Veterinary Management System Requirements Specification

Version 2

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# Executive Summary

## Project Overview

The **veterinary management system (VMS)** ensures smooth communication between veterinarians and pet owners, provides an efficient storage solution for patient information, lays out the patient appointment scheduling in a simple matter, making it so the user experience is pleasant and easy.

# Product/Service Description

The **Veterinary Management System** is designed to enhance the efficiency and organization of veterinary clinics by providing a centralized platform for managing patient records, appointments, billing, and medical history. The system is intended to **streamline daily operations**, **reduce paperwork**, **minimize errors**, and **improve the overall experience for veterinarians, staff, and pet owners**(patients/users).

## Product Context

The Veterinary Management System is a self-contained*(containing in oneself or itself all that is necessary; independent)* software but also interfaces with external systems, such as:

* **Payment Gateways** (for online payment processing)
* **Insurance Systems** (for verifying pet insurance coverage, if needed/available)
* **Pharmacy Databases** (for medication availability and prescription tracking)
* **Laboratory Information Systems** (for real-time diagnostic test results integration)

The system can be implemented as a standalone desktop/web application or integrated with a **larger hospital management system** if needed.

## User Characteristics

There are many users which are not included, such as general staff, veterinary assistants, etc, however we consider these 4 to be the key users to the application.

|  |  |  |  |
| --- | --- | --- | --- |
| User Type | Experience Level | Technical Expertise | General Characteristics |
| Veterinary | High (Expected to have finished higher education in the field) | High | Diagnosing and treating pets, prescribing medication. |
| Receptionists | Medium to low | Medium (A receptionist should know how to navigate various software.) | Scheduling appointments, handling payments, noting down information regarding pets if needed. |
| Pet owners | None | Low (Should know how to operate around the website/application, which is why the website/application should be easy for anybody to use.) | Booking appointments, accessing pet information and records online. |
| System Administrator | High | High | Managing user access, adding and removing users, system updates and security, ensuring pet records are encrypted and safe. |
| Finance Officer | Medium to high | Medium (A finance officer should know how to navigate various software, according to their job. ) | Oversees financial transactions, generates financial reports, and ensures compliance with accounting regulations.  Requires seamless integration with payment systems and accounting software for accurate financial tracking. |

## Assumptions

## The veterinary clinic will have **computers, barcode scanners (for medication scanning and prescriptions), and printers** available for use.

* The system will be compatible with **Windows, macOS, and Linux** operating systems.
* If the clinic requires a mobile application, a separate version must be developed for **iOS** and **Android**.
* If deployed as a **cloud-based** system, an **internet connection** is required for features like online booking, cloud storage, and insurance verification.
* For an **on-premises** version, the system should function offline, with local database storage.
* The system assumes that **role-based access control (RBAC)** will be implemented, ensuring that veterinarians, staff, and clients can only access permitted data.

## Constraints and Dependencies

### ****1. Constraints****

#### ****1.1 System Integration Constraints****

* The VMS **must integrate** with third-party services such as **payment gateways, insurance verification systems, and laboratory databases**.
* If external APIs (e.g., **pet insurance providers, pharmacy databases**) are unavailable or changed, certain functionalities may be **delayed or modified**.

#### ****1.2 Security and Compliance Constraints****

* The system must comply with **data protection laws** to protect patient and pet owner records.
* **Role-based access control (RBAC)** must be enforced to prevent unauthorized access to sensitive medical and financial data.
* The system **must support audit logging** for tracking changes in medical records and financial transactions.

#### ****1.3 Performance and Scalability Constraints****

* The system **must handle multiple concurrent users**, including veterinarians, assistants, and receptionists.
* **Database performance** should allow fast retrieval of patient records even when storing **thousands of entries**.
* If the clinic expands, the system **should scale** to support **multiple branches** or additional features without major rework.

#### ****1.4 User Accessibility Constraints****

* The **web portal must be mobile-friendly** to accommodate pet owners booking appointments online.
* The system must be designed for users **with minimal technical expertise**, ensuring an intuitive and user-friendly interface.

#### ****1.5 Hardware and Network Constraints****

* The system assumes **reliable internet access** for cloud-based operations. If unavailable, an **offline mode** should be provided for essential functionalities.
* The system should support **barcode scanners** for tracking medications and prescriptions.

#### ****1.6 Operational Constraints****

* **Clinic operating hours** impact system maintenance schedules—updates should occur **outside peak working hours** to avoid disruptions.
* The system should provide **backup and recovery options** to prevent data loss in case of failures.

### ****2. Dependencies****

#### ****2.1 Parallel Operation with Legacy Systems****

* If the clinic is already using an **older management system**, the VMS may need to **operate in parallel** until full migration is completed.
* Data from the old system **must be imported** into the new VMS without losing nor corrupting patient histories and medical records.

#### ****2.2 Dependency on External Modules****

* The **appointment scheduling module must be completed** before the notification and reminder system can be developed.
* **Billing and invoicing features depend on the successful integration** of payment gateways.

#### ****2.3 Data Synchronization Dependencies****

* If the system supports **cloud storage**, data synchronization between local and cloud databases must be handled efficiently.

#### ****2.4 Training and Adoption Dependencies****

* Staff must undergo **training sessions** before transitioning to the new system.
* Full implementation depends on **clinic staff adoption and feedback**, which may influence additional modifications before deployment.

# Requirements

## Functional Requirements

For the **Veterinary Management System (VMS)**, the most effective way to organize the requirements would be **By User Class** since the system provides different functionalities for veterinarians, receptionists, administrators, and pet owners. Organizing by features could work as well, and will be considered in future drafts of the requirements.

**ADMIN FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| ADM\_FR\_1 | The system shall authenticate users based on email and password. | Essential for secure login functionality. | 1 | 10/03/2025 |  |
| ADM\_FR\_2 | Administrators shall be able to add new users with specific roles. | New users must be added to manage system access, as well as new employees of any rank. | 1 | 10/03/2025 |  |
| ADM\_FR\_3 | Administrators shall be able to delete or deactivate user accounts. | Necessary for handling events where staff leaves, or any other such event occurs where deactivation is necessary. | 2 | 10/03/2025 |  |
| ADM\_FR\_4 | Administrators shall assign or revoke user permissions based on roles. | Ensures appropriate access levels for each user class. (For example, a veterinarian can access all patient information, while a receptionist can only see surface level information, such as a patient’s name and DOB.) | 1 | 10/03/2025 |  |
| ADM\_FR\_5 | Administrators shall be able to generate reports on clinic activity. | Administrators need reports to manage and evaluate the clinic's performance and operations. | 3 | 10/03/2025 |  |
| ADM\_FR\_6 | Monitor inventory | Track stock levels of medication. | 3 | 11/03/2025 |  |
| ADM\_FR\_7 | Set Pricing and Billing Policies | Adjust prices in coordination with veterinarians and online information. | 1 | 11/03/2025 |  |
| ADM\_FR\_8 | Manage Discounts and Promotions | Apply discounts and show promotions as advised by veterinary staff. | 3 | 11/03/2025 |  |
| ADM\_FR\_9 | Backup and restore data | Ensure data integrity and make sure it is safe and backed up at all times. | 2 | 11/03/2025 |  |

**VETERINARIAN FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| VET\_FR\_1 | Veterinarians shall be able to view pet medical records. | Important for veterinarians to assess treatment and history of the pets. | 1 | 10/03/2025 |  |
| VET\_FR\_2 | Veterinarians shall be able to add treatment and information records to pet medical files. | This is essential for keeping track of treatments, diagnoses, and medication. | 1 | 10/03/2025 |  |
| VET\_FR\_3 | Veterinarians shall be able to prescribe medications for pets. | Needed to facilitate treatment processes for pets. | 1 | 10/03/2025 |  |
| VET\_FR\_4 | Veterinarians shall be able to schedule follow-up appointments. | If necessary, a veterinarian may schedule an appointment date after finishing a current appointment with a patient. | 2 | 10/03/2025 |  |
| VET\_FR\_5 | Access Lab Reports | View and upload test results | 2 | 10/03/2025 |  |
| VET\_FR\_6 | Record and Track treatments | Document and track the medication, making sure it is refilled if It runs out. | 3 | 11/03/2025 |  |
| VET\_FR\_7 | Generate Health certificates | Provide health certificates for legal or travel purposes. | 3 | 11/03/2025 |  |
| VET\_FR\_8 | Communicate with clients | Through means of the software, communicate with the client regarding follow-up appointments or any other cause. | 2 | 11/03/2025 |  |
| VET\_FR\_9 | Refer case to specialists | Cases where the pet might have an unique illness. | 3 | 11/03/2025 |  |

**RECEPTIONIST FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| REC\_FR\_1 | Receptionists shall be able to schedule appointments for pets. | Appointment scheduling is a core feature of the system for managing client visits. | 1 | 10/03/2025 |  |
| REC\_FR\_2 | Receptionists shall be able to update appointment status (completed, cancelled). | Receptionists need to update the system with appointment status for tracking purposes. | 2 | 10/03/2025 |  |
| REC\_FR\_3 | Receptionists shall be able to process payments for services. | Necessary for transaction processing in the clinic. | 1 | 10/03/2025 |  |
| REC\_FR\_4 | Check-in and check-out patients | Use the website to track when the client arrives at the appointment. | 1 | 11/03/2025 |  |
| REC\_FR\_5 | Handle walk-in patients | Manage unscheduled patients who may need urgent care. | 2 | 11/03/2025 |  |
| REC\_FR\_6 | Register new patients | Use the software efficiently to register new patients/pets and their medical history. | 1 | 11/03/2025 |  |
| REC\_FR\_7 | Coordinate with veterinarians | Notify the veterinarians in real-time regarding appointments, assign patients to certain veterinarians | 1 | 11/03/2025 |  |

**Finance Officer Functional Requirements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| FIN\_FR\_1 | The finance officer shall process and manage invoices. | Ensures timely payments. | 1 |  |  |
| FIN\_FR\_2 | The finance officer shall track revenue and expenses. | Required for financial reporting. | 1 |  |  |
| FIN\_FR\_3 | The finance officer shall generate financial reports. | Assists in financial planning. | 2 |  |  |
| FIN\_FR\_4 | The finance officer shall manage tax-related documentation. | Ensures legal compliance. | 2 |  |  |
| FIN\_FR\_5 | The finance officer shall integrate financial data with accounting software. | Automates financial processes. | 3 |  |  |

**PATIENT FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| PAT\_FR\_1 | Pet owners shall be able to view their pet's medical record. | Owners should have access to their pet’s health history for transparency. | 1 | 10/03/2025 |  |
| PAT\_FR\_2 | Pet owners shall be able to receive reminders for scheduled appointments. | Automated reminders through various means ensure clients do not miss their appointments. | 3 | 10/03/2025 |  |
| PAT\_FR\_3 | Pet owners shall be able to update their contact information (phone number, address). | Required to ensure up-to-date contact records. | 2 | 10/03/2025 |  |
| PAT\_FR\_4 | Pet owners shall be able to reschedule or cancel their appointments. | If owners cannot make the appointment, there should be means of cancelling the appointment or rescheduling it. | 2 | 10/03/2025 |  |
| PAT\_FR\_5 |  |  |  |  |  |
| PAT\_FR\_6 |  |  |  |  |  |

## Non-Functional Requirements

**ADMIN NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| ADM\_NFR\_1 | The system shall process administrative tasks (e.g., user management, system updates) within 2 seconds. | Ensures that administrators experience minimal delays when managing system functions | 1 | 10/03/2025 |  |
| ADM\_NFR\_ 2 | The admin dashboard shall have a user-friendly and intuitive design. | Simplifies management tasks and reduces the learning curve for new administrators. | 1 | 10/03/2025 |  |
| ADM\_NFR\_ 3 | The system shall log all administrative actions with accurate timestamps. | Provides a comprehensive audit trail for security and troubleshooting purposes. | 1 | 10/03/2025 |  |
| ADM\_NFR\_ 4 | The system shall support simultaneous administrative sessions without performance degradation. | Allows multiple administrators to work concurrently without slowing down system performance. | 2 | 10/03/2025 |  |
| ADM\_NFR\_ 5 | The system shall be compatible with Windows, macOS, and Linux for administrative tasks. | Ensures accessibility and flexibility for administrators using various platforms. | 2 |  |  |

**VETERINARIAN NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| VET\_NFR\_ 1 | The system shall load pet medical records within 1 second. | Provides quick access to critical patient data during consultations. | 1 | 10/03/2025 |  |
| VET\_NFR\_ 2 | The veterinarian interface shall display data in a clear, concise, and well-organized format. | Ensures that vital medical information is easily accessible, even in emergencies. | 1 | 10/03/2025 |  |
| VET\_NFR\_ 3 | The system shall auto-save treatment records and updates in real time. | Prevents data loss during active sessions and critical operations. | 1 | 10/03/2025 |  |
| VET\_NFR\_ 4 | The system shall maintain an uptime of 99.9% to ensure continuous availability during clinic hours | Guarantees high reliability, especially during high-demand periods or emergencies. | 1 | 10/03/2025 |  |
| VET\_NFR\_ 5 | The system shall enforce multi-factor authentication for veterinarian logins. | Enhances security by ensuring that only authorized personnel can access sensitive patient data. | 2 |  |  |

**RECEPTIONIST NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| REC\_FR\_1 | The appointment scheduling interface shall load within 2 seconds. | Ensures rapid access for receptionists when booking or updating appointments. | 1 | 10/03/2025 |  |
| REC\_FR\_2 | The system shall synchronize appointment and payment data in real time. | The system shall synchronize appointment and payment data in real time. | 1 | 10/03/2025 |  |
| REC\_FR\_3 | The receptionist interface shall be designed for ease-of-use with minimal training required. | Minimizes errors and accelerates user adoption, especially for less technically skilled staff. | 1 | 10/03/2025 |  |
| REC\_FR\_4 | The system shall support concurrent sessions for multiple receptionists. | Allows the clinic to operate smoothly even when several receptionists are active at the same time. | 2 | 10/03/2025 |  |
| REC\_FR\_5 | Maintenance and updates shall be scheduled outside of peak clinic hours. | Minimizes disruptions to daily operations and ensures continuity of services during busy periods. | 2 | 10/03/2025 |  |

**PET OWNER NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| PAT\_NFR\_1 | The pet owner portal shall load within 3 seconds. | Enhances user experience by reducing waiting times, especially on slower connections. | 1 | 10/03/2025 |  |
| PAT\_NFR\_2 | The portal shall be mobile-responsive across various devices (smartphones, tablets, desktops). | Ensures a consistent and accessible user experience regardless of the device used. | 1 | 10/03/2025 |  |
| PAT\_NFR\_3 | The system shall include accessibility features (e.g., scalable text, screen reader support). | Improves navigation and readability for users with disabilities, ensuring broader usability. | 2 | 10/03/2025 |  |
| PAT\_NFR\_4 | All pet owner data shall be encrypted during transmission and storage. | Protects sensitive personal and pet-related information from unauthorized access. | 1 | 10/03/2025 |  |
| PAT\_NFR\_5 | The interface shall allow new users to learn basic navigation and functionalities within one minute. | Enhances user adoption by ensuring that even non-technical pet owners can quickly become comfortable with the system. | 2 | 10/03/2025 |  |

**FINANCE OFFICER NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirements | Comments | Priority | Date Reviewed | Reviewed/Approved by |
| FIN\_NFR\_1 | The system shall generate financial reports within 3 seconds. | Improves efficiency. | 1 |  |  |
| FIN\_NFR\_2 | Financial data shall be encrypted in storage and transmission. | Ensures security. | 1 |  |  |
| FIN\_NFR\_3 | The finance module shall support role-based access. | Prevents unauthorized changes. | 2 |  |  |
| FIN\_NFR\_4 | The finance officer dashboard shall provide real-time updates. | Ensures accurate monitoring. | 2 |  |  |
| FIN\_NFR\_5 | The system shall support financial auditing tools. | Ensures compliance with regulations. | 3 |  |  |

### Product Requirements

#### Client Registration

#### The system shall allow users to register clients by entering their personal details, such as full name, address, contact information, and preferred method of communication. The system should also support updating and deleting client information.

#### Pet Registration

#### Each pet shall be linked to a registered client. The system shall capture pet details such as name, species, breed, gender, age, medical history, vaccination records, and microchip number (if available).

#### Appointment Scheduling

#### Users shall be able to schedule, reschedule, or cancel appointments. The system shall send automated reminders to clients through SMS or email. Additionally, it shall prevent scheduling conflicts by checking for available time slots.

#### Medical Records Management

#### The system shall maintain a complete medical history for each pet, including previous illnesses, surgeries, treatments, and prescribed medications. Veterinary staff shall be able to update and retrieve medical records as needed.

#### Billing and Invoicing

#### The system shall generate invoices for veterinary services and products purchased. It should support different payment methods, including cash, credit/debit cards, and online payments. Users shall also be able to track outstanding balances and payment history.

#### 3.2.1.1 Usability Requirements

Include any specific usability requirements, for example,

* Learnability
* The user documentation and help should be complete
* The system should be easy to learn

#### 3.2.1.2 Performance Requirements

Specify static and dynamic numerical requirements placed on the system or on human interaction with the system:

* Static numerical requirements may include the number of terminals to be supported, the number of simultaneous users to be supported, and the amount and type of information to be handled.
* Dynamic numerical requirements may include the number of transactions and tasks and the amount of data to be processed within a certain time period for both normal and peak workload conditions.

All of these requirements should be stated in measurable form. For example, "95% of the transactions shall be processed in less than 1 second" rather than “an operator shall not have to wait for the transaction to complete”.

#### 3.2.1.3 Availability

Include specific and measurable requirements for:

* Level of availability required
* Coverage for geographic areas
* Impact of downtime on users and business operations
* Impact of scheduled and unscheduled maintenance on uptime and maintenance communications procedures
* Reliability (e.g., acceptable mean time between failures (MTBF), or the maximum permitted number of failures per hour).

#### 3.2.1.4 Security

Specify the factors that will protect the system from malicious or accidental access, modification, disclosure, destruction, or misuse. For example:

* encryption
* activity logging, historical data sets
* restrictions on intermodule communications
* data integrity checks

### Organizational Requirements

Requirements which are a consequence of organisational policies and procedures e.g. process standards used, implementation requirements.

### External Requirements

* + Requirements which arise from factors which are external to the system and its development process e.g. interoperability requirements, legislative requirements, etc.

# User Scenarios/Use Cases

# 1. Administrator Use Cases

## UC\_ADM\_01: Authenticate User

Business Scenario: Ensure secure access to the system for administrators. Actors: System Administrator. Objectives: Prevent unauthorized access to sensitive data. Success Metrics: 100% secure logins with no breaches reported.

## UC\_ADM\_02: Add New User

Business Scenario: Streamline onboarding of new clinic staff. Actors: System Administrator. Objectives: Assign roles (e.g., veterinarian, receptionist) to new users. Success Metrics: All new users added within 24 hours of joining.

## UC\_ADM\_03: User Role Management

Business Scenario: Manage user roles and access. Actors: System Administrator. Objectives: Assign or revoke user permissions. Success Metrics: Role updates applied instantly with audit logs maintained.

# 2. Veterinarian Use Cases

## UC\_VET\_01: View Medical Records

Business Scenario: Access comprehensive pet health history during consultations. Actors: Veterinarian. Objectives: Reduce time spent retrieving records and improve diagnosis accuracy. Success Metrics: Records load within 1 second; 95% reduction in manual record searches.

## UC\_VET\_02: Prescribe Medication

Business Scenario: Ensure accurate medication tracking and pharmacy integration. Actors: Veterinarian, Pharmacy Database. Objectives: Minimize prescription errors and automate pharmacy communication. Success Metrics: 100% prescriptions electronically sent to pharmacies.

## UC\_VET\_03: Schedule Follow-Up Appointment

Business Scenario: Improve continuity of care by scheduling necessary follow-ups. Actors: Veterinarian. Objectives: Ensure timely follow-ups to monitor pet health. Success Metrics: 80% of follow-ups scheduled before the pet leaves the clinic.

# 3. Receptionist Use Cases

## UC\_REC\_01: Schedule Appointment

Business Scenario: Manage clinic appointments efficiently to reduce wait times. Actors: Receptionist, Pet Owner. Objectives: Avoid scheduling conflicts and improve client satisfaction. Success Metrics: 90% of appointments scheduled without overlaps.

## UC\_REC\_02: Process Payment

Business Scenario: Simplify payment handling for services rendered. Actors: Receptionist, Payment Gateway. Objectives: Ensure real-time transaction processing and receipt generation. Success Metrics: Payments processed within 5 seconds; 100% receipt accuracy.

## UC\_REC\_03: Handle Walk-In Patients

Business Scenario: Efficiently manage unscheduled patients needing urgent care. Actors: Receptionist, Veterinarian. Objectives: Prioritize emergencies and notify veterinarians in real time. Success Metrics: 90% of emergencies handled within 15 minutes.

# 4. Pet Owner Use Cases

## UC\_PAT\_01: View Pet Medical Record

Business Scenario: Provide transparency to pet owners about their pet’s health. Actors: Pet Owner. Objectives: Enable easy access to vaccination history, treatments, and lab results. Success Metrics: 80% of pet owners access records monthly.

## UC\_PAT\_02: Reschedule Appointment

Business Scenario: Allow flexibility for pet owners to adjust appointments. Actors: Pet Owner. Objectives: Reduce no-shows and optimize clinic workflow. Success Metrics: 70% of rescheduled appointments confirmed via automated reminders.

# 5. Finance Officer Use Cases

## UC\_FIN\_01: Generate Financial Report

Business Scenario: Monitor clinic revenue and expenses for compliance. Actors: Finance Officer. Objectives: Automate financial tracking and reporting. Success Metrics: Reports generated within 3 seconds; 100% audit compliance.

## UC\_FIN\_02: Integrate Accounting Software

Business Scenario: Streamline financial data synchronization with external tools. Actors: Finance Officer, Accounting Software. Objectives: Eliminate manual data entry errors. Success Metrics: 100% data accuracy post-integration.

# 6. System-Wide Use Cases

## UC\_SYS\_01: User Login and Authentication

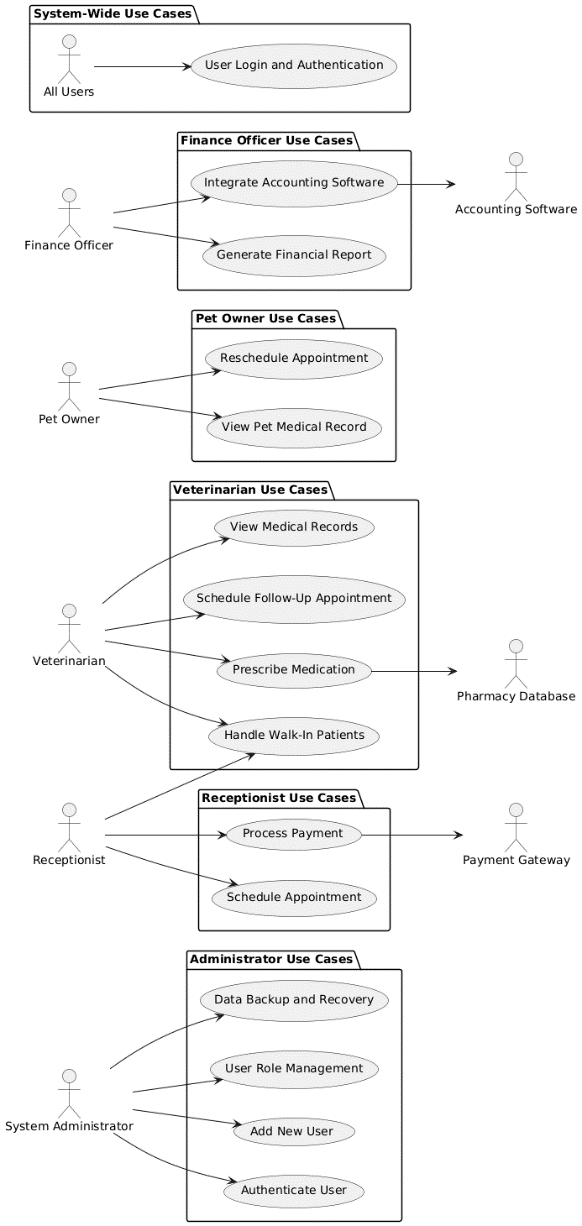
Actors: All users. Business Scenario: Secure user access based on roles. Objectives: Ensure only authorized users access the system. Success Metrics: 99.9% successful logins without security breaches.

## UC\_SYS\_02: Data Backup and Recovery

Actors: System Administrator. Business Scenario: Prevent data loss through regular backups. Objectives: Secure pet records and financial transactions. Success Metrics: Data restored within 5 minutes in case of failure.

**Use Cases Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | Business Scenario | Actors | Objectives | Success Metrics |
| **UC\_ADM\_01** | Ensure secure access to the system for administrators. | System Administrator | Prevent unauthorized access to sensitive data. | 100% secure logins with no breaches reported. |
| **UC\_ADM\_02** | Streamline onboarding of new clinic staff. | System Administrator | Assign roles (e.g., veterinarian, receptionist) to new users. | All new users added within 24 hours of joining. |
| **UC\_ADM\_03** | Manage user roles and access. | System Administrator | Assign or revoke user permissions. | Role updates applied instantly with audit logs maintained. |
| **UC\_VET\_01** | Access comprehensive pet health history during consultations. | Veterinarian | Reduce time spent retrieving records and improve diagnosis accuracy. | Records load within 1 second; 95% reduction in manual record searches. |
| **UC\_VET\_02** | Ensure accurate medication tracking and pharmacy integration. | Veterinarian, Pharmacy Database | Minimize prescription errors and automate pharmacy communication. | 100% prescriptions electronically sent to pharmacies. |
| **UC\_VET\_03** | Improve continuity of care by scheduling necessary follow-ups. | Veterinarian | Ensure timely follow-ups to monitor pet health. | 80% of follow-ups scheduled before the pet leaves the clinic. |
| **UC\_REC\_01** | Manage clinic appointments efficiently to reduce wait times. | Receptionist, Pet Owner | Avoid scheduling conflicts and improve client satisfaction. | 90% of appointments scheduled without overlaps. |
| **UC\_REC\_02** | Simplify payment handling for services rendered. | Receptionist, Payment Gateway | Ensure real-time transaction processing and receipt generation. | Payments processed within 5 seconds; 100% receipt accuracy. |
| **UC\_REC\_03** | Efficiently manage unscheduled patients needing urgent care. | Receptionist, Veterinarian | Prioritize emergencies and notify veterinarians in real time. | 90% of emergencies handled within 15 minutes. |
| **UC\_PAT\_01** | Provide transparency to pet owners about their pet’s health. | Pet Owner | Enable easy access to vaccination history, treatments, and lab results. | 80% of pet owners access records monthly. |
| **UC\_PAT\_02** | Allow flexibility for pet owners to adjust appointments. | Pet Owner | Reduce no-shows and optimize clinic workflow. | 70% of rescheduled appointments confirmed via automated reminders. |
| **UC\_FIN\_01** | Monitor clinic revenue and expenses for compliance. | Finance Officer | Automate financial tracking and reporting. | Reports generated within 3 seconds; 100% audit compliance. |
| **UC\_FIN\_02** | Streamline financial data synchronization with external tools. | Finance Officer, Accounting Software | Eliminate manual data entry errors. | 100% data accuracy post-integration. |
| **UC\_SYS\_01** | Secure user access based on roles. | All users | Ensure only authorized users access the system. | 99.9% successful logins without security breaches. |
| **UC\_SYS\_02** | Prevent data loss through regular backups. | System Administrator | Secure pet records and financial transactions. | Data restored within 5 minutes in case of failure. |



# 

# 5. Diagrams

# 

In this section you are going to place all of the diagrams that you build throughout to the course, in following with the slides presented throughout the weeks.

5.1 ER Diagram

Standard ERD for your project. Not much but the skills gained in the DBMS course are required.  
  
5.2 Use Case Diagram (general)

Use Case Diagram (only one, with all the use cases).

5.3 Activity Diagram

Each Activity Diagram should be associated with an use case, associated with a particular requirement which is further associated with a particular use-case. E.g BR\_01 which becomes UC\_01 which becomes AC\_01.

5.4. Class diagram.

One class diagram (general) for all the classes. Edit it afterwards with the design pattern implemented in it.

5.5 State diagram

Place all the relevant state diagrams here.

5.6 Sequence diagram.

All sequence diagrams are associated with an Activity Diagram. A Sequence Diagram is built based on an activity diagram. If the activity diagram is named AC\_07, the Sequence Diagram will be named SC\_07.

5.7. Collaboration diagram

All collaboration diagrams directly relate to a sequence diagram. If a sequence diagram is named SC\_07, then the collaboration diagram is named CC\_07

# 6. Design Patterns

Choose the relevant design patterns for your project. For each, give a reasoning and the associated class and sequence diagram. These are NOT part of the above diagrams, and need not carry the following naming scheme.