SE 201.3 - Systems Analysis and Design

Group Assignment – Group BL

Veterinary Clinic Management System

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Introduction to the Veterinary Clinic Management System (VCMS)

Veterinary clinics must now adjust and modernize their management techniques to meet the demands of a fast-paced world where pet ownership is growing, and high-quality veterinary treatment is becoming more and more necessary. Being a respected veterinary clinic committed to offering pets the best treatment possible, we recognize how critical it is to keep up with the times and serve the demands of our expanding clientele. In considering this, we understand the need for a complete Veterinary Clinic Management System (VCMS) to improve our workflow, boost productivity, and raise the standard of care we give to our beloved animal patients.

Our proposed VCMS is a big step in transforming how we monitor important areas of our clinic's operations. Our system aims to meet the many needs of our clinic while offering useful insights through insightful reports, from keeping correct pet lists to effectively handling appointments, medicines, and billing. We hope that putting this system into place will lead to a radical change in the way we provide care, with an emphasis on increasing operational effectiveness, speeding administrative duties, and ultimately improving the standard of living for our animal friends.
We established the context for the importance of the suggested VCMS in our veterinary clinic with this introduction. It emphasizes our dedication to changing with our patients' and clients' requirements while keeping the main objective of raising the standard of care and service delivery at the forefront of our thinking.

In addition to the introduction of the Veterinary Clinic Management System (VCMS) as outlined, incorporating telemedicine, digital signatures, and automated bill payments as additional business benefits seamlessly into the last paragraph could be achieved as follows:
With this introduction, we established the stage for the significance of the recommended VCMS in our veterinary clinic. It highlights our commitment to adapting to the needs of our patients and clients while maintaining the primary goal of lifting the bar for care and service delivery at the forefront of our minds. Through the integration of telemedicine remote technology-based healthcare which provides diagnosis, treatment, and consultations without the need for in-person visits, we hope to increase patient reach, decrease wait times, and improve accessibility.

In additionally, digital signatures for document signing also improve security and expedite paperwork procedures, doing away with paper papers, cutting expenses, and simplifying approval processes.
Furthermore, the use of electronic systems for automated bill payments will eliminate human labor and mistakes, enhance cash flow management, decrease late payments, and improve customer satisfaction. These improvements are in line with our dedication to quality and innovation in pet care, which will eventually improve the experience for both our customers and our animal patients.

Feasibility Report

- **Introduction**

The goal of the Veterinary Clinic Management System (VCMS) is to improve the quality of care given to animal patients while modernizing and streamlining veterinarian clinic operations to meet the increasing needs of pet owners. The technical, financial, operational, and scheduling viability of putting the VCMS project into action are all assessed in this feasibility assessment.

- **Technical Feasibility -:**

    - It is expected of users and analysts to have a basic knowledge of the software programs and computer systems that are usually used in veterinary clinics. Programs for training will be given to improve VCMS knowledge.
    - The medium-sized VCMS project includes the creation of a user interface, database, component for booking appointments, billing system, and reporting features. The necessary technology is widely accessible and expandable to meet future needs.
    - The veterinary clinics' current IT system and the VCMS are intended to work together harmoniously. To make sure that data transfers smoothly and that legacy systems are compatible, compatibility testing will be carried out.

- **Operational Feasibility -:**

    - Lead veterinarian or panel take responsibility to lead the VCMS project and give guidance.
    - The veterinary staff members are excited about the VCMS and ready to take part in training courses to increase their knowledge of the system.
    - The clinic's management has budgeted and allocated resources to the VCMS project because they are dedicated to its success.
    - The veterinary clinic is well-suited to joining the VCMS because of its environment of innovation and constant development. To ensure an effortless switch and mass acceptance of the new system, change management techniques will be implemented.

- **Economic Feasibility -:**

    - Development Cost-: Purchasing hardware, developing software, and integrating the system are all estimated development expenses for the VCMS project.
    - Operational Cost-: Ongoing operational costs for maintenance, support, training, and system upgrades are projected to this part.

- Tangible Benefits-: Benefits from the VCMS are expected to include lower administrative costs, more income from improved services, and cost savings through increased efficiency.
- It is anticipated that the clinic's reputation and long-term survival will be enhanced by qualitative benefits including better patient care, increased customer happiness, and competitive advantage.

- **Schedule Feasibility-:**

  - The VCMS project has a good chance of being finished in the allotted time given the project strategy and resource allocation.
  - To handle potential scheduling risks such resource limitations, technological difficulties, and scope modifications, contingency plans have been created. To guarantee adherence to the project deadline, regular progress monitoring and communication will take place.

According to the feasibility report, there is a good chance that the Veterinary Clinic Management System (VCMS) project will be finished on schedule and that it is technically, financially, and operationally sound. By modernizing clinic procedures and improving patient care, the VCMS will help the veterinary clinic remain successful in the long run.

Practical approach of Agile methodology

When considering the development of our Veterinary Clinic Management System, Agile methodology is aligning with our software development's dynamic nature as well as continuous feedback. As below we follow the Agile methodology to develop the system and applied it.

1.Requirement understanding:

As outlined in the proposal, our team understands what should be included in a veterinary clinic's system. Then we include things like billing, prescriptions and managing appointments.

2. Breaking tasks into chunks:

We create user stories by breaking down these requirements into small pieces. In the system each user here is representing a specific functionality or a feature.

3. Prioritizing and planning:

In the planning process we consider what should be the first and how long will it take for a complete work. And based on their importance to the clinic, our team prioritizes these user stories.

4. Iterative Development:

Typically, 2-4 weeks long, in sprints our team developed the system. Then we do our testing, developing, and delivering to the clinic, in each sprint as we work on a set of user stories.

5. Continuous Feedback:

Our team gathers feedback from the stakeholders and the clinical staff inside the process of development. That was helpful to allow necessary adjustments and for being on the right track.

6. Reflection and Regular Reviews:

We review built things with the clinical staff at the end of each sprint as well as we discuss what should be improved, what went well and changes for our plans.

7. Flexibility and Adaptation:

To meet the clinic's needs effectively, the system evolves by adapting to meet new requirements and changes that may arise during the process of development.

8. Continuous Improvement:

To deliver a high-quality system which fits to the clinic's needs, our team is always learning and making our development process better as we go.

By using this agile methodology, we ensure our system is developing efficiently, frequently communicating, collaborating, and adapting to ensure system success.

Requirement collection methods followed.

Reception Area: Observe how client inquiries and appointments are managed to streamline the initial interaction process. Focus on understanding the flow from first contact to appointment scheduling to identify areas for improvement.

Veterinarian Consultations: Examine how medical records are accessed and how prescriptions are created during consultations. This will help in understanding the workflow and pinpointing inefficiencies in current practices.

Billing Process: Analyze the billing process from generation to management. This includes evaluating how bills are created, processed, and tracked to identify potential enhancements.

Document Analysis: Review existing documentation to grasp current processes and data management needs:

- **Patient Records:** Assess the format and details of current pet medical records to identify any gaps or areas for improvement.
- **Appointment Logs:** Analyze the existing method for scheduling and tracking appointments to streamline the process.
- **Billing Records:** Review the current billing process and pinpoint areas that could benefit from improvements.

Prototyping: Create initial prototypes or wireframes to visualize system functionalities and gather feedback:

- **Wireframes:** Develop key interface wireframes such as the admin dashboard, appointment management, and billing systems.
- **Interactive Prototypes:** Create clickable prototypes to simulate user interactions, facilitating detailed feedback on usability and design.

User Stories and Use Cases: Develop user stories and use cases to capture detailed functional requirements:

- **User Stories:** Collect stories from different user perspectives to understand their specific needs (e.g., "As a veterinarian, I want to access pet medical history to provide accurate treatments").
- **Use Cases:** Document detailed use cases for functionalities like appointment scheduling, prescription creation, and billing.

Brainstorming Sessions: Hold brainstorming sessions to generate ideas and explore new functionalities that stakeholders might not have considered. Discuss potential integration with telemedicine technologies and explore possibilities for enhancing client satisfaction through automated bill payments and digital signatures.

Requirements

01.Business Requirements

Improved Patient Care:

- The health and well-being of animal patients must be the VCMS's top priority, and they must get excellent care and attention.
- Better patient care can be facilitated by include features like medication management, treatment history monitoring, and thorough patient records.
- Integration with equipment and diagnostic instruments to speed up diagnosis procedures and offer prompt treatment choices.

Streamlined Operations:

- Reduced manual labor and automated repetitive procedures should improve clinic operations.
- To improve workflow efficiency, appointment scheduling, patient check-in/check-out, and inventory management should be streamlined.
- Features for staff work assignment and communication that enhance clinic staff cooperation and collaboration.

Increased Revenue:

- Better services should be made possible by the VCMS to increase client retention and satisfaction.
- Features like customized treatment plans, online appointment scheduling, and preventative care visit reminders can increase patient loyalty and participation.
- Integrating with accounting and invoicing software to guarantee precise and prompt payment processing and minimize lost revenue.

Cost Savings:

- The automation of administrative chores and decrease in paperwork that come with VCMS implementation should lead to lower administrative costs.
- Features for inventory management that optimize stock levels, cut down on waste, and lower the expenses associated with maintaining inventory.

- Effective resource management by planning staff schedules and managing workloads to reduce overtime costs.

Enhanced Reputation:

- The VCMS should enhance customer happiness, patient care, and general service quality to improve the clinic's reputation.
- Features that facilitate follow-up care, client communication, and customized care plans can increase customer satisfaction and loyalty.
- Capabilities for analytics and reporting to monitor patient results, client comments, and clinic performance, enabling ongoing innovation and improvement.

02.User Requirements

User Interface:

- The interface of the system should be visually appealing and simple to use, with buttons, icons, and navigation menus that are straightforward to understand.
- It should be made accessible to veterinarians, employees, and administrators by accommodating users with different degrees of technical proficiency.
- The user interface should give priority to the most important information and actions, making it easy for users to make appointments, retrieve patient records, and carry out other crucial tasks.

Training Needs:

- The development of thorough training courses that address subjects including data entry, report creation, system navigation, and troubleshooting is necessary to acquaint users with the VCMS.
- To guarantee relevance and efficacy, training programs must be customized to the distinct tasks and responsibilities of various user groups.
- The provision of training materials, including interactive simulations, video tutorials, and user manuals, is vital to facilitate continuous learning and skill enhancement.

Responsibility Assignment:

- The lead veterinarian, administrative staff, IT staff, and training facilitators are among the users involved in the VCMS project, and they should all have clear roles and responsibilities established.

- To guarantee that the system is adopted smoothly, the lead veterinarian should supervise the implementation process and offer direction and support.

- Employees who take training classes ought to be labeled as super-users or system champions, tasked with supporting their peers and encouraging user participation.

Acceptance and Engagement:

- Throughout the entire project lifecycle, from system design and development to training and deployment, user engagement should be given top priority.
- To get user input, address issues, and promote a sense of ownership and buy-in, regular contact and feedback sessions should be held.
- To promote enthusiastic engagement and active participation among users, incentives or awards may be made available. This will serve to emphasize the significance of the VCMS in enhancing clinic operations and patient care.

03.Functional Requirements

- Appointment Booking: Users can efficiently schedule and manage appointments for animal patients using the VCMS interface, including features like appointment reminders and notifications to optimize clinic workflow.

- Billing and Invoicing: The VCMS incorporates a billing module to generate invoices for services, medications, and other charges, supporting various payment methods and ensuring accurate financial records through features like invoice tracking and payment reminders.

- Reporting: Comprehensive reporting features enable users to track clinic performance, patient demographics, appointment statistics, and revenue trends, with customizable reports for decision-making and evaluation purposes.

- Database Management: A secure database manages patient records, treatment histories, and clinical data, designed for scalability and data integrity through encryption, access controls, and regular backups.

- Integration: The VCMS seamlessly integrates with existing IT infrastructure and legacy systems in veterinary clinics, supporting data exchange and interoperability standards for smooth communication and collaboration while undergoing compatibility testing for seamless data transfer.

04.Non-Functional Requirements

- Performance: The VCMS must maintain responsiveness and efficiency, even during peak usage, to support smooth clinic operations.

- Reliability: It should be dependable, experiencing minimal downtime or disruptions, ensuring continuous clinic functionality.

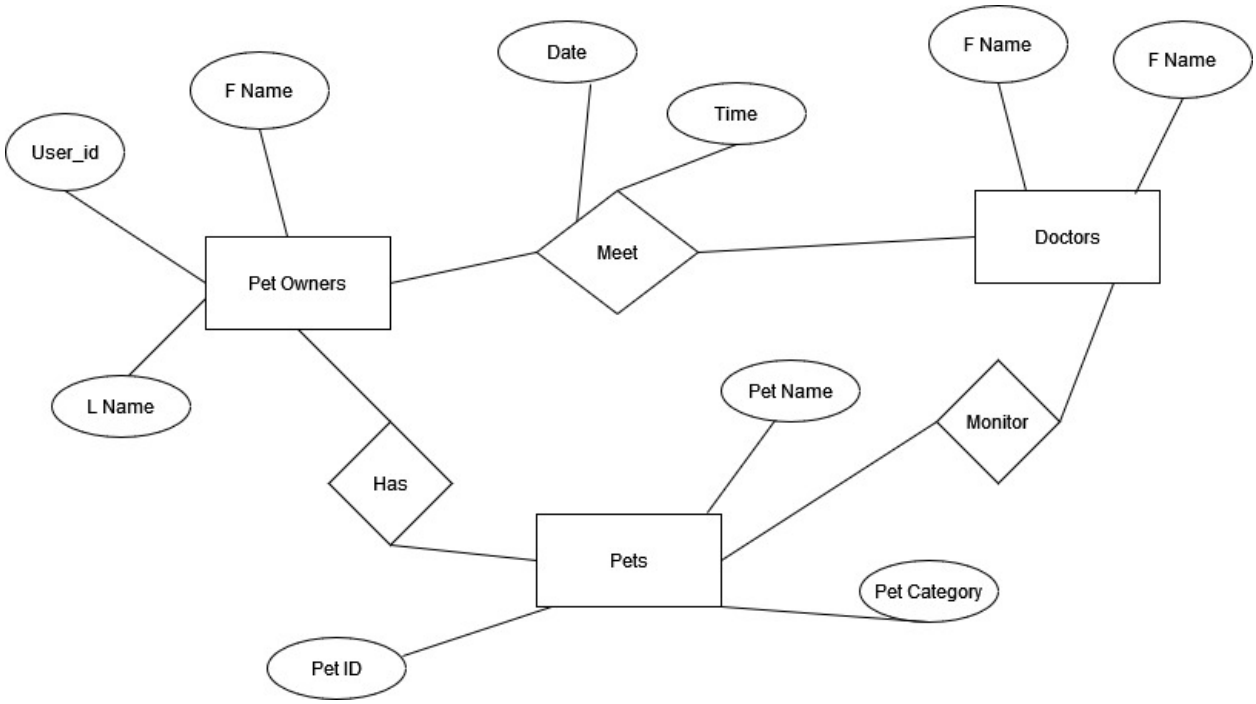
- Scalability: The system needs to expand alongside veterinary clinics, accommodating increased patient numbers and additional features as required.

- Compliance: The VCMS must adhere to applicable regulations and standards governing patient data and healthcare information management.

- Usability: Users should find the system intuitive and easy to navigate, requiring minimal training to operate proficiently.

To facilitate better patient care, efficient operations, and long-term success, these requirements work together to guarantee that the VCMS satisfies the needs of the veterinary clinic and its users.

ER Diagram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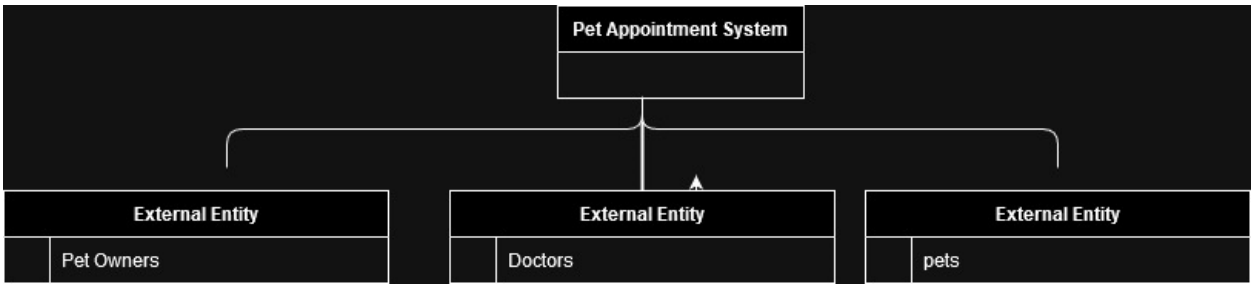
DFD Diagram

Level 0



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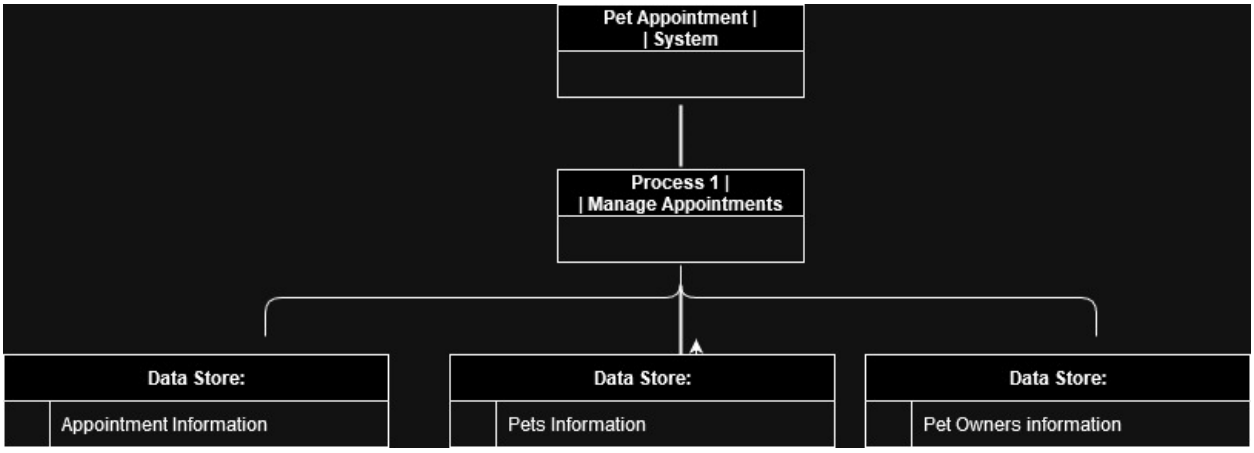

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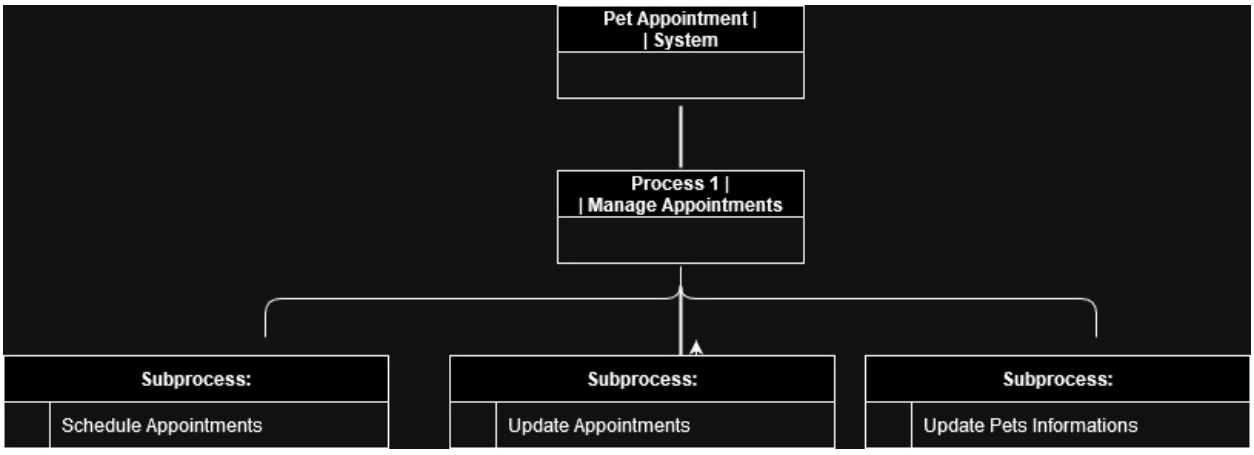
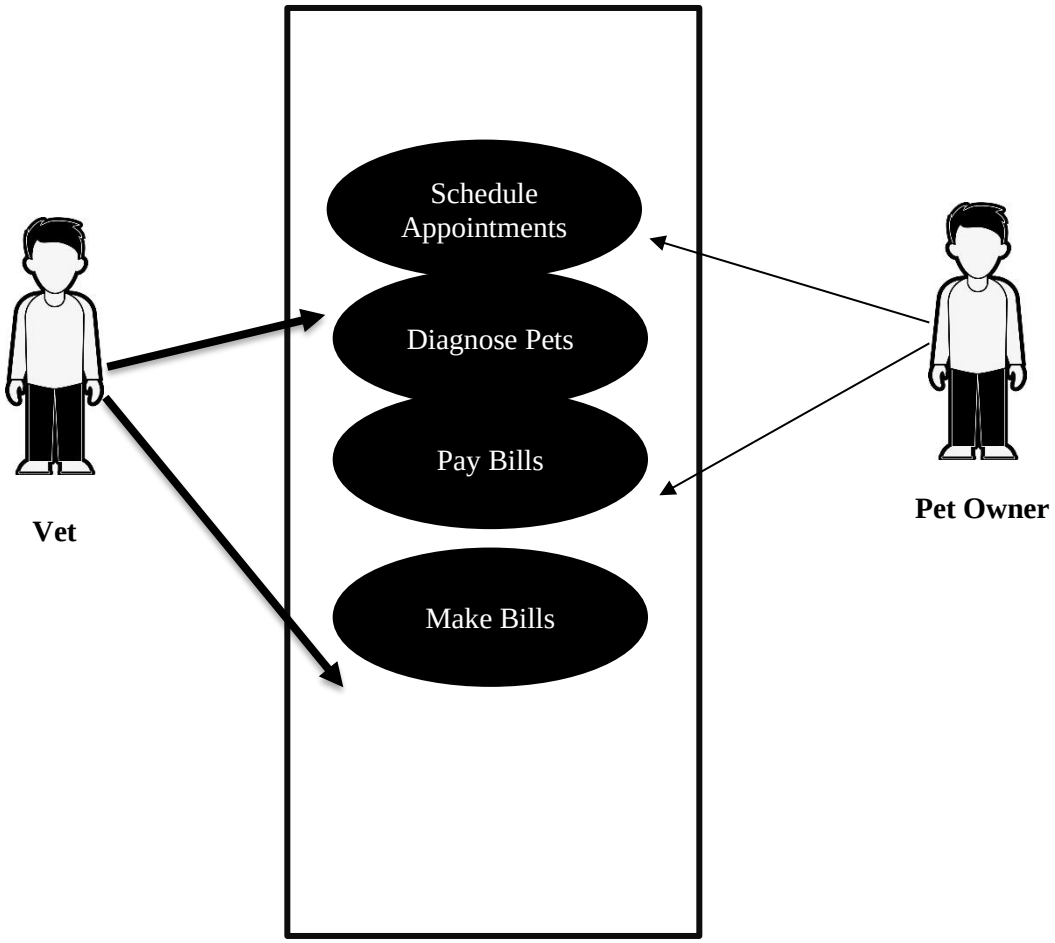


Use-case Diagrams.



Testing

1. **Unit Testing**:
    - Test individual components/modules (such as appointment scheduling, user management) to ensure they function correctly.
    - Use testing frameworks like JUnit for automated unit testing.
    - Test for boundary cases, error handling, and edge cases.
2. **Integration Testing**:
    - Test interactions between different modules to ensure they work together seamlessly.
    - Verify data flow between components.
    - Test API integrations if the system interacts with external services (such as sending reminders or notifications).
3. **System Testing**:
    - Test the system to ensure it meets the specified requirements.
    - Conduct functional testing to verify that all features work as expected (e.g., appointment scheduling, viewing appointments).
    - Test non-functional requirements such as performance, scalability, and security.
    - Conduct regression testing to ensure new changes do not introduce new issues.
4. **User Acceptance Testing (UAT)**:
    - Involve actual users (pet owners, veterinarians) to test the system in a real-world environment.
    - Verify that the system meets user needs and is user-friendly.
    - Collect feedback from users to identify any usability issues or improvements needed.
5. **Load and Performance Testing**:
    - Simulate many concurrent users to test system performance under load.
    - Measure response times for critical operations (e.g., appointment scheduling, viewing appointments) to ensure they meet performance requirements.
    - Identify and address any bottlenecks or performance issues.
6. **Security Testing**:
    - Conduct security testing to identify vulnerabilities and ensure data protection.
    - Test for common security threats such as SQL injection, cross-site scripting (XSS), and authentication/authorization flaws.
    - Ensure data encryption for sensitive information such as user credentials and medical records.
7. **Usability Testing**:
    - Evaluate the user interface (UI) and user experience (UX) to ensure the system is intuitive and easy to use.
    - Test navigation flows for common user tasks (e.g., scheduling an appointment, updating personal information).
    - Identify any usability issues or areas for improvement.
8. **Compatibility Testing**:
    - Test the system on different devices (desktops, laptops, smartphones) and web browsers to ensure compatibility.
    - Verify that the system functions correctly across various platforms and screen sizes.

9. **Documentation Review**:
    - Review system documentation (user manuals, technical documentation) to ensure accuracy and completeness.
    - Verify that the documentation provides clear instructions for users and developers.

UI – Link
https://www.figma.com/design/EyqFPVRTolt6uKZfNMRSNb/Untitled?t=cRrKHxoXC0s2qjWs-0

Demo - test.appvendy.com