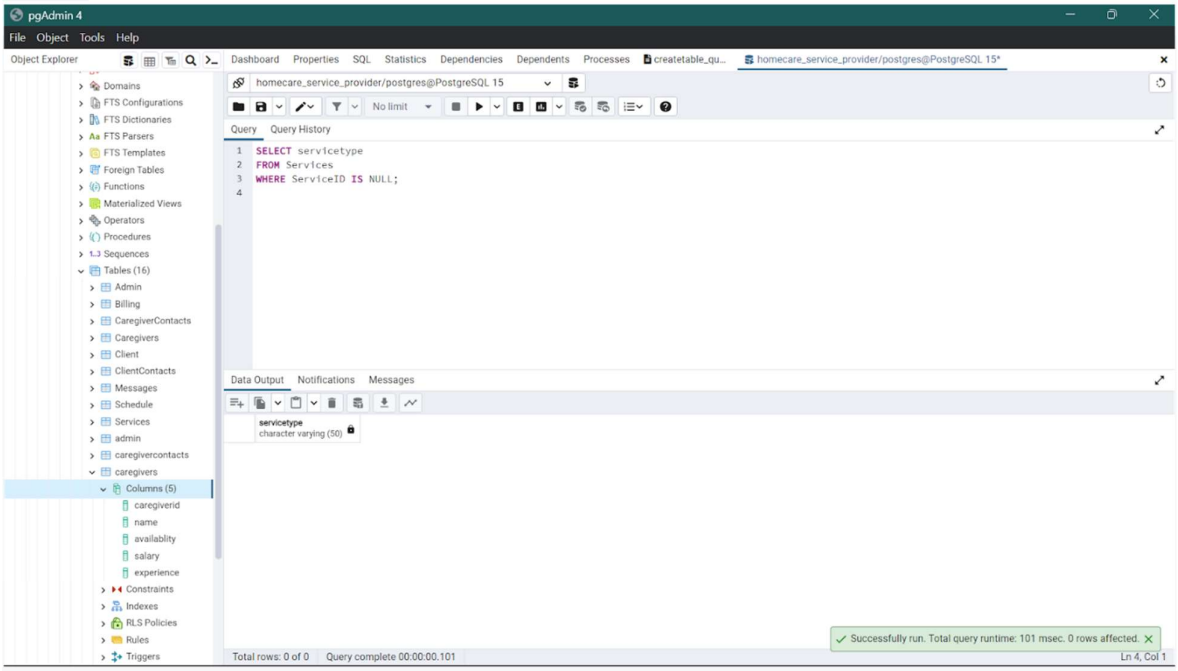
ANS:-




```
SELECT servicetype, cost
FROM Services
ORDER BY cost DESC
LIMIT 5;
```

51. Find Services That Were Never Used: Identify service types that have never been used by any customer.

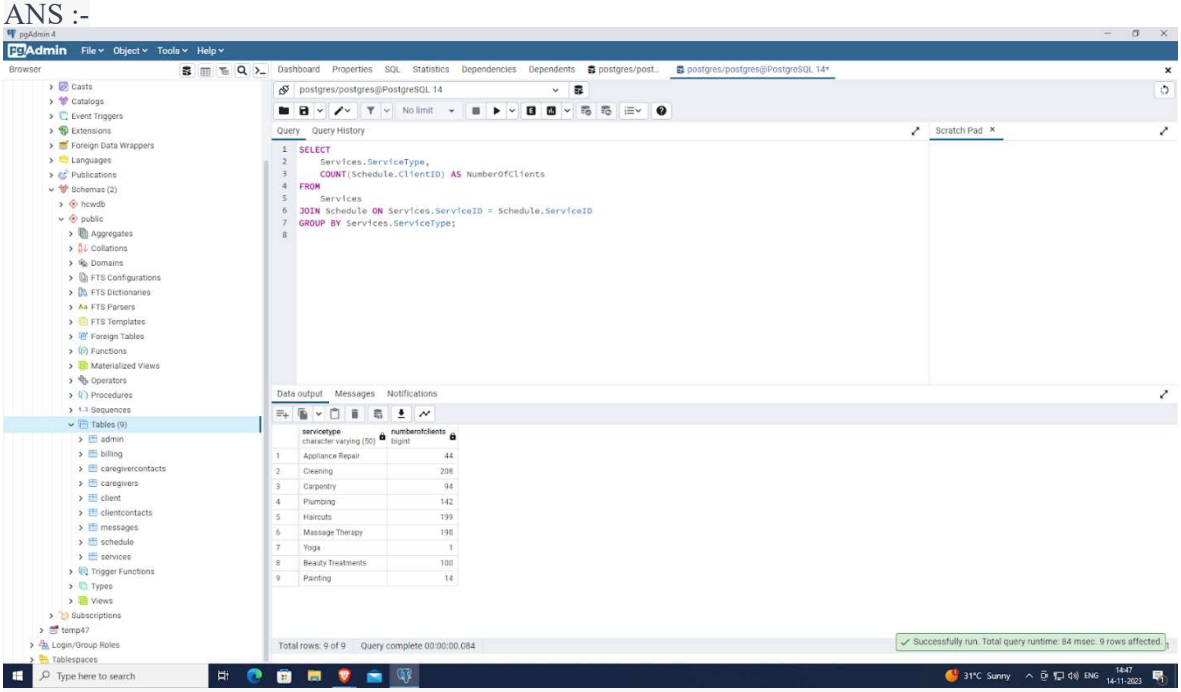
ANS :-




```
SELECT servicetype
FROM Services
WHERE ServiceID IS NULL;
```

52. How many clients have utilized each service type.

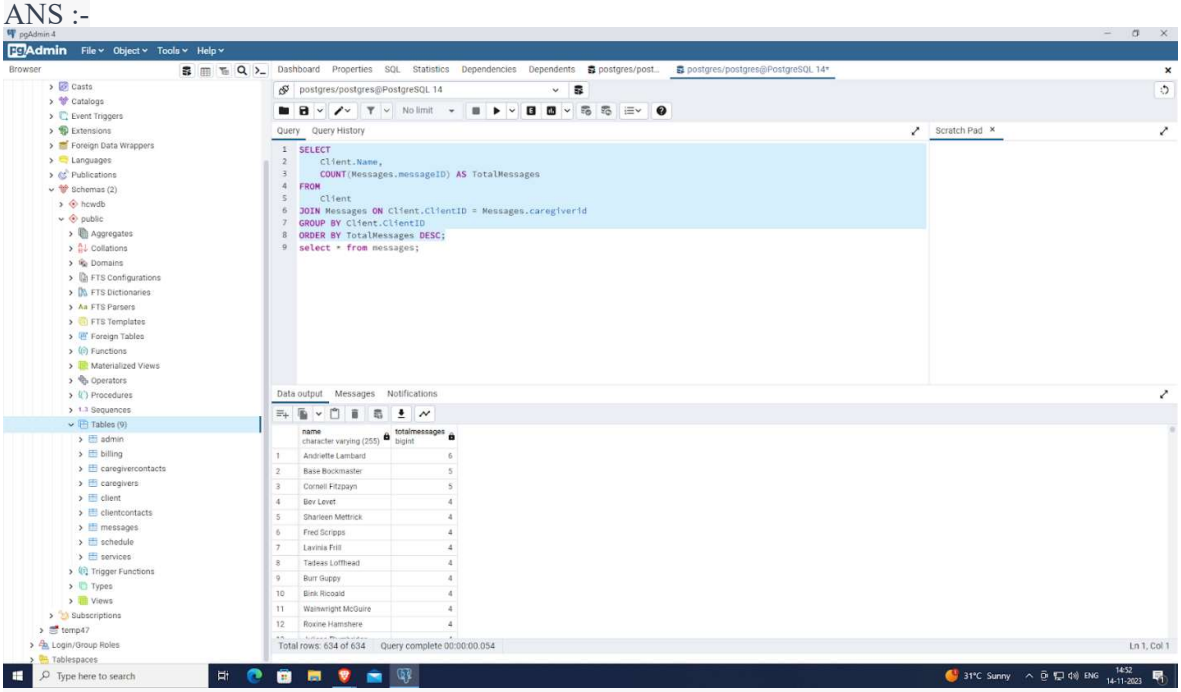
ANS :-




```
SELECT
    Services.ServiceType,
    COUNT(Schedule.ServiceID) AS ServiceCount
FROM
    Services
JOIN Schedule ON Services.ServiceID = Schedule.ServiceID
GROUP BY Services.ServiceType
ORDER BY ServiceCount DESC;
```

53. Identifies the most active caregiver in terms of communication, which could indicate engagement or client issues.

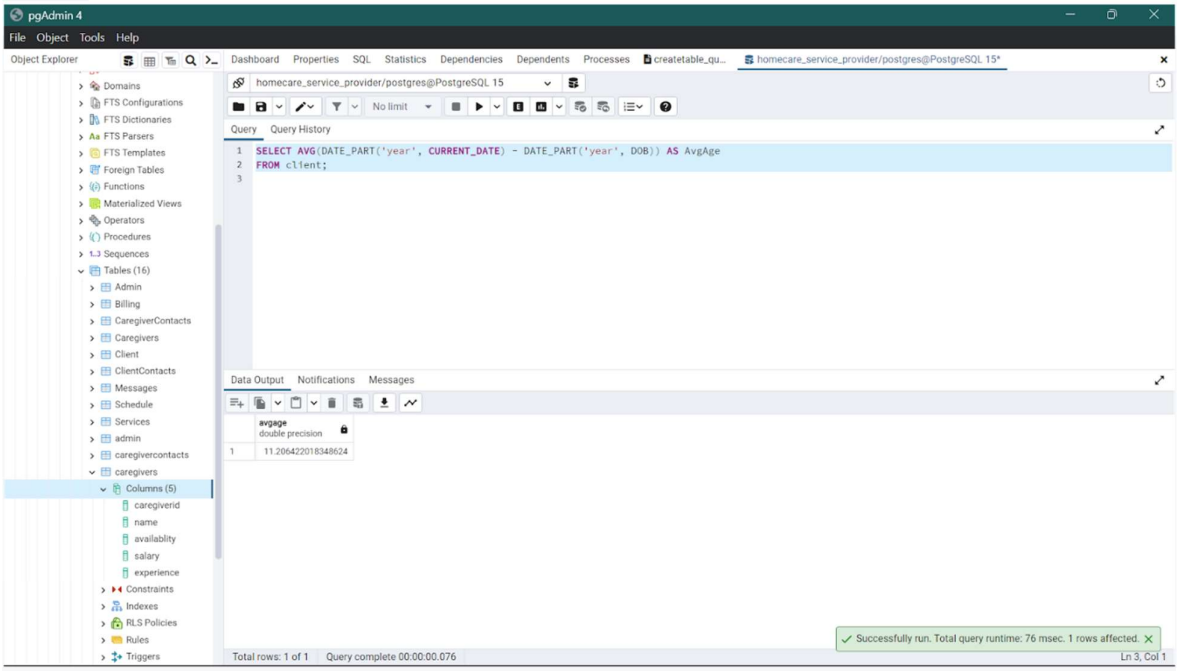
ANS :-




```
SELECT
   Client.Name,
   COUNT(Messages.messageID) AS TotalMessages
FROM
   Client
JOIN Messages ON Client.ClientID = messages.caregiverid
GROUP BY Client.ClientID
ORDER BY TotalMessages DESC;
```

54. Calculate the Average Age of Customers: Calculate the average age of all customers

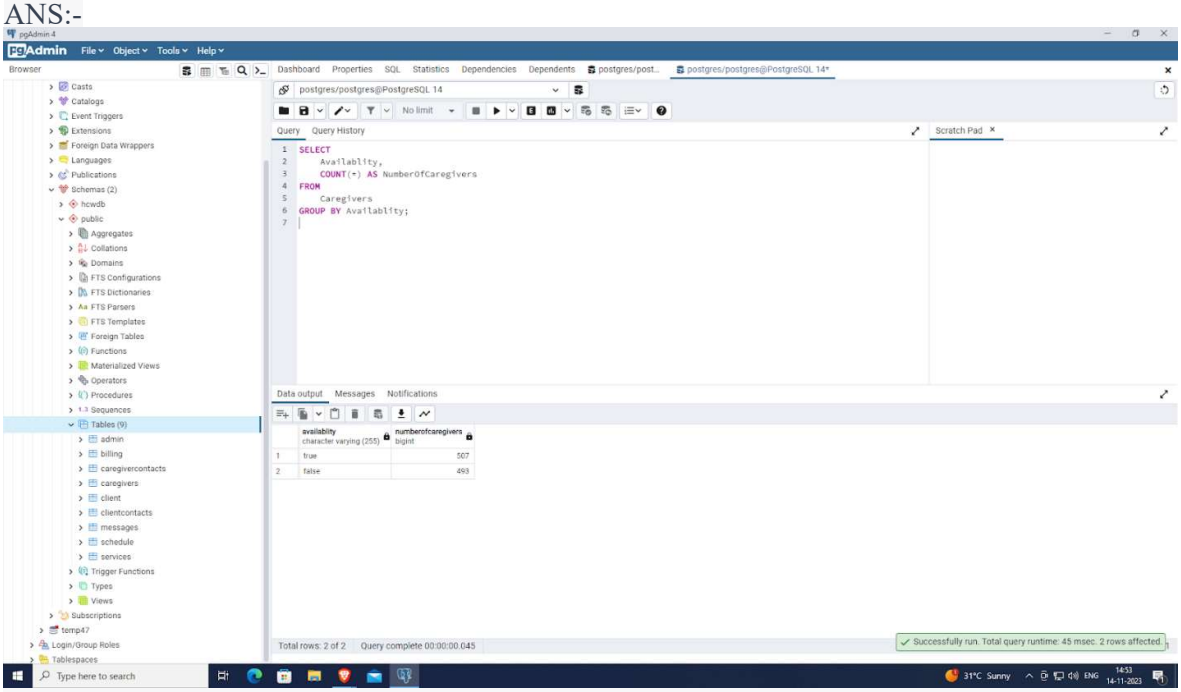
ANS :-



SELECT AVG(DATE_PART('year', CURRENT_DATE) - DATE_PART('year', DOB)) AS AvgAge
FROM Customers;

55. An overview of caregiver availability, which is crucial for scheduling and resource allocation.

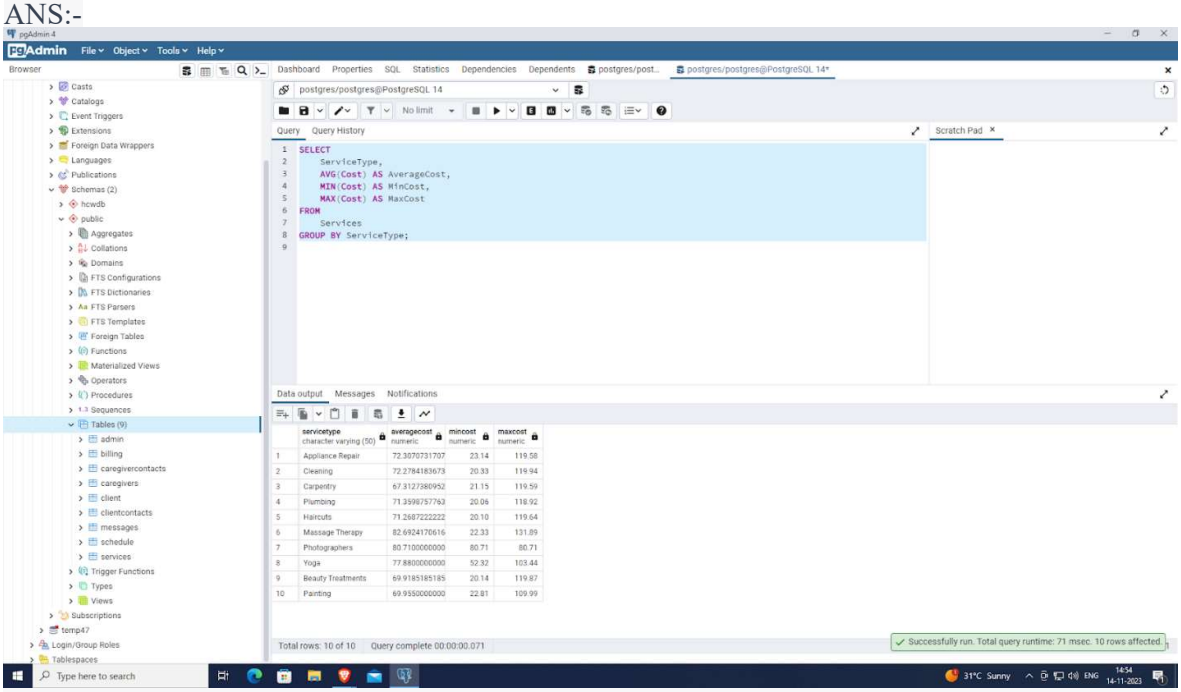
ANS:-




```
SELECT
   Availablity,
   COUNT(*) AS NumberOfCaregivers
FROM
   Caregivers
GROUP BY Availablity;
```

56. The cost range for each type of service, aiding in pricing strategy and market positioning.

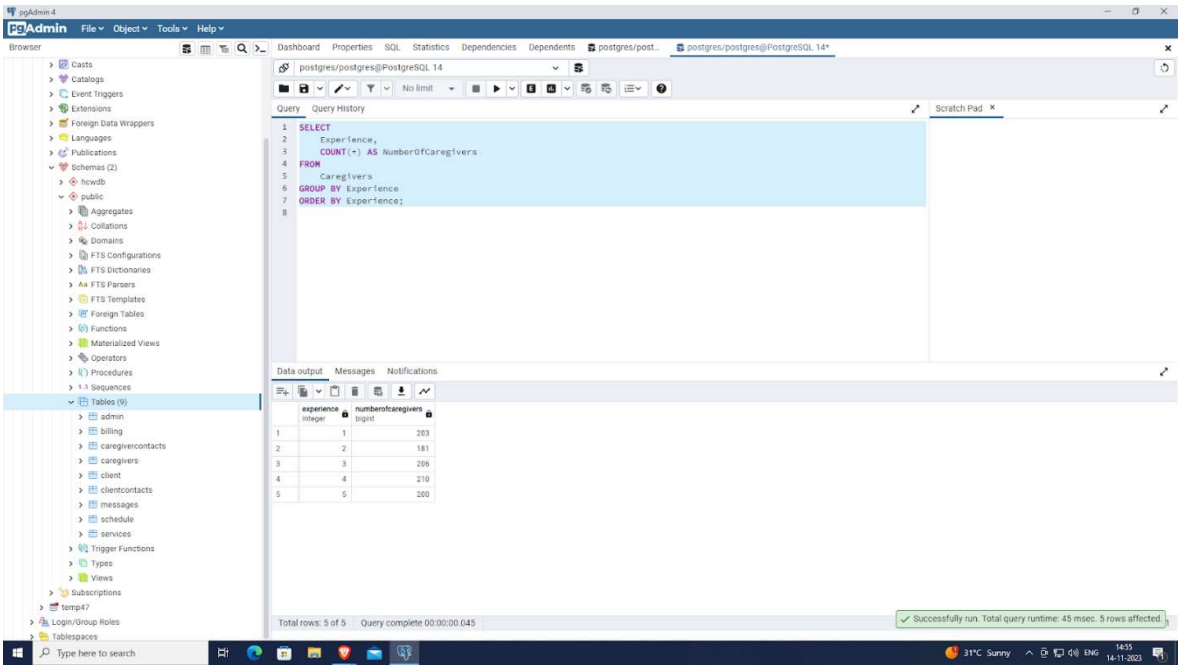
ANS:-




```
SELECT
    ServiceType,
    AVG(Cost) AS AverageCost,
    MIN(Cost) AS MinCost,
    MAX(Cost) AS MaxCost
FROM
    Services
GROUP BY ServiceType;
```

57. The distribution of experience among caregivers, which is essential for service quality assessment.

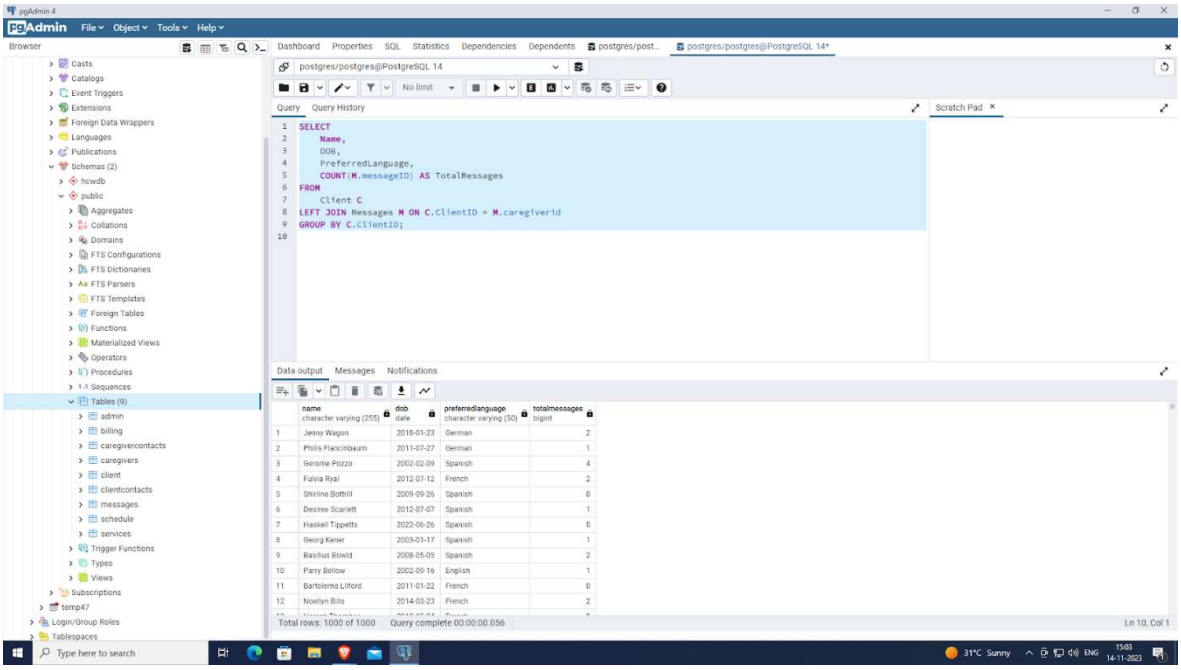
ANS :-




```
SELECT
    Experience,
    COUNT(*) AS NumberOfCaregivers
FROM
    Caregivers
GROUP BY Experience
ORDER BY Experience;
```

58. insights into client demographics, language preferences, and their engagement level in terms of message interactions.

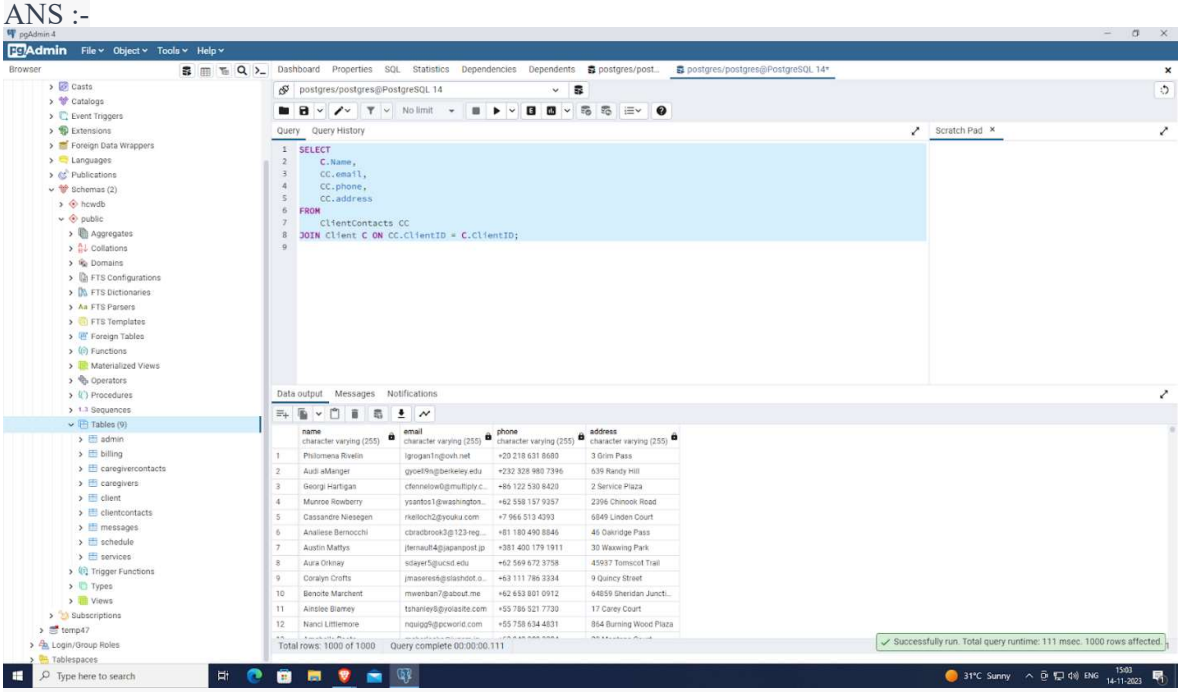
ANS :-




```
SELECT
    Name,
    DOB,
    PreferredLanguage,
    COUNT(M.messageID) AS TotalMessages
FROM
    Client C
LEFT JOIN Messages M ON C.ClientID = M.caregiverid
GROUP BY C.ClientID;
```

59 . Details about the contact information of clients, which is vital for communication and service delivery.

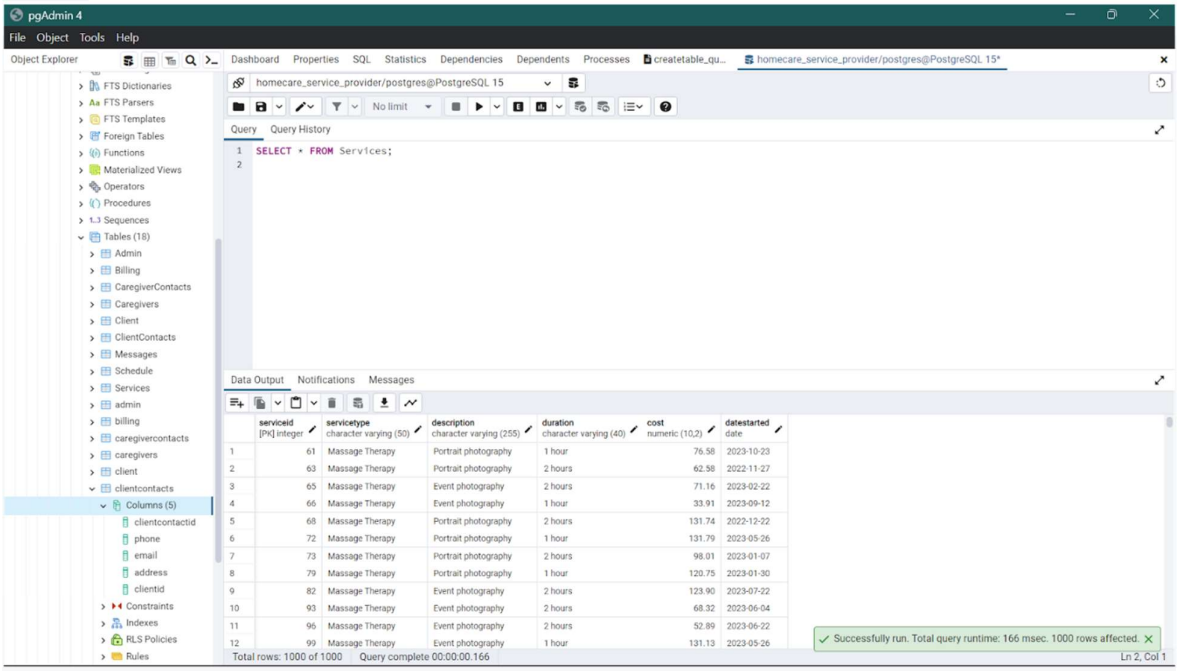
ANS :-




```
SELECT
    C.Name,
    CC.email,
    CC.phone,
    CC.address
FROM
    ClientContacts CC
JOIN Client C ON CC.ClientID = C.ClientID;
```

60.List All Services: Retrieve a list of all services available.

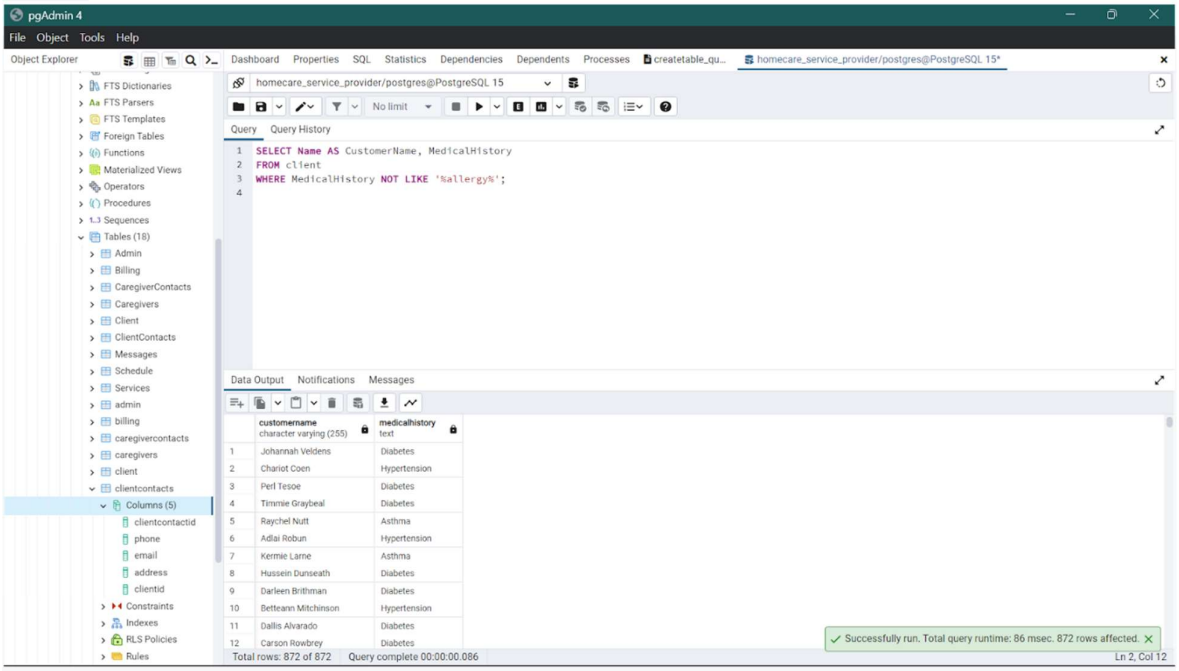
ANS :-



SELECT * FROM Services;

61. Find Customers without Allergies: Retrieve customers who have no allergies listed in their medical history.

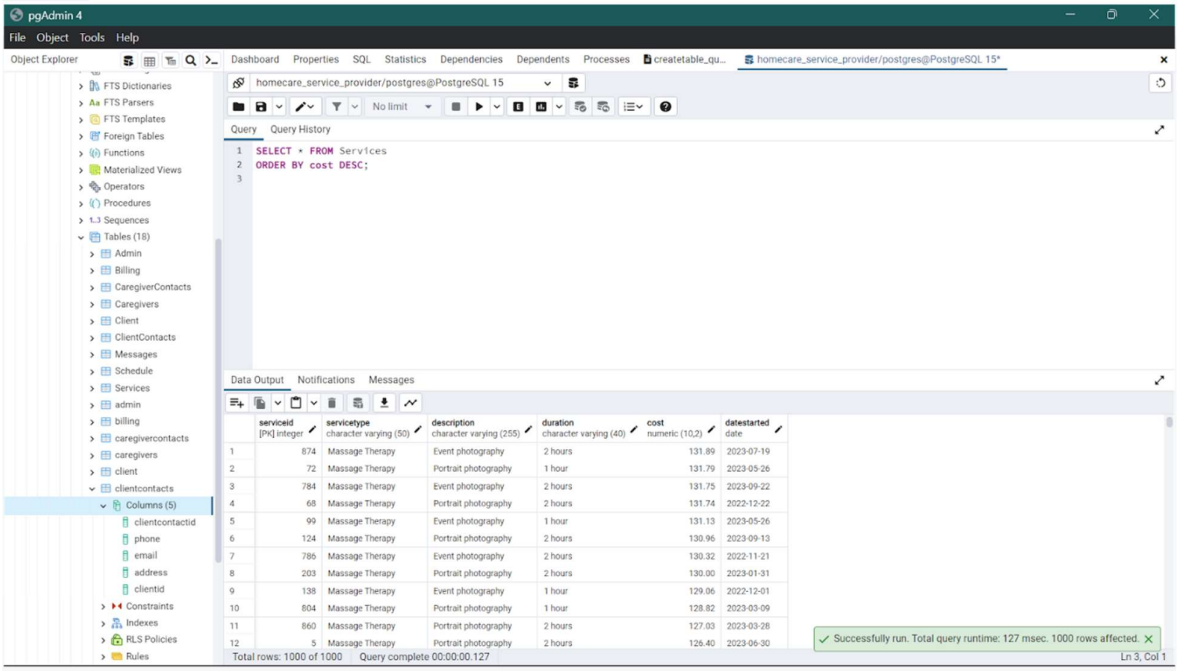
ANS :-




```
SELECT Name AS CustomerName, MedicalHistory
FROM Customers
WHERE MedicalHistory NOT LIKE '%allergy%';
```

62. Sort Services by Cost in Descending Order: List services sorted by their cost in descending order.

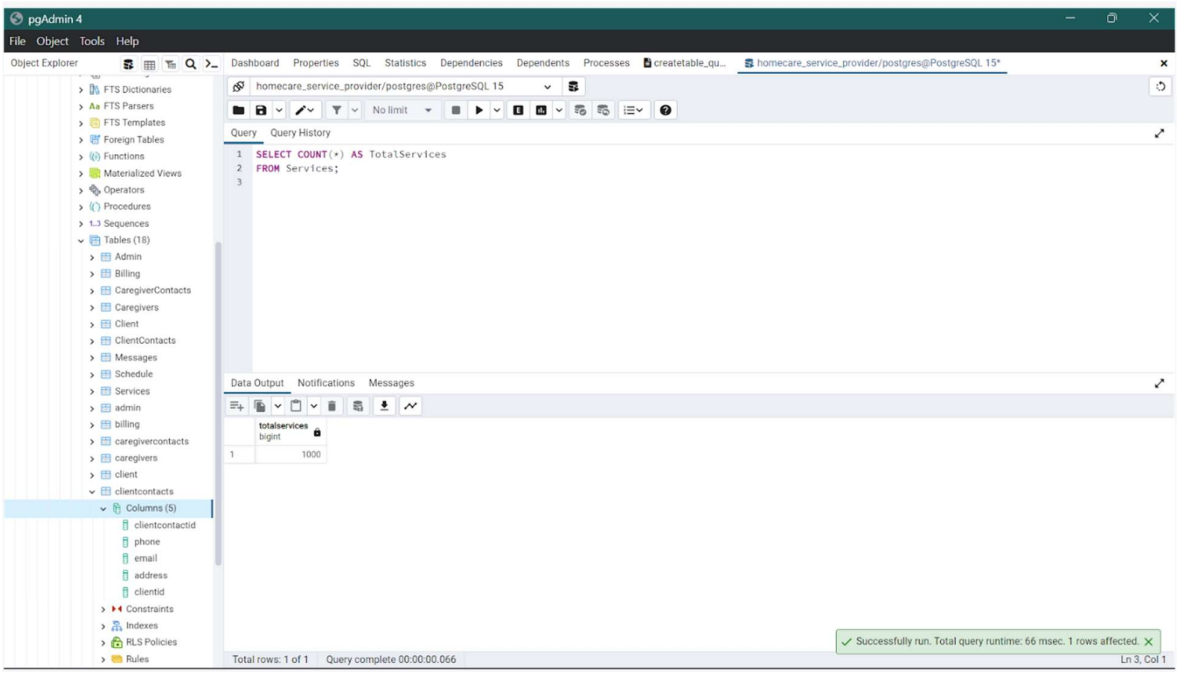
ANS :-




```
SELECT * FROM Services
ORDER BY cost DESC;
```

63. Calculate the Total Number of Services: Count the total number of services available.

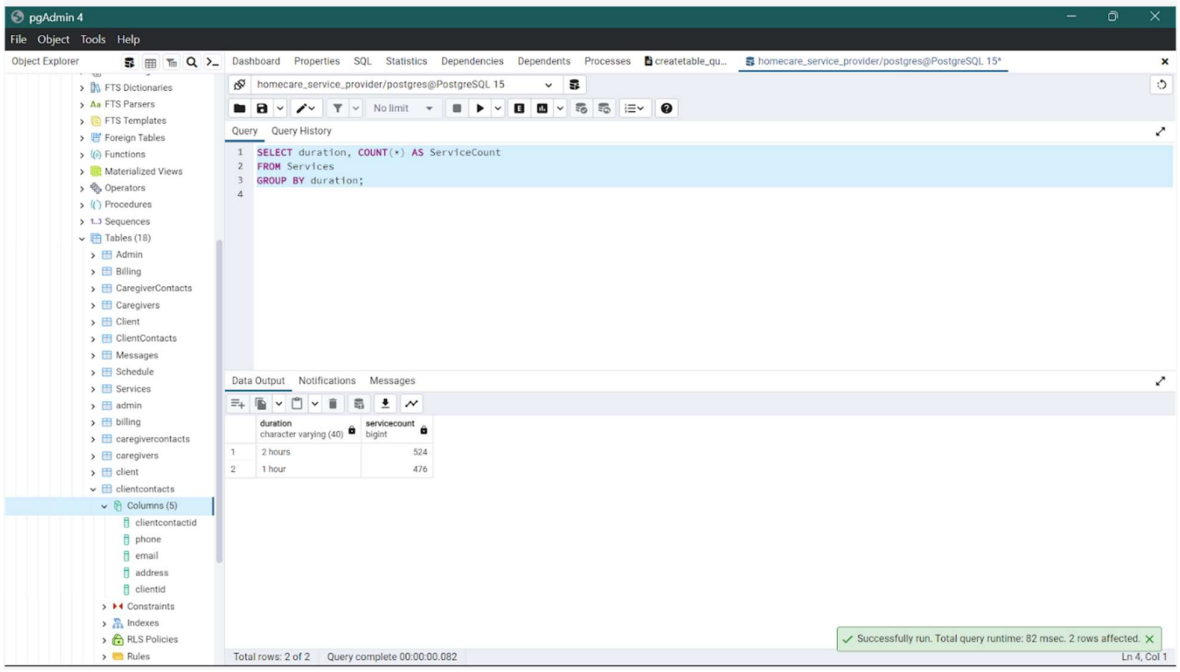
ANS :-



```
SELECT COUNT(*) AS TotalServices
FROM Services;
```

64. Group Services by Duration: Group services by their duration and calculate the count in each group.

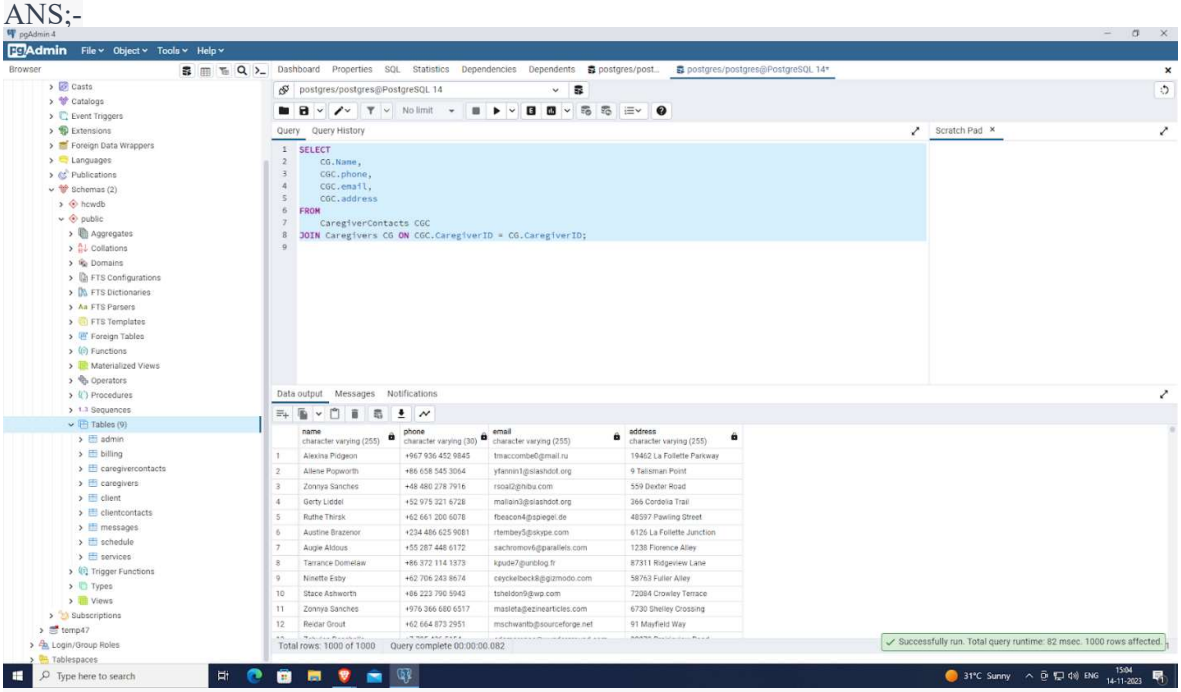
ANS :-




```
SELECT duration, COUNT(*) AS ServiceCount
FROM Services
GROUP BY duration;
```

65. Provides contact details of caregivers, crucial for internal coordination and emergency contact.

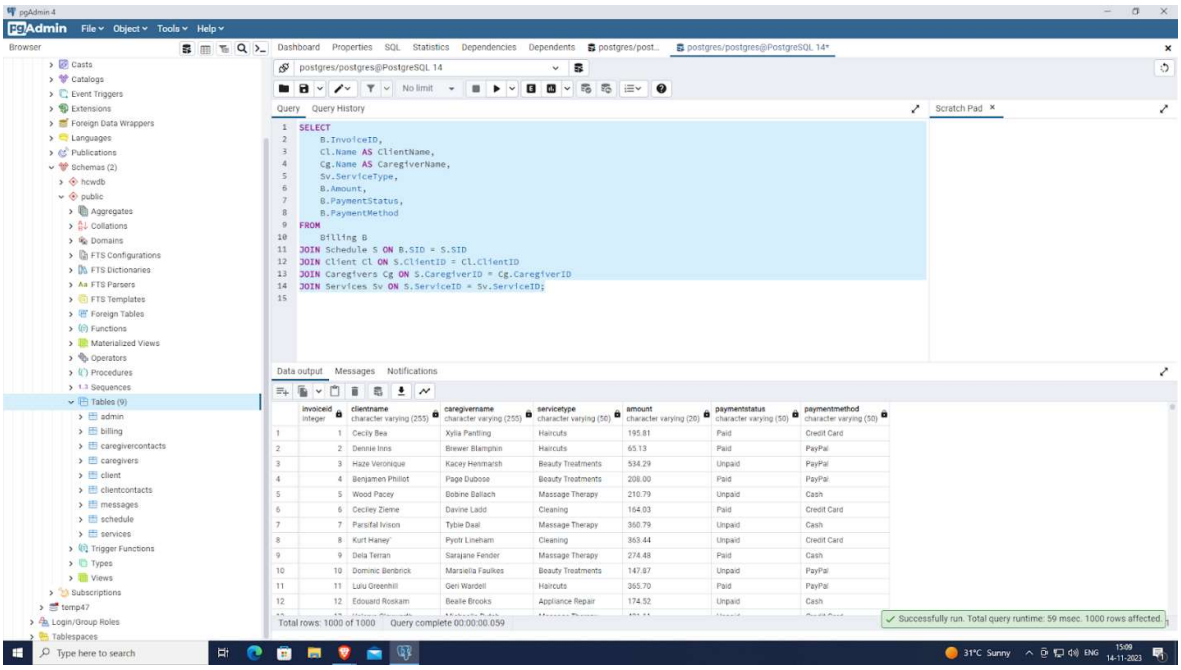
ANS;-




```
SELECT
    CG.Name,
    CGC.phone,
    CGC.email,
    CGC.address
FROM
    CaregiverContacts CGC
JOIN Caregivers CG ON CGC.CaregiverID = CG.CaregiverID;
```

66. A detailed view of billing for services, including client and caregiver details, service types, and payment information, offering a comprehensive financial perspective.

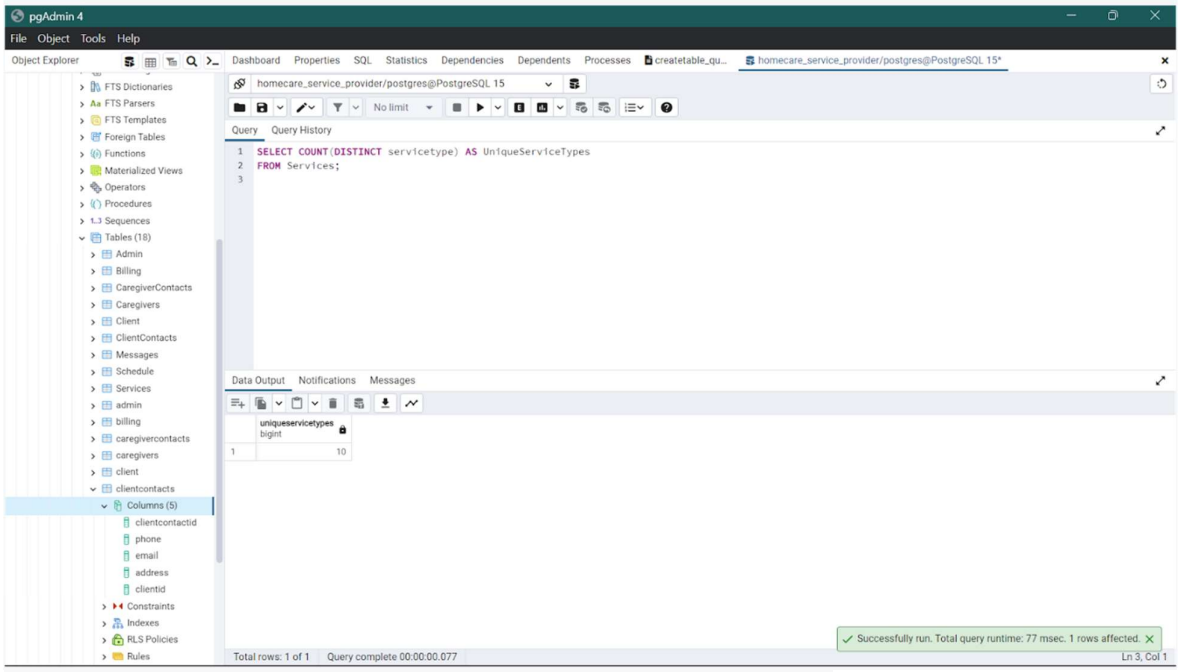
ANS :-




```
SELECT
    B.InvoiceID,
    Cl.Name AS ClientName,
    Cg.Name AS CaregiverName,
    Sv.ServiceType,
    B.Amount,
    B.PaymentStatus,
    B.PaymentMethod
FROM
    Billing B
JOIN Schedule S ON B.SID = S.SID
JOIN Client Cl ON S.ClientID = Cl.ClientID
JOIN Caregivers Cg ON S.CaregiverID = Cg.CaregiverID
JOIN Services Sv ON S.ServiceID = Sv.ServiceID;
```

67. Count Unique Service Types: Count the number of unique service types available.

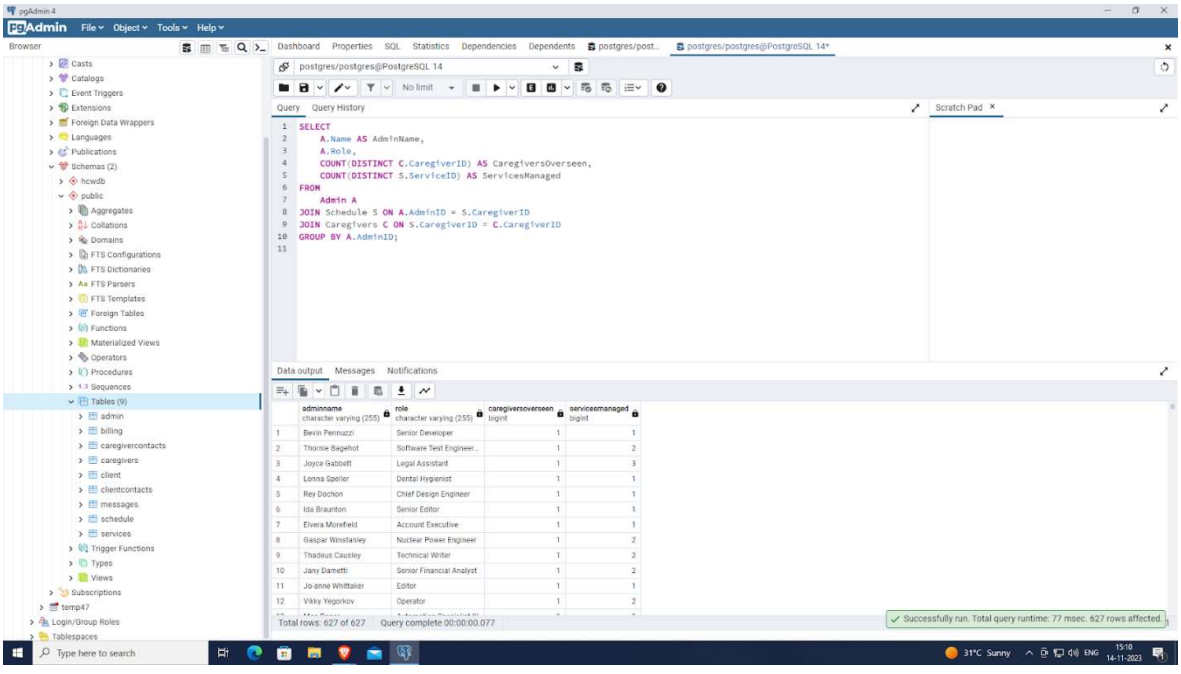
ANS:-




```
SELECT COUNT(DISTINCT servicetype) AS UniqueServiceTypes
FROM Services;
```

68. The roles of admin staff in managing caregivers and services, indicating their workload and areas of responsibility.

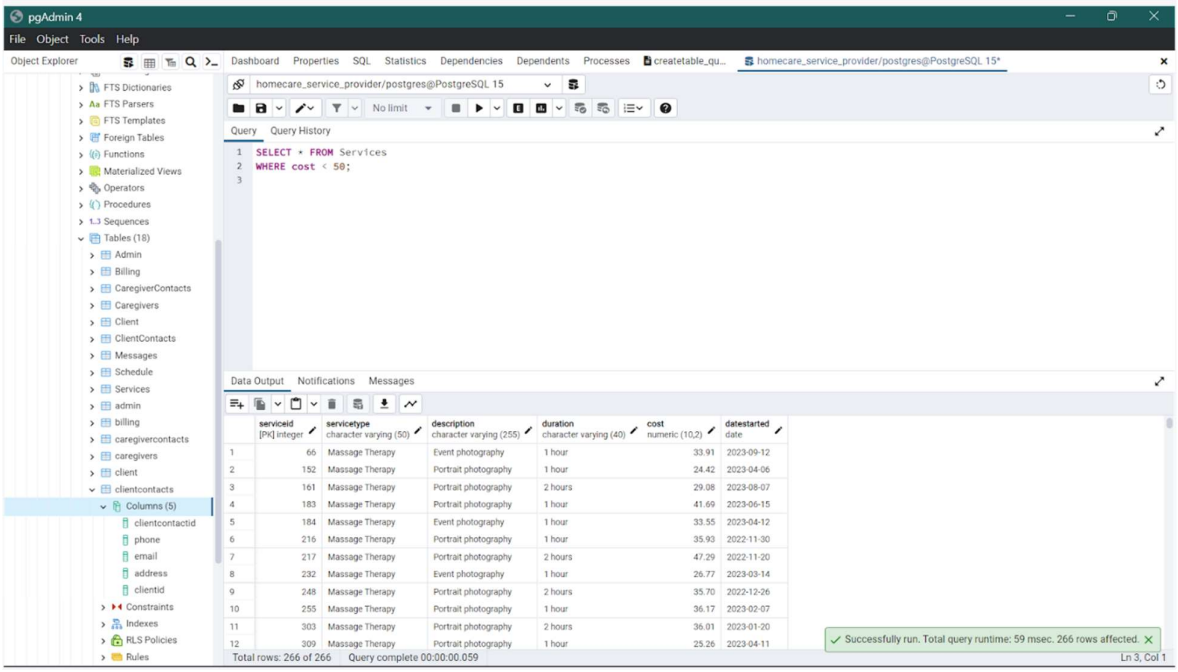
ANS :-



```
SELECT
    A.Name AS AdminName,
    A.Role,
    COUNT(DISTINCT C.CaregiverID) AS CaregiversOverseen,
    COUNT(DISTINCT S.ServiceID) AS ServicesManaged
FROM
    Admin A
JOIN Schedule S ON A.AdminID = S.CaregiverID
JOIN Caregivers C ON S.CaregiverID = C.CaregiverID
GROUP BY A.AdminID;
```

69. List Services with a Cost Less Than 50: Retrieve services with a cost less than 50.

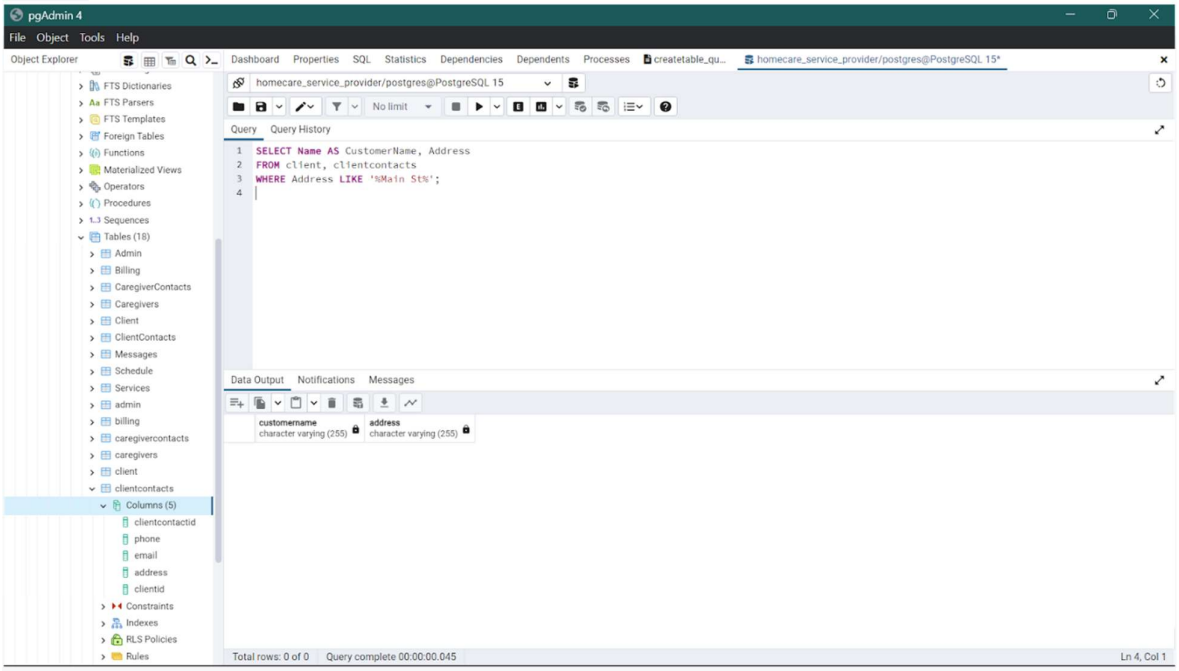
ANS :-




```
SELECT * FROM Services
WHERE cost < 50;
```

70. Find Customers with Addresses Containing 'Main St': Retrieve customers who live on streets with 'Main St' in their address.

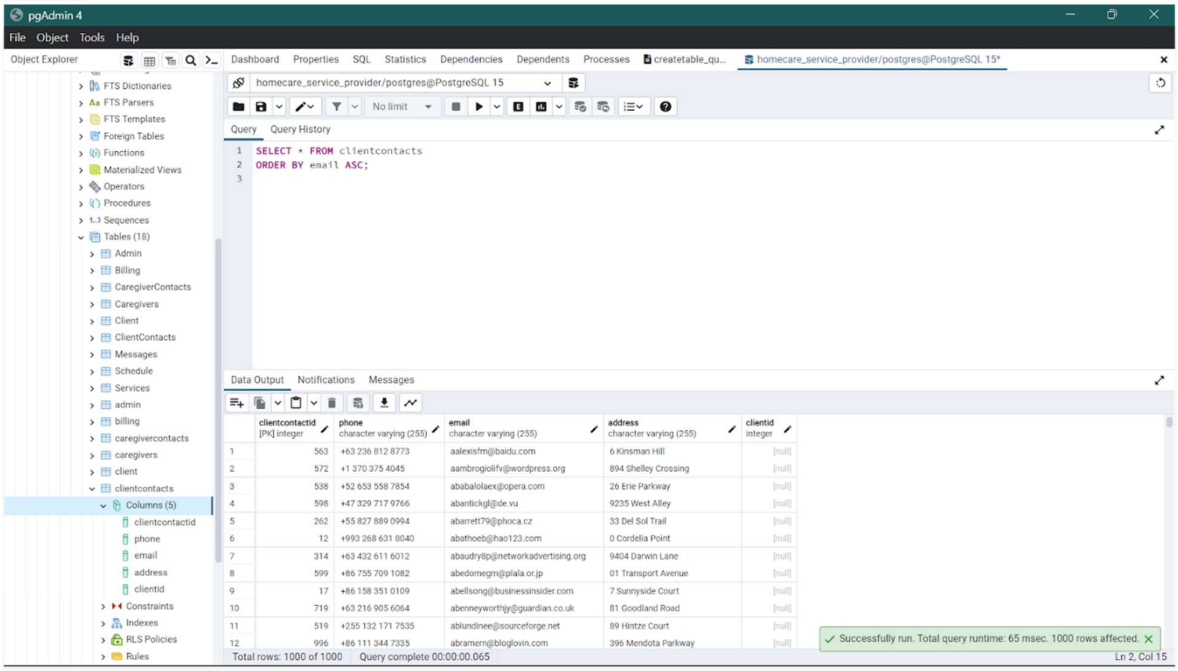
ANS :-




```
SELECT Name AS CustomerName, Address
FROM Customers
WHERE Address LIKE '%Main St%';
```

71. Sort Customers by Contact Number in Ascending Order: List customers sorted by their contact numbers in ascending order.

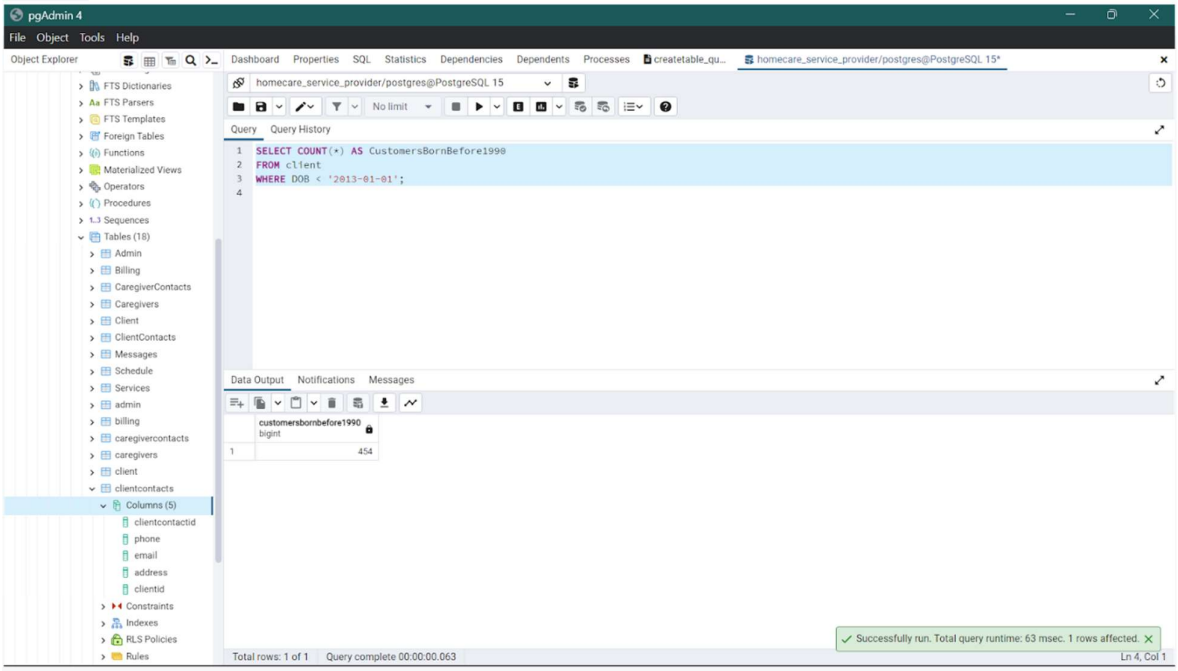
ANS :-



SELECT * FROM clientcontacts
ORDER BY email ASC;

72. Count Customers Born Before 1990: Count the number of customers born before the year 1990.

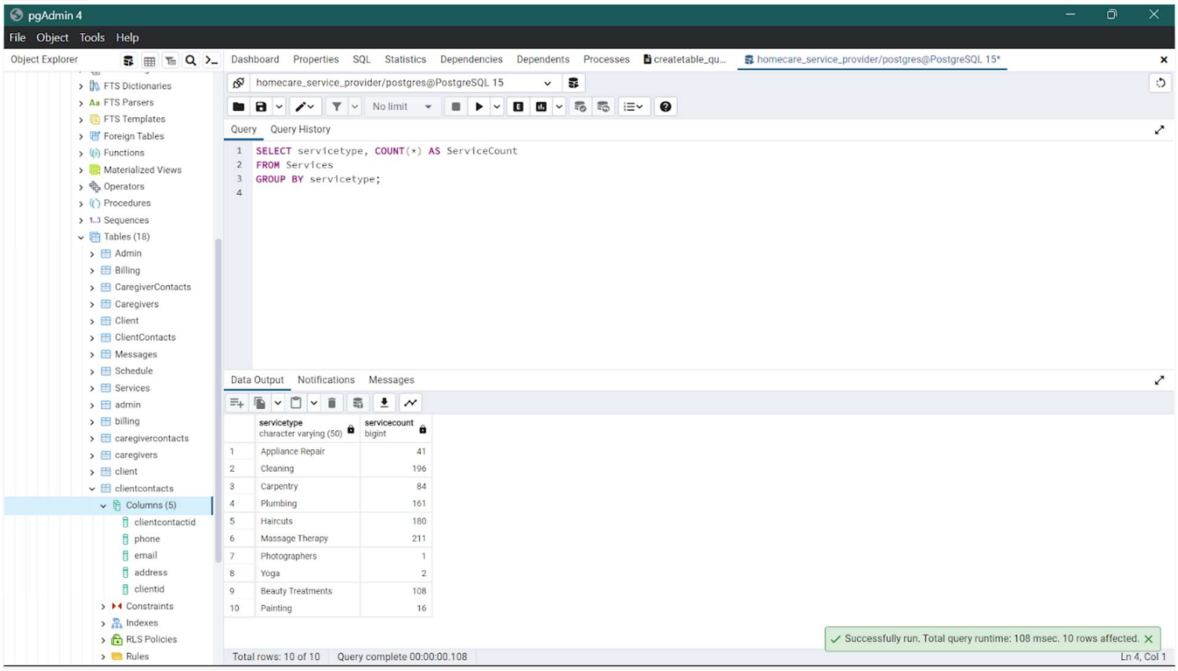
ANS :-




```
SELECT COUNT(*) AS CustomersBornBefore1990
FROM Customers
WHERE DOB < '2013-01-01';
```

73. Group Services by Service Type and Count: Group services by service type and count the number of each service type.

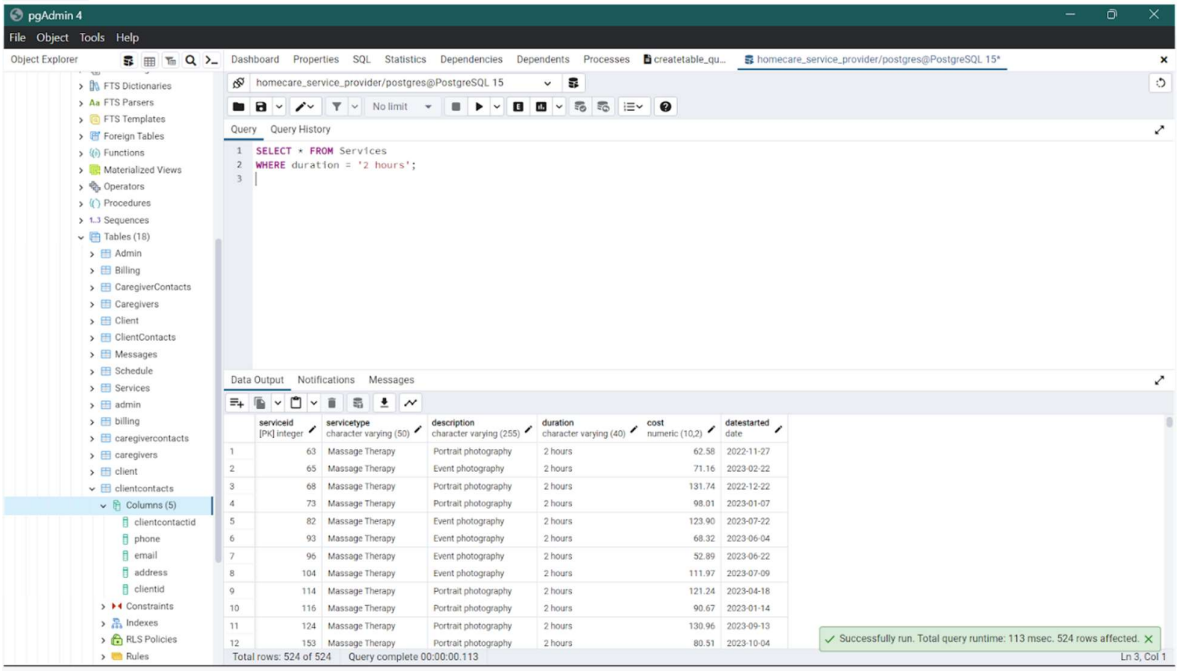
ANS :-




```
SELECT servicetype, COUNT(*) AS ServiceCount
FROM Services
GROUP BY servicetype;
```

74. List Services with a Duration of '2 hours': Retrieve services with a duration of '2 hours'.

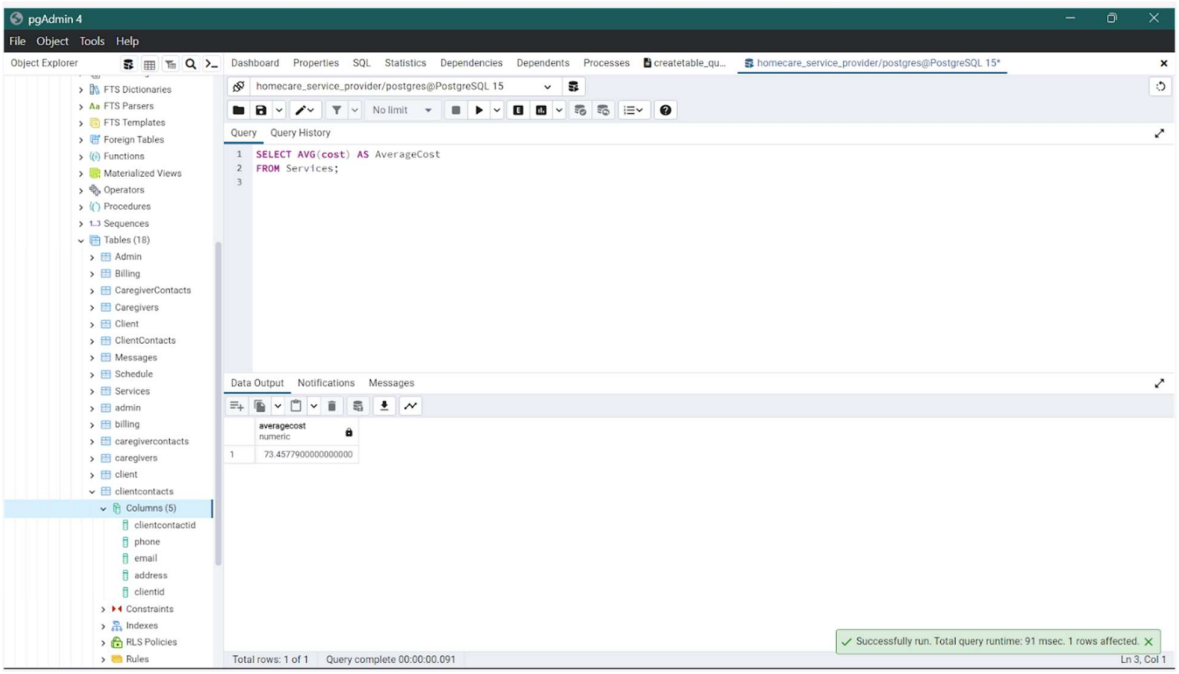
ANS :-




```
SELECT * FROM Services
WHERE duration = '2 hours';
```

75. Calculate the Average Cost of Services: Calculate the average cost of all services

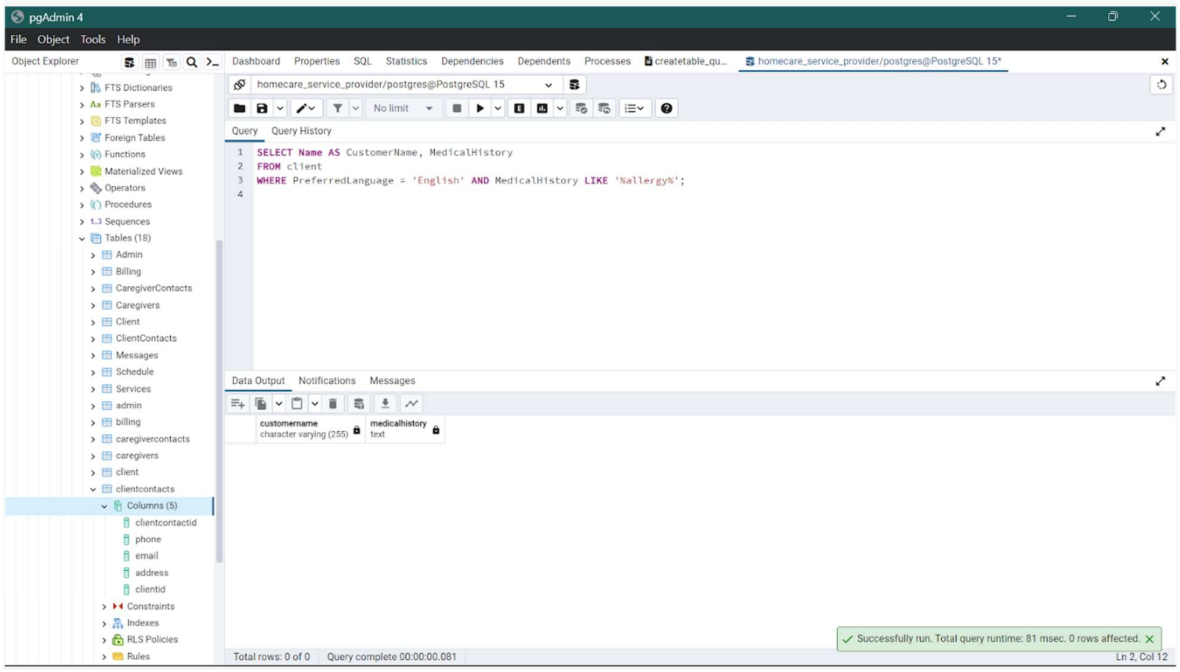
ANS :-



```
SELECT AVG(cost) AS AverageCost
FROM Services;
```

76. Find Customers Who Prefer 'English' and Have Allergies: Retrieve customers who prefer 'English' and have allergies listed in their medical history.

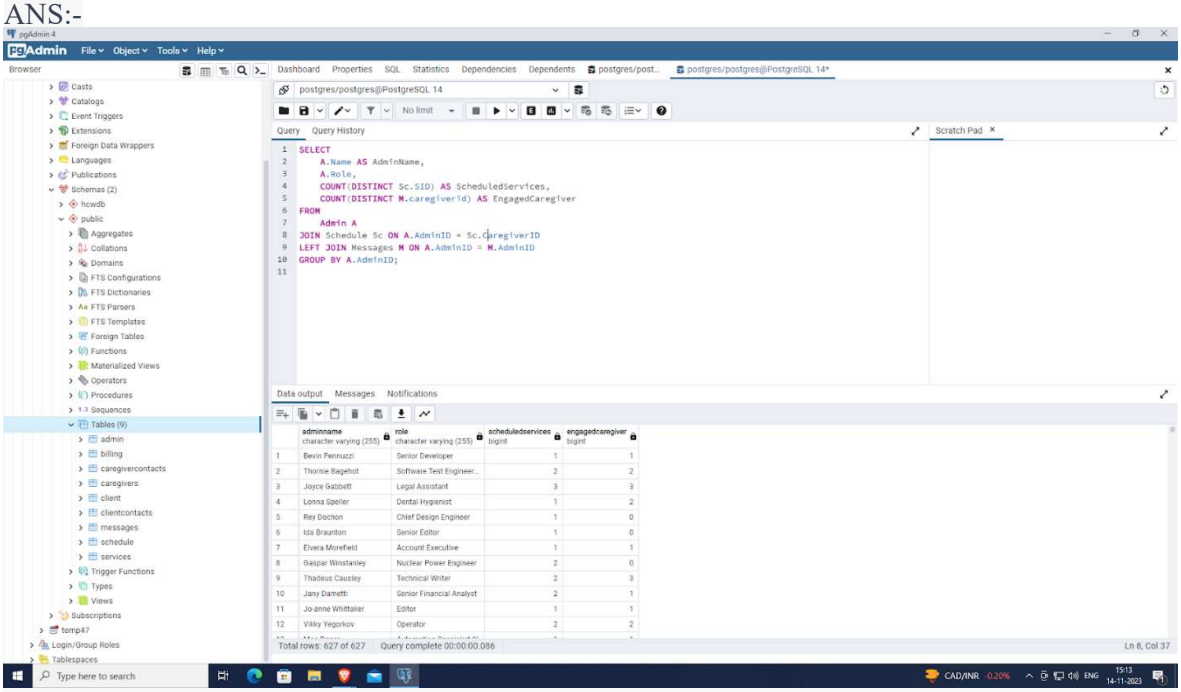
ANS :-




```
SELECT Name AS CustomerName, MedicalHistory
FROM Customers
WHERE PreferredLanguage = 'English' AND MedicalHistory LIKE '%allergy%';
```

77. How each admin is involved in scheduling services and their level of direct engagement with clients.

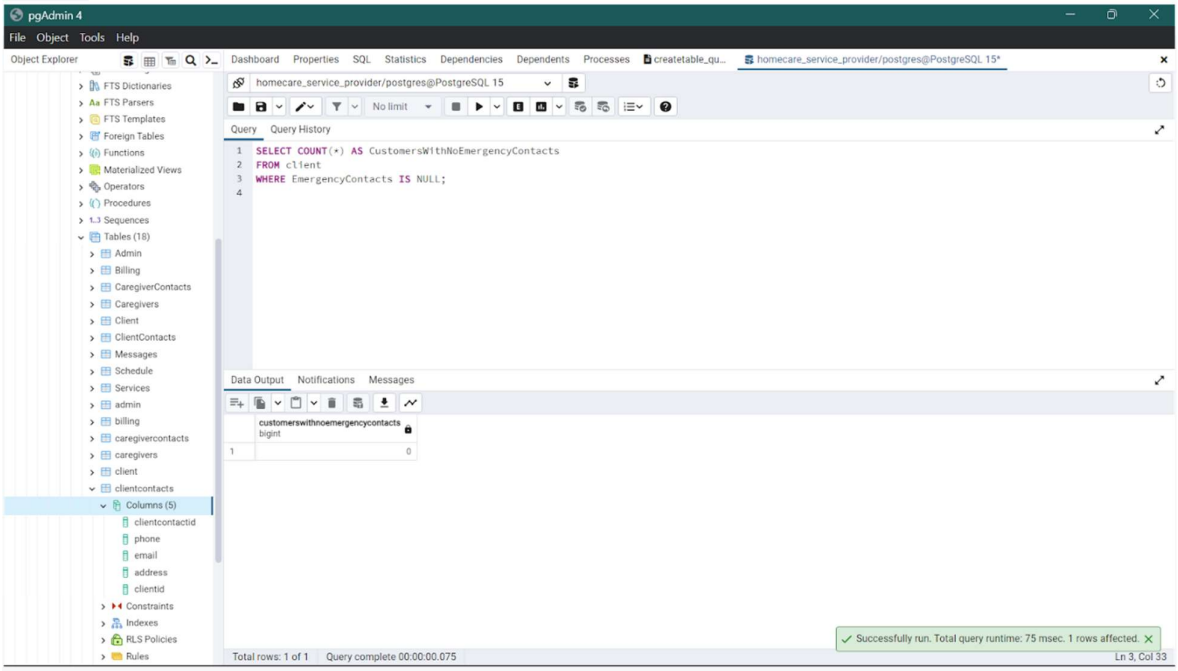
ANS:-




```
SELECT
    A.Name AS AdminName,
    A.Role,
    COUNT(DISTINCT Sc.SID) AS ScheduledServices,
    COUNT(DISTINCT M.caregiverid) AS EngagedCaregiver
FROM
    Admin A
JOIN Schedule Sc ON A.AdminID = Sc.CaregiverID
LEFT JOIN Messages M ON A.AdminID = M.AdminID
GROUP BY A.AdminID;
```

78. Count Customers with No Emergency Contacts: Count the number of customers who have no emergency contacts specified.

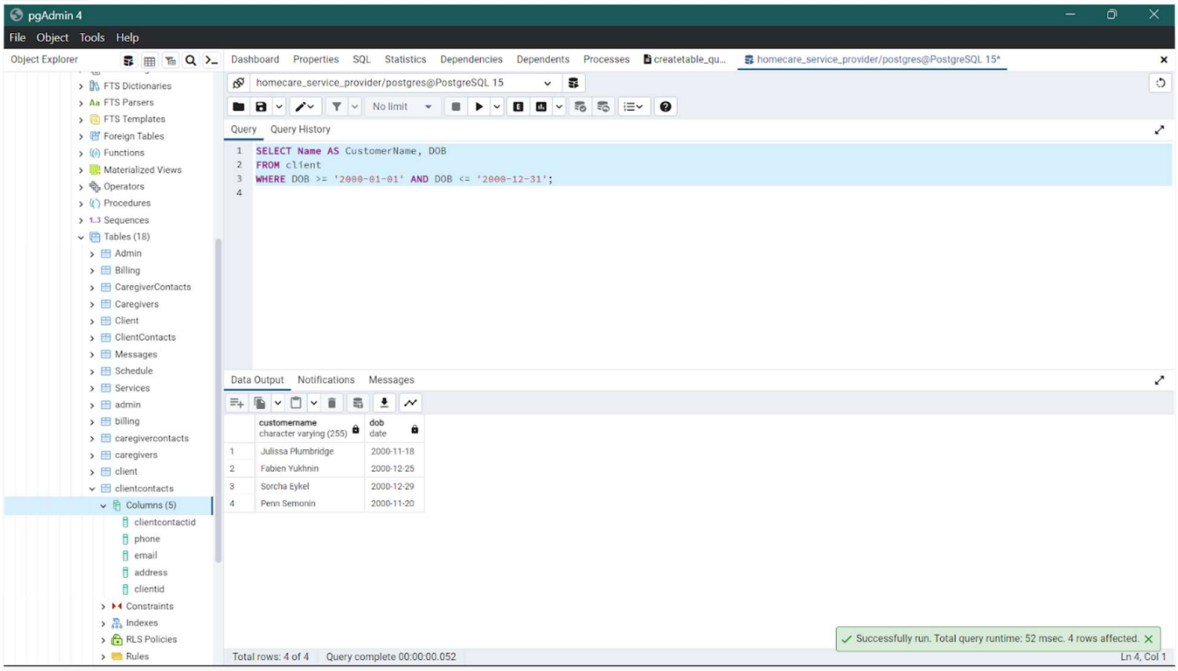
ANS :-




```
SELECT COUNT(*) AS CustomersWithNoEmergencyContacts
FROM Customers
WHERE EmergencyContacts IS NULL;
```

79. Find Customers Born in 2000: Retrieve customers who were born in the year 2000.

ANS :-




```
SELECT Name AS CustomerName, DOB
FROM Customers
WHERE DOB >= '2000-01-01' AND DOB <= '2000-12-31';
```