



Department of
Computer Science & Engineering
University of Liberal Arts Bangladesh

Care4Purrt
(Pet Health Care System)

Submitted to

Md Anowarul Abedin

Department of Computer Science and Engineering (CSE)
University of Liberal Arts Bangladesh.

Dhaka, Bangladesh

Submitted by

Altafunnesa Afshi(231014046)

Abir Akbar(231014042)

Course Title: Software Engineering, Course Code: CSE3203

Section: 03, Semester: Fall 2025

ABSTRACT

Care4Purrt (Pet Health Care System) is a web-based application designed to simplify and modernize pet healthcare management by integrating medical records, emotional well-being tracking, personalized care planning, and travel compliance features into a single platform. The system is developed to assist pet owners, veterinary doctors, and administrators in managing all aspects of pet health in an organized and efficient manner. Pet owners can create and manage pet profiles, book appointments, track their pets' moods, and access personalized health recommendations, while doctors can review medical histories, add diagnoses, and suggest treatment or follow-up plans. Administrators oversee the system by managing users, verifying health records, and generating pet travel passports.

Care4Purrt is developed using PHP with Object-Oriented Programming (OOP) principles to ensure modularity, reusability, and scalability. The system uses a MySQL database for secure and structured data storage and is designed to operate on a local server environment using XAMPP during development. By combining physical health management with emotional behavior tracking and travel-readiness features, Care4Purrt goes beyond traditional pet healthcare systems. This project aims to demonstrate the practical application of software design concepts while providing a reliable, user-friendly, and comprehensive solution for modern pet healthcare management.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to Wahida Ferdose Urmi, Lecturer, Department of Computer Science and Engineering (CSE), University of Liberal Arts Bangladesh, for her continuous guidance, encouragement, and valuable feedback throughout the development of our project, Care4Purrt (Pet Health Care System). Her support and insights played a significant role in helping us understand the practical aspects of system design and implementation.

We are also thankful to our department for providing us with the opportunity to work on this project as part of the Design Project-II course, which allowed us to apply theoretical knowledge to a real-world problem. Additionally, we would like to acknowledge our families and friends for their constant motivation and support during the project development process.

Finally, we would like to thank all team members for their dedication, cooperation, and teamwork, which were essential in successfully completing this project.

Team Members:

Bushra Nusyba Chowdhury (231014004)

Ibnul Haque Chowdhury (231014006)

Abir Akbar (231014042)

Altafun Nesa Afshi (231014046)

Table of Contents

| | |
|--|-----------|
| ABSTRACT..... | 2 |
| CHAPTER 1..... | 8 |
| INTRODUCTION | 8 |
| 1.1 INTRODUCTION TO PROJECT..... | 8 |
| PET HEALTHCARE MANAGEMENT IS AN ESSENTIAL RESPONSIBILITY FOR PET OWNERS, YET IT OFTEN BECOMES COMPLICATED DUE TO SCATTERED MEDICAL RECORDS, IRREGULAR CHECK-UPS, LACK OF EMOTIONAL BEHAVIOR MONITORING, AND DIFFICULTIES IN MAINTAINING TRAVEL-RELATED HEALTH DOCUMENTATION. MANY PET OWNERS RELY ON MANUAL RECORDS OR MULTIPLE PLATFORMS TO MANAGE APPOINTMENTS, VACCINATIONS, AND MEDICAL HISTORIES, WHICH CAN LEAD TO DATA LOSS AND INEFFICIENCY. TO ADDRESS THESE CHALLENGES, CARE4PURRT HAS BEEN DEVELOPED AS A CENTRALIZED PET HEALTHCARE MANAGEMENT SYSTEM. | 8 |
| CARE4PURRT PROVIDES A DIGITAL PLATFORM WHERE PET OWNERS, VETERINARY DOCTORS, AND ADMINISTRATORS CAN INTERACT SEAMLESSLY. PET OWNERS CAN REGISTER THEIR PETS, MANAGE HEALTH PROFILES, BOOK APPOINTMENTS, TRACK DAILY MOODS, AND RECEIVE PERSONALIZED CARE PLANS. VETERINARY DOCTORS CAN ACCESS ASSIGNED PET PROFILES, UPDATE MEDICAL RECORDS, AND SUGGEST TREATMENT OR PREVENTIVE CARE. ADMINISTRATORS ENSURE SYSTEM INTEGRITY BY MANAGING USERS, VERIFYING HEALTH COMPLIANCE, AND GENERATING PET TRAVEL PASSPORTS. BY BRINGING ALL THESE FEATURES TOGETHER, CARE4PURRT AIMS TO SIMPLIFY PET HEALTHCARE MANAGEMENT AND PROMOTE RESPONSIBLE PET OWNERSHIP..... | 8 |
| 1.2 BACKGROUND | 8 |
| WITH THE INCREASING NUMBER OF PET OWNERS AND GROWING AWARENESS OF ANIMAL WELL-BEING, THE DEMAND FOR ORGANIZED AND RELIABLE PET HEALTHCARE SYSTEMS HAS SIGNIFICANTLY INCREASED. TRADITIONAL PET HEALTHCARE PRACTICES OFTEN DEPEND ON PAPER-BASED RECORDS, WHICH ARE PRONE TO LOSS AND INCONSISTENCY. MOREOVER, MOST EXISTING SYSTEMS FOCUS ONLY ON PHYSICAL HEALTH, IGNORING EMOTIONAL AND BEHAVIORAL ASPECTS THAT DIRECTLY IMPACT A PET'S OVERALL WELL-BEING. | 8 |
| ANOTHER CHALLENGE ARISES WHEN PET OWNERS TRAVEL INTERNATIONALLY WITH THEIR PETS. TRAVEL COMPLIANCE REQUIRES PROPER VACCINATION RECORDS, HEALTH CERTIFICATES, AND VERIFICATION PROCESSES, WHICH CAN BE TIME-CONSUMING AND CONFUSING. CARE4PURRT IS DESIGNED TO OVERCOME THESE LIMITATIONS BY PROVIDING A DIGITAL SOLUTION THAT INTEGRATES MEDICAL, EMOTIONAL, AND TRAVEL-RELATED PET DATA INTO A SINGLE SYSTEM. THE PROJECT ALSO SERVES AS AN ACADEMIC DEMONSTRATION OF OBJECT-ORIENTED PROGRAMMING CONCEPTS AND DATABASE-DRIVEN WEB APPLICATION DEVELOPMENT..... | 8 |
| 1.3 OBJECTIVES..... | 8 |
| 1.4 SCOPE | 9 |
| 1.5 REPORT OVERVIEW | 9 |
| CHAPTER 2..... | 10 |
| LITERATURE REVIEW | 10 |
| 2.1 PetMD | 10 |
| 2.2 UNITED PET CARE (UPC)..... | 10 |
| 2.3 ZOETIS PETCARE..... | 11 |
| 2.4 PETIVITY..... | 11 |
| 2.5 VETERINARY PARTNER – VIN..... | 11 |
| 2.6 PET HEALTH CLUB..... | 12 |
| SUMMARY OF LITERATURE REVIEW..... | 12 |
| CHAPTER 3..... | 12 |
| METHODOLOGY..... | 12 |
| SUMMARY OF METHODOLOGY | 14 |
| CHAPTER 4..... | 15 |

| | |
|--|-----------|
| REQUIREMENTS ANALYSIS | 15 |
| REQUIREMENTS ANALYSIS IS A CRITICAL PHASE IN SYSTEM DEVELOPMENT THAT FOCUSES ON IDENTIFYING THE PROBLEMS TO BE SOLVED AND DETERMINING THE FUNCTIONAL AND NON-FUNCTIONAL NEEDS OF THE SYSTEM. FOR THE CARE4PURRT PROJECT, THIS PHASE HELPED DEFINE WHAT THE SYSTEM SHOULD DO, WHO WILL USE IT, AND HOW IT SHOULD PERFORM. | |
| PROPER REQUIREMENT ANALYSIS ENSURES THAT THE DEVELOPED SYSTEM MEETS USER EXPECTATIONS AND SUPPORTS ALL INTENDED FUNCTIONALITIES EFFECTIVELY. | 15 |
| 4.1 PROBLEM STATEMENT..... | 15 |
| 4.2 REQUIREMENTS GATHERING | 15 |
| SUMMARY OF REQUIREMENTS ANALYSIS..... | 17 |
| CHAPTER 5..... | 17 |
| PROJECT DEVELOPMENT DOCUMENTATION | 17 |
| 5.1 SOFTWARE REQUIREMENTS SPECIFICATION (SRS) FOR CARE4PURRT..... | 17 |
| 5.1.1 <i>Introduction</i> | 17 |
| 5.1.2 <i>Overall Description</i> | 18 |
| 5.1.3 <i>Functional Requirements</i> | 18 |
| 5.1.4 <i>Non-Functional Requirements</i> | 19 |
| 5.1.5 <i>System Model</i> | 20 |
| 5.2 INFORMATION GATHERING TOOLS FOR CARE4PURRT | 20 |
| 5.2.1 <i>Review Literature, Procedures, and Forms</i> | 20 |
| 5.2.2 <i>Observation</i> | 21 |
| 5.2.3 <i>Interviews</i> | 21 |
| 5.2.4 <i>Survey Questionnaire</i> | 21 |
| 5.2.5 <i>Outcomes from Requirement Analysis</i> | 32 |
| CHAPTER 6..... | 34 |
| DESIGNING THE SYSTEM..... | 34 |
| 6.1 FEATURES OF THE PROPOSED SYSTEM | 35 |
| 6.2 FEATURES IN DETAILS | 35 |
| 6.2.1 <i>Admin Features</i> | 35 |
| 6.2.2 <i>Pet Owner Features</i> | 36 |
| 6.2.3 <i>Doctor Features</i> | 36 |
| 6.2.4 <i>How Admin Uses the Dashboard</i> | 36 |
| 6.2.5 <i>How Users Use the System</i> | 37 |
| 6.3 USE CASE DIAGRAM | 37 |
| 6.3.1 <i>Admin Use Case Description</i> | 37 |
| 6.3.2 <i>User Use Case Description</i> | 38 |
| 6.4 ACTIVITY DIAGRAM..... | 40 |
| 6.4.1 <i>Activities in the Care4Purrt Activity Diagram</i> | 40 |
| 6.5. CLASS DIAGRAM..... | 41 |
| 6.5.1 <i>Activities in the Care4Purrt Class Diagram</i> | 41 |
| 6.6. ENTITY RELATIONSHIP DIAGRAM (ERD)..... | 42 |
| 6.6.1 <i>Activities in the Care4Purrt ER Diagram</i> | 42 |
| CHAPTER 7..... | 43 |
| IMPLEMENTATION PLAN..... | 43 |
| 7.1 IMPLEMENTATION PLAN | 43 |
| 7.1.1 <i>Development Phases</i> | 44 |
| 7.1.2 <i>Team Structure</i> | 44 |
| 7.1.3 <i>Risk Analysis</i> | 45 |
| 7.2 TECHNICAL SPECIFICATIONS | 45 |

| | |
|---|-----------|
| 7.2.1 Hardware Requirements..... | 45 |
| 7.2.2 Software Requirements | 45 |
| 7.2.3 System Constraints | 46 |
| 7.3 IMPLEMENTATION OF THE SYSTEM..... | 46 |
| 7.3.1 Web-Based Features and Database Work..... | 46 |
| 7.3.2 Web-Based Features (Care4Purr Platform) | 46 |
| 7.3.3 System Interface Overview | 46 |
| CHAPTER 8..... | 54 |
| COST CALCULATION..... | 54 |
| 8.1 Cost ANALYSIS | 55 |
| 2. Hosting and Maintenance Costs (Annual)..... | 55 |
| 3. Administrative and Miscellaneous Costs (Annual)..... | 55 |
| 8.2 BENEFIT ANALYSIS..... | 55 |
| 2. Financial Benefits (Hypothetical) | 56 |
| 8.3 ROI CALCULATION FOR 2 YEARS..... | 56 |
| Year 1 ROI Calculation: | 56 |
| ROI Summary..... | 57 |
| CHAPTER 9..... | 57 |
| TESTING AND VALIDATION..... | 57 |
| 9.1 TESTING PLAN | 57 |
| 9.2 TEST CASES | 58 |
| Test Case 1: User Registration and Login | 58 |
| Test Case 2: Pet Profile Management | 58 |
| Test Case 3: Appointment Scheduling | 58 |
| Test Case 4: Medical Record Management | 59 |
| Test Case 5: MoodTrack Logging..... | 59 |
| Test Case 6: PurrPort Generation | 59 |
| 9.3 VALIDATION..... | 60 |
| 1. Functional Validation..... | 60 |
| 2. Performance Validation | 60 |
| 3. Security Validation | 60 |
| 4. Usability Validation | 60 |
| 5. Cross-Platform Validation..... | 60 |
| Summary of Testing and Validation | 60 |
| CHAPTER 10..... | 61 |
| DEPLOYMENT AND MAINTENANCE..... | 61 |
| 10.1 DEPLOYMENT PLAN | 61 |
| 10.1.1 Deployment Steps | 61 |
| 10.1.2 Timeline..... | 62 |
| 10.2 TRAINING..... | 63 |
| Admin Training | 63 |
| User Training (Pet Owners and Doctors) | 63 |
| 10.3 MAINTENANCE..... | 63 |
| 1. Regular Updates | 63 |
| 2. Bug Fixes..... | 63 |
| 3. Performance Optimization | 63 |
| 4. Security Maintenance | 64 |
| 5. Backup and Recovery | 64 |
| Summary of Deployment and Maintenance | 64 |

| | |
|--|-----------|
| CHAPTER 11..... | 64 |
| FUTURE PLANS..... | 64 |
| 1. Mobile Application Development | 64 |
| 2. Real-Time Notifications and Alerts | 64 |
| 3. Advanced Health Analytics..... | 65 |
| 4. Integration with Veterinary Clinics and Devices..... | 65 |
| 5. Enhanced Security and Authentication | 65 |
| 6. Geographic and Feature Expansion | 65 |
| Summary of Future Plans | 65 |
| CHAPTER 12..... | 65 |
| CONCLUSION | 65 |
| 12.1 PROJECT BOUNDARIES..... | 66 |
| 12.1.1 Security Issues | 66 |
| 12.1.2 Internet Connection Speed Matters..... | 66 |
| 12.1.3 Data Accuracy and User Dependency: | 66 |
| 12.2 CONSTRAINTS | 66 |
| 12.3 DISCUSSION | 67 |
| OVERALL, CARE4PURRT SUCCESSFULLY ACHIEVES ITS PRIMARY GOAL OF CREATING A CENTRALIZED PET HEALTHCARE MANAGEMENT SYSTEM THAT SUPPORTS MULTIPLE USER ROLES AND INTEGRATES BOTH PHYSICAL AND EMOTIONAL HEALTH CONSIDERATIONS. THE INCLUSION OF FEATURES SUCH AS MOODTRACK, CARETAILOR, AND PURRPORT ADDS REAL-WORLD RELEVANCE AND DISTINGUISHES THE SYSTEM FROM TRADITIONAL PET HEALTHCARE APPLICATIONS. DESPITE CERTAIN LIMITATIONS RELATED TO SECURITY, SCALABILITY, AND DEPLOYMENT, THE SYSTEM PROVIDES A STRONG FOUNDATION FOR FUTURE EXPANSION. WITH FURTHER DEVELOPMENT, ENHANCED SECURITY, AND BROADER INTEGRATION, CARE4PURRT HAS THE POTENTIAL TO EVOLVE INTO A FULLY FUNCTIONAL AND COMMERCIALLY VIABLE PET HEALTHCARE PLATFORM. FROM AN ACADEMIC PERSPECTIVE, THE PROJECT EFFECTIVELY DEMONSTRATES SYSTEM ANALYSIS, DESIGN, IMPLEMENTATION, AND TESTING CONCEPTS, MAKING IT A SUCCESSFUL AND COMPLETE DESIGN PROJECT-II SUBMISSION..... | 67 |
| REFERENCES | 67 |
| EXTRA CODES FOR APPENDIX..... | 67 |

Chapter 1

Introduction

1.1 Introduction to Project

Pet healthcare management is an essential responsibility for pet owners, yet it often becomes complicated due to scattered medical records, irregular check-ups, lack of emotional behavior monitoring, and difficulties in maintaining travel-related health documentation. Many pet owners rely on manual records or multiple platforms to manage appointments, vaccinations, and medical histories, which can lead to data loss and inefficiency. To address these challenges, **Care4Purrt** has been developed as a centralized pet healthcare management system.

Care4Purrt provides a digital platform where pet owners, veterinary doctors, and administrators can interact seamlessly. Pet owners can register their pets, manage health profiles, book appointments, track daily moods, and receive personalized care plans. Veterinary doctors can access assigned pet profiles, update medical records, and suggest treatment or preventive care. Administrators ensure system integrity by managing users, verifying health compliance, and generating pet travel passports. By bringing all these features together, Care4Purrt aims to simplify pet healthcare management and promote responsible pet ownership.

1.2 Background

With the increasing number of pet owners and growing awareness of animal well-being, the demand for organized and reliable pet healthcare systems has significantly increased. Traditional pet healthcare practices often depend on paper-based records, which are prone to loss and inconsistency. Moreover, most existing systems focus only on physical health, ignoring emotional and behavioral aspects that directly impact a pet's overall well-being.

Another challenge arises when pet owners travel internationally with their pets. Travel compliance requires proper vaccination records, health certificates, and verification processes, which can be time-consuming and confusing. Care4Purrt is designed to overcome these limitations by providing a digital solution that integrates medical, emotional, and travel-related pet data into a single system. The project also serves as an academic demonstration of Object-Oriented Programming concepts and database-driven web application development.

1.3 Objectives

The main objectives of the Care4Purrt project are as follows:

1. To develop a user-friendly pet healthcare management system for pet owners, doctors, and administrators.
2. To allow pet owners to manage pet profiles, medical records, appointments, and emotional behavior logs efficiently.
3. To enable veterinary doctors to diagnose pets, update medical histories, and suggest personalized treatment or care plans.
4. To provide an admin-controlled system for managing users, verifying vaccination and health records, and generating pet travel passports.
5. To demonstrate the practical application of Object-Oriented Programming (OOP) concepts such as encapsulation, inheritance, abstraction, and polymorphism.
6. To ensure secure data storage and role-based access using a database-driven architecture.

1.4 Scope

The scope of Care4Purrt includes the development of a complete pet healthcare management platform that supports multiple user roles. The system allows pet owners to create and manage detailed pet profiles, schedule appointments, log moods, and access personalized health recommendations. Doctors can view assigned pets, update medical records, and review emotional behavior logs. Administrators can manage users, monitor system activity, and generate pet travel passports after verifying health compliance. The system is developed for educational and demonstration purposes and is deployed on a local server environment during development. While the current scope focuses on core healthcare and management features, the system is designed in a way that allows future expansion, such as mobile application support or integration with real-time veterinary services.

1.5 Report Overview

This report presents the complete design and development process of Care4Purrt, a pet healthcare management system developed as part of the Design Project-II course.

Key points covered in this report include:

- a) Purpose: To provide a centralized system for managing pet healthcare, emotional well-being, and travel compliance.
- b) Target Users: Pet owners, veterinary doctors, and system administrators.
- c) Key Features: Pet profile management, appointment scheduling, medical records, MoodTrack, CareTailor, and PurrPort.
- d) Technology Stack: PHP, HTML, CSS, MySQL, and XAMPP.
- e) Future Goals: System scalability, mobile integration, and enhanced automation.

The following chapters describe the literature review, methodology, system design, implementation, testing, deployment, and future improvements of the Care4Purrt system in detail.

Chapter 2

Literature Review

A literature review helps analyze existing systems and platforms related to the project domain in order to understand current solutions, identify limitations, and justify the need for the proposed system. In the context of pet healthcare management, several online platforms and digital services exist that focus on veterinary information, preventive care, and pet wellness. However, most of these systems address only selected aspects of pet care and do not provide a unified solution that integrates medical records, emotional health tracking, and travel compliance. The following platforms were reviewed to gain insights relevant to the development of Care4Purrt.

2.1 PetMD

PetMD is a well-known online platform dedicated to providing veterinarian-approved information on pet health and care. Founded in 2008, the platform offers articles, guides, and health-related resources covering nutrition, diseases, behavior, and preventive care. A key strength of PetMD is its collaboration with licensed veterinarians who review and update content regularly, ensuring accuracy and reliability. Although PetMD is an excellent educational resource, it functions primarily as an information-based platform rather than an interactive healthcare management system. It does not allow pet owners to store individual pet medical records, track appointments, or manage personalized care plans. Care4Purrt builds upon the informational concept of PetMD by offering an interactive system where users can actively manage pet health data rather than only consuming content.

2.2 United Pet Care (UPC)

United Pet Care (UPC) provides a membership-based pet healthcare program focused on affordability and accessibility. Through its platform, pet owners can register under a plan and receive discounted veterinary services from participating clinics. Unlike traditional pet insurance, UPC does not require claim forms, deductibles, or waiting periods, making it a convenient option for many pet owners. While UPC successfully addresses cost-related concerns, it does not offer features such as digital medical record management, emotional behavior tracking, or role-based system access for veterinarians and administrators. Care4Purrt differs by focusing on system-based healthcare management rather than

financial discounts, allowing structured data handling and role-based interactions between pet owners, doctors, and admins.

2.3 Zoetis Petcare

Zoetis Petcare is a comprehensive platform that combines veterinarian-approved products, expert advice, and digital tools to support pet wellness. The platform provides access to preventive care products, vaccination information, and educational resources. Zoetis also offers digital tools such as health quizzes and reward programs to encourage proactive pet care. Despite its strong focus on professional accuracy and preventive health, Zoetis Petcare does not provide a centralized system for managing individual pet records, appointments, or behavioral logs. Care4Purrt extends beyond informational and product-based services by enabling users to actively store, update, and analyze pet-specific health and emotional data within a single system.

2.4 Petivity

Petivity is a technology-driven pet health platform that focuses on monitoring pet health through smart devices and at-home diagnostic tools. Its smart litter box monitor tracks weight, urination, and defecation patterns in cats and provides analytical reports through a mobile application. Petivity emphasizes early detection of health issues using data-driven insights. Although Petivity introduces innovative health monitoring techniques, it relies heavily on specialized hardware and focuses mainly on specific health indicators. It does not provide a complete healthcare management system that includes appointment scheduling, veterinary interaction, or travel compliance documentation. Care4Purrt offers a more generalized and accessible solution by focusing on software-based health management that can be used without additional hardware.

2.5 Veterinary Partner – VIN

Veterinary Partner, operated by the Veterinary Information Network (VIN), is a trusted online resource offering veterinarian-reviewed pet health information. The platform provides detailed, species-specific articles on diseases, medications, diagnostics, and preventive care. It supports pet owners in understanding medical conditions and making informed healthcare decisions. While Veterinary Partner excels in educational content, it does not offer interactive features such as pet profile management, mood tracking, or personalized health planning. Care4Purrt complements such informational platforms by transforming static knowledge into actionable healthcare management through structured data storage and role-based system access.

2.6 Pet Health Club

Pet Health Club is a preventive healthcare program designed to help pet owners manage routine veterinary needs through structured monthly plans. It focuses on vaccinations, regular health checks, parasite treatments, and discounts on veterinary services. The platform promotes long-term preventive care through consistent monitoring and budgeting. Despite its strong preventive care model, Pet Health Club does not offer digital healthcare management features such as centralized medical records, emotional behavior tracking, or travel passport generation. Care4Purrt integrates preventive care concepts into a digital system that allows comprehensive monitoring and documentation, making it suitable for both academic demonstration and potential real-world extension.

Summary of Literature Review

The reviewed platforms demonstrate that while many systems provide valuable pet health information, financial assistance, or preventive care services, none offer a fully integrated solution that combines medical records, emotional health tracking, personalized care planning, and travel compliance within a single role-based system. Care4Purrt addresses these gaps by providing a unified, database-driven platform that supports interaction between pet owners, doctors, and administrators. This literature review justifies the need for Care4Purrt as a comprehensive and modern pet healthcare management system.

Chapter 3

Methodology

The methodology of the Care4Purrt project focuses on developing a structured, reliable, and user-friendly pet healthcare management system that meets the needs of pet owners, veterinary doctors, and administrators. A systematic approach was followed to ensure that each phase of development aligned with the project objectives and academic requirements. The methodology emphasizes proper planning, modular system design, role-based functionality, and secure data handling.

The following stages outline the overall development methodology of the Care4Purrt system:

1. Requirement Analysis:

The first phase of the methodology involved identifying and understanding the needs of the system users. This step focused on determining the essential features required for effective pet healthcare management.

- I. Identifying user roles such as Pet Owners, Doctors, and Admins and defining their responsibilities.

- II. Analyzing common challenges faced by pet owners, including managing medical records, appointments, emotional behavior, and travel documentation.
- III. Identifying the functional requirements necessary to support pet profile management, appointment scheduling, medical record handling, mood tracking, and personalized care planning.

This phase ensured that the system was designed to solve real-world problems while remaining suitable for academic demonstration.

2. System Design:

The system design phase focused on creating a clear and organized structure for the Care4Purrt platform.

- I. Designing the overall system architecture using Object-Oriented Programming (OOP) principles to promote modularity and reusability.
- II. Creating UML diagrams such as Use Case Diagrams, Activity Diagrams, Class Diagrams, and ER Diagrams to visually represent system functionality and data relationships.
- III. Planning role-based dashboards to ensure that each user type accesses only relevant features.

This step provided a blueprint for implementation and ensured consistency between system design and development.

3. Technology Stack Selection:

Selecting the appropriate technology stack was crucial for building a secure and scalable web-based system.

- I. Frontend technologies such as HTML and CSS were chosen to design a clean and user-friendly interface.
- II. PHP was selected as the backend programming language due to its strong support for server-side processing and compatibility with OOP concepts.
- III. MySQL was used as the database management system to store user data, pet profiles, medical records, and appointment information.
- IV. XAMPP was used as the local development environment to manage Apache and MySQL services efficiently.

This technology stack ensured smooth integration between the frontend, backend, and database components.

4. Development and Implementation:

The development phase involved building the actual system based on the approved design and requirements.

- I. Implementing core functionalities such as user registration, login, pet profile management, appointment booking, and medical record updates.

- II. Developing role-based access control to ensure secure interaction between pet owners, doctors, and administrators.
- III. Integrating additional modules like MoodTrack for emotional behavior logging, CareTailor for personalized health planning, and PurrPort for travel passport generation.
- IV. Ensuring proper database connectivity and data validation during all CRUD operations.

This phase translated system designs into functional modules using structured and maintainable code.

5. Testing and Quality Assurance:

Testing was conducted throughout the development process to ensure system reliability and correctness.

- I. Functional testing was performed to verify that all features worked as expected.
- II. Usability testing ensured that the system was easy to navigate for all user roles.
- III. Basic validation checks were implemented to prevent invalid data entry and ensure data consistency.

Testing helped identify and resolve issues early, improving overall system stability.

6. Deployment Environment:

During the development phase, the Care4Purrt system was deployed on a local server environment.

- I. The system was hosted locally using XAMPP to simulate real-world deployment conditions.
- II. Apache handled server-side requests, while MySQL managed database operations.
- III. The local deployment allowed safe testing and debugging before potential future live deployment.

7. Maintenance and Future Updates:

The methodology also considered future maintenance and enhancement possibilities.

- I. The system design allows for easy feature expansion and code modification.
- II. Future updates may include mobile application support, real-time notifications, and improved analytics.
- III. Regular updates and testing can be performed to ensure long-term system reliability.

Summary of Methodology

The methodology followed in the Care4Purrt project ensures a structured and systematic development process. By combining requirement analysis, system design, appropriate technology selection, careful implementation, and testing, the project demonstrates a practical approach to building a real-world pet healthcare management system. This

methodology not only supports the successful completion of the project but also reinforces core software engineering concepts learned throughout the course.

Chapter 4

Requirements Analysis

Requirements analysis is a critical phase in system development that focuses on identifying the problems to be solved and determining the functional and non-functional needs of the system. For the Care4Purrt project, this phase helped define what the system should do, who will use it, and how it should perform. Proper requirement analysis ensures that the developed system meets user expectations and supports all intended functionalities effectively.

4.1 Problem Statement

Pet owners often face difficulties in managing their pets' healthcare information due to scattered records, manual documentation, and lack of centralized systems. Medical histories, vaccination records, appointment schedules, and behavioral observations are frequently stored in different places, making it hard to maintain consistency and accuracy. This issue becomes more complex when multiple stakeholders such as pet owners, veterinary doctors, and administrators are involved. Additionally, most existing systems focus primarily on physical health and ignore emotional and behavioral well-being, which plays a vital role in a pet's overall health. Another significant challenge arises during pet travel, where owners must ensure compliance with vaccination, microchipping, and health certification requirements. Managing these documents manually is time-consuming and error-prone. Therefore, there is a need for a centralized, role-based digital system that can efficiently manage pet healthcare data, emotional health tracking, and travel compliance in one integrated platform.

4.2 Requirements Gathering

To design a system that effectively addresses the identified problems, requirements were gathered by analyzing user needs, reviewing similar systems, and studying the project proposal. The requirements focus on user roles, core system features, usability, and data security.

1. User Roles

The Care4Purrt system is designed to support three primary user roles:

(a) Pet Owners: Pet owners are responsible for managing their pets' profiles, booking appointments, tracking moods, and accessing personalized care plans and travel readiness information.

(b) Doctors: Veterinary doctors can view assigned pets, update medical records, review mood logs, and suggest health or follow-up plans.

(c) Admin: The admin manages users, oversees system activities, verifies health and vaccination records, and generates pet travel passports.

2. Core Functional Requirements

(a) User Registration and Login: Users must be able to register and log in securely based on their assigned roles. Role-based access ensures that each user sees only relevant features.

(b) Pet Profile Management: Pet owners should be able to add, update, view, and delete pet profiles, including details such as breed, age, vaccination status, and medical history.

(c) Appointment Management: Pet owners should be able to book, update, or cancel appointments. Doctors should be able to view scheduled appointments and manage follow-ups.

(d) Medical Record Management: Doctors must be able to add diagnoses, prescriptions, and treatment notes, while pet owners can view medical records in a read-only format.

(e) MoodTrack - Emotional Behavior Logging: Pet owners should be able to log daily moods and behavioral changes. Doctors can review these logs to assess emotional well-being.

(f) CareTailor - Personalized Health Planning: The system should generate personalized nutrition, exercise, and preventive care recommendations based on pet-specific data.

(g) PurrPort - Travel Compliance Management: Admins should be able to verify vaccination records and health certificates and generate digital pet passports for travel compliance.

3. System Design Requirements

(a) User-Friendly Interface: The system must provide a simple and intuitive interface so that users with minimal technical knowledge can navigate it easily.

(b) Role-Based Dashboards: Each user role must have a dedicated dashboard displaying relevant functionalities and information.

(c) Database-Driven Architecture: All data must be stored in a structured database to ensure data persistence, accuracy, and easy retrieval.

4. Security and Data Integrity Requirements

- (a) User authentication must be implemented to prevent unauthorized access.
- (b) Sensitive data such as medical records and personal information must be stored securely.
- (c) The system must ensure data consistency across all user interactions.

Summary of Requirements Analysis

The requirements analysis phase clearly defines the problems faced by pet owners and veterinary professionals and outlines the functional and technical needs of the Care4Purrt system. By identifying user roles, core functionalities, and security requirements, this phase provides a strong foundation for system design and implementation. Meeting these requirements ensures that Care4Purrt delivers a reliable, efficient, and user-centered pet healthcare management solution.

Chapter 5

Project Development Documentation

This chapter presents the Software Requirements Specification (SRS) for the Care4Purrt system. The SRS document defines the overall purpose, scope, functional and non-functional requirements, and system model of the project. It serves as a formal reference to understand what the system is expected to do and how it should behave, ensuring clarity between design and implementation.

5.1 Software Requirements Specification (SRS) for Care4Purrt

5.1.1 Introduction

Care4Purrt is a web-based pet healthcare management system designed to assist pet owners, veterinary doctors, and administrators in managing pet health records, appointments, emotional well-being, and travel compliance. The system provides a centralized platform where all relevant pet-related data can be stored, accessed, and updated securely. This SRS document outlines the functional and non-functional requirements of the system, along with its overall structure and constraints, to guide the development and evaluation of the project.

5.1.2 Overall Description

Care4Purrt is developed as a role-based web application using PHP and MySQL, following Object-Oriented Programming (OOP) principles. The system is designed to be simple, efficient, and scalable, ensuring ease of use for all user roles.

The platform supports three main types of users:

- a. **Pet Owners** – Can register pets, manage pet profiles, book appointments, log moods, and view medical records and personalized care plans.
- b. **Doctors** – Can view assigned pets, update medical records, review emotional behavior logs, and suggest treatments or follow-ups.
- c. **Admin** – Can manage users, verify health and vaccination records, and generate pet travel passports.

The system operates on a database-driven architecture, ensuring secure data storage and structured information flow between users.

5.1.3 Functional Requirements

The functional requirements describe the core services and operations that Care4Purrt must support.

1. User Management

- a. Users **shall** be able to register and log in based on their assigned roles.
- b. Secure login authentication **shall** be implemented to prevent unauthorized access.
- c. Each user **shall** be redirected to a role-specific dashboard after login.

2. Pet Profile Management

- a. Pet owners **shall** be able to add, edit, view, and delete pet profiles.
- b. Each pet profile **shall** include details such as name, age, breed, vaccination status, and medical history.

3. Appointment Management

- a. Pet owners **shall** be able to book, update, or cancel appointments with doctors.
- b. Doctors **shall** be able to view scheduled appointments and manage follow-up information.

4. Medical Record Management

- a. Doctors **shall** be able to add diagnoses, prescriptions, and treatment notes.
- b. Pet owners **shall** be able to view medical records in a read-only format.

5. MoodTrack – Emotional Behavior Logging

- a. Pet owners **shall** be able to log daily moods and behavioral changes.
- b. Doctors **shall** be able to review mood logs to assess emotional health and suggest support.

6. CareTailor – Personalized Health Planner

- a. The system **shall** analyze pet data such as age and breed to suggest nutrition and exercise plans.
- b. Preventive care and vaccination recommendations **shall** be generated automatically.

7. PurrPort – Travel Compliance

- a. Admin **shall** verify vaccination records, microchip information, and health certificates.
- b. The system **shall** generate a printable pet travel passport for eligible pets.

5.1.4 Non-Functional Requirements

Non-functional requirements define the quality attributes of the Care4Purrt system.

1. Performance

- a. The system **shall** handle multiple users simultaneously without noticeable delay.
- b. Page load time **shall** remain within acceptable limits under normal usage.

2. Security

- a. User authentication **shall** be implemented to protect system access.
- b. Sensitive data such as medical records **shall** be stored securely.

3. Usability

- a. The system interface **shall** be easy to understand and navigate.
- b. The platform **shall** be accessible on standard web browsers.

4. Availability

- a. The system **shall** remain available during normal operation hours.
- b. Proper database backup mechanisms **shall** be considered.

5. Scalability

- a. The system **shall** allow future feature expansion without major redesign.

5.1.5 System Model

The Care4Purrt system consists of the following major components:

1. User Interface

- a. Web-based interfaces for Pet Owners, Doctors, and Admins.
- b. Role-based dashboards displaying relevant features and data.

2. Database

- a. Stores user details, pet profiles, appointments, medical records, mood logs, and travel data.
- b. Ensures data consistency and structured relationships between entities.

3. Application Logic

- a. PHP-based backend handling business logic and data processing.
- b. Implements Object-Oriented Programming concepts for modularity.

4. Admin Dashboard

- a. Allows admins to manage users and system activities.
- b. Supports verification and passport generation tasks.

This system model ensures smooth interaction between users and system components while maintaining security and performance.

5.2 Information Gathering Tools for Care4Purrt

5.2.1 Review Literature, Procedures, and Forms

Existing pet healthcare platforms, veterinary documentation processes, and digital health systems were reviewed to understand common practices and limitations. This helped define relevant features and system workflows.

5.2.2 Observation

General observation of how pet owners manage medical records and appointments helped identify common pain points such as record loss, lack of reminders, and difficulty tracking emotional behavior.

5.2.3 Interviews

Informal discussions with pet owners and veterinary professionals provided insights into desired features such as appointment tracking, medical history access, and simplified record management.

5.2.4 Survey Questionnaire

Basic survey-style questions were considered to understand user expectations regarding system usability, feature importance, and data accessibility.

5.2.4.1 Section A: Multiple Choice Questions (for Both Roles)

- a. Participant Role (Pet Owner, Veterian)
- b. How often do you search for pet health information online?
- c. How do you currently manage pet health information or medical records?
- d. How comfortable are you using online systems or apps for pet-related management?
- e. Would a unified platform for pet owners and veterinarians improve overall pet healthcare?
- f. How useful do you find the idea of MoodTrack — logging a pet's emotions or behavior patterns?
- g. How likely are you to use CareTailor, the personalized health and nutrition planner for pets?
- h. How important is a digital pet passport (PurrPort) for travel and health verification?
- i. How much do you trust digital platforms to securely store and manage pet health data?
- j. How valuable would it be for pet owners and doctors to communicate directly within the same system?
- k. How helpful do you think appointment scheduling and reminders will be in maintaining pet health?
- l. How easy do you expect the Care4purrt dashboard to be for daily use and navigation?
- m. How likely are you to recommend this kind of pet healthcare platform to others?
- n. How important is it for you to track vaccination and medical compliance digitally?

- o.** How useful do you find the concept of generating printable pet travel passports?
- p.** Do you feel having separate role-based dashboards (Owner, Doctor, Admin) makes the system more organized?
- q.** Based on the demo, how innovative do you think Care4purrt is compared to existing pet management solutions?
- r.** Have you ever used or visited any of the following online pet care platforms?
- s.** What kind of pet care feature do you find most useful from these platforms?
- t.** Do you think a single integrated system like Care4purrt (combining medical, emotional, and travel features) is more convenient than using separate platforms?
- u.** How much do you think Care4purrt could improve your overall pet management or clinical experience compared to current methods?

The image displays two side-by-side screenshots of a survey interface, likely from a mobile device or a web-based survey tool.

Screenshot 1 (Left):

- Title:** Care4purrt – Pet Healthcare System
- Section:** Section 1 of 4
- Section Title:** Care4purrt – Pet Healthcare System (Pre-Use User Survey)
- Welcome Message:** Welcome! Thank you for taking part in this short survey for our project Care4purrt – Pet Healthcare System.
- Description:** Care4purrt is a smart, all-in-one digital platform designed to make pet healthcare management easier, more personalized, and travel-compliant. It connects Pet Owners, Veterinarians, and Admins in a single secure system that supports every aspect of pet health and well-being.

Screenshot 2 (Right):

- Title:** Care4purrt – Pet Healthcare System
- Section:** Our project Care4purrt – Pet Healthcare System.
- Description:** Care4purrt is a smart, all-in-one digital platform designed to make pet healthcare management easier, more personalized, and travel-compliant. It connects Pet Owners, Veterinarians, and Admins in a single secure system that supports every aspect of pet health and well-being.
- Goal:** The goal of Care4purrt is to bring together medical, emotional, and travel-related care for pets ensuring convenience, accuracy, and better collaboration between users.
- For Pet Owners:**
 - Maintain complete health records including vaccination, medical history, and treatments.
 - Book and manage appointments with veterinarians.
 - Track daily moods and behaviors through MoodTrack for emotional insights.
 - Receive personalized health nutrition.

The image displays two side-by-side screenshots of a survey interface, likely from Google Forms, for the Care4purr Pet Healthcare System.

Screenshot 1 (Left):

- Title:** Care4purr – Pet Healthcare System
- Section:** For Doctors / Veterinarians
- List:**
 - 🌟 Receive personalized health, nutrition, and exercise plans via *CareTailor*.
 - 🛫 Access travel-ready documents and digital pet passports using *PurrPort*.

Screenshot 2 (Right):

- Title:** Care4purr – Pet Healthcare System
- Section:** For Admins
- List:**
 - 📊 Monitor all users (pet owners and doctors) and manage system activities.
 - 📃 Approve vaccination, microchip, and health certificates for travel compliance.
 - 🖨 Generate and print digital pet passports (*PurrPort*) for approved pets.
 - 🎯 Add, edit, or remove doctors and oversee user roles.
 - 📈 Generate health summaries, vaccination reports, and system-wide compliance records.

Text at the bottom right:

This survey is being conducted **before the final development phase**, after introducing you to Care4purr's features and use cases. Your feedback will help us refine the system's design, user interface, and overall experience to make it practical and user-friendly.

Care4purrt - Pet Healthcare System

Questions Responses 11 Settings

This survey is being conducted **before the final development phase**, after introducing you to Care4purrt's features and use cases. Your feedback will help us refine the system's design, user interface, and overall experience to make it practical and user-friendly.

Please answer all questions honestly – your responses will remain confidential and will only be used for academic and development purposes.

Duration: 3–5 minutes
Target Participants: Pet Owners, Veterinarians, and Admins
Survey Type: Pre-use feedback (after concept demonstration)

Participant Role: *

- Pet Owner
- Doctor (Veterinarian)

After section Continue to next section 1

Section 2 of 4

Section A: Multiple Choice Questions (for Both Roles)

Description (optional)

How often do you search for pet health information online? *

- Frequently
- Occasionally
- Rarely
- Never
- N/A

How do you currently manage pet health information or medical records? *

- Paper documents
- Mobile apps
- Manually written notes
- I don't manage much
- N/A

How comfortable are you using online systems or apps for pet-related management? *

- Very comfortable

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How comfortable are you using online systems or apps for pet-related management? *

- Very comfortable
- Somewhat comfortable
- Neutral
- Not comfortable
- N/A

Would a unified platform for pet owners and veterinarians improve overall pet healthcare? *

- Yes, definitely
- Maybe
- Not sure
- No
- N/A

How useful do you find the idea of MoodTrack – logging a pet's emotions or behavior patterns? *

- Yes, definitely
- Maybe
- Not useful
- N/A

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How useful do you find the idea of MoodTrack – logging a pet's emotions or behavior patterns? *

- Extremely useful
- Somewhat useful
- Neutral
- Not useful
- N/A

How likely are you to use CareTailor, the personalized health and nutrition planner for pets? *

- Very likely
- Likely
- Neutral
- Unlikely
- N/A

How likely are you to use CareTailor, the personalized health and nutrition planner for pets? *

- Very likely
- Likely
- Neutral
- Unlikely
- N/A

How important is a digital pet passport (PurrPort) for travel and health verification? *

- Very important
- Important
- Neutral
- Unimportant
- Very unimportant

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How important is a *digital pet passport (PurrPort)* for travel and health verification?

B I U G X

Very important
 Somewhat important
 Neutral
 Not important
 N/A

How much do you trust digital platforms to securely store and manage pet health data?

Fully trust

Fully trust
 Somewhat trust
 Neutral
 Don't trust
 N/A

How valuable would it be for pet owners and doctors to communicate directly within the same system?

Very valuable

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How much do you trust digital platforms to securely store and manage pet health data?

B I U G X

Fully trust
 Somewhat trust
 Neutral
 Don't trust
 N/A

How valuable would it be for pet owners and doctors to communicate directly within the same system?

Very valuable

How much do you trust digital platforms to securely store and manage pet health data?

Fully trust
 Somewhat trust
 Neutral
 Don't trust
 N/A

How valuable would it be for pet owners and doctors to communicate directly within the same system?

Very valuable

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How valuable would it be for pet owners and doctors to communicate directly within the same system? *

Very valuable
 Somewhat valuable
 Neutral
 Not valuable
 N/A

How helpful do you think appointment scheduling and reminders will be in maintaining pet health? *

Very helpful
 Somewhat helpful
 Neutral
 Not necessary
 N/A

How helpful do you think appointment scheduling and reminders will be in maintaining pet health? *

Very helpful

How easy do you expect the Care4purrt dashboard to be for daily use and navigation? *

Very easy

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How easy do you expect the Care4purrt dashboard to be for daily use and navigation? *

B I U ↵ ⌘

Very easy
 Fairly easy
 Average
 Complicated
 N/A

How likely are you to recommend this kind of pet healthcare platform to others? *

B I U ↵ ⌘

Very likely
 Likely
 Neutral
 Unlikely
 N/A

How likely are you to recommend this kind of pet healthcare platform to others? *

Very likely

How important is it for you to track vaccination and medical compliance digitally? *

Very important

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How important is it for you to track vaccination and medical compliance digitally? *

Very important
 Somewhat important
 Neutral
 Not important
 N/A

How useful do you find the concept of generating printable pet travel passports? *

Very useful

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

How useful do you find the concept of generating printable pet travel passports? *

Very useful
 Somewhat useful
 Neutral
 Not useful
 N/A

Do you feel having separate role-based dashboards (Owner, Doctor, Admin) makes the system more organized? *

B I U ↵ X

Yes, definitely
 Maybe
 Not sure
 No
 N/A

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

Do you feel having separate role-based dashboards (Owner, Doctor, Admin) makes the system more organized? *

B I U ↵ X

Yes, definitely
 Maybe
 Not sure
 No
 N/A

Based on the demo, how innovative do you think Care4purrt is compared to existing pet management solutions? *

B I U ↵ X

Extremely innovative
 Moderately innovative
 Average
 Not innovative
 N/A

PetMD

Have you ever used or visited any of the following online pet care platforms? (Select all that apply) *

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

Have you ever used or visited any of the following online pet care platforms? (Select all that apply)

- PetMD
- United Pet Care (UPC)
- Zoetis Petcare
- Petivity
- Veterinary Partner (VIN)
- Pet Health Club
- None of the above
- N/A

What kind of pet care feature do you find most useful from these platforms?

- Health and disease information (PetMD, VIN)
- Discount/membership programs (UPC)
- Smart tracking devices (Petivity)
- Reward-based pet care (Zoetis)
- Preventive care plans (Pet Health Club)
- N/A

Do you think a single integrated system like Care4purrt (combining medical, emotional, and travel

Care4purrt – Pet Healthcare System

Questions Responses 11 Settings

Do you think a single integrated system like Care4purrt (combining medical, emotional, and travel features) is more convenient than using separate platforms?

- Strongly agree
- Agree
- Neutral
- Disagree
- N/A

How much do you think Care4purrt could improve your overall pet management or clinical experience compared to current methods?

- Significantly improve
- Slightly improve
- Neutral
- No change
- N/A

After
section Continue to next section
2

Section 3 of 4

5.2.4.2 Open-Ended Questions (for All Users)

1. Which feature of Care4purrt do you find most valuable or promising, and why?
2. What improvements or extra features would you suggest for better user experience?
3. How do you feel about the system's user interface (UI) and dashboard layout from what you've seen?

4. What potential challenges or limitations do you think users might face when using Care4purr?
 5. How do you feel about integrating Care4purr with wearable or smart tracking devices for pets in the future?

Care4purr – Pet Healthcare System

Questions Responses (11) Settings

Section 3 of 4

Section B: Open-Ended Questions (for All Users)

Description (optional)

Which feature of Care4purr do you find most valuable or promising, and why? *

Long answer text

What improvements or extra features would you suggest for better user experience? *

Long answer text

How do you feel about the system's user interface (UI) and dashboard layout from what you've seen? *

Long answer text

What potential challenges or limitations do you think users might face when using Care4purr? *

Long answer text

(+)

File

Tt

Image

Video

Table

Care4purr – Pet Healthcare System

Questions Responses (11) Settings

limitations do you think users might face when using Care4purr?

Long answer text

How do you feel about integrating Care4purr with wearable or smart tracking devices for pets in the future? *

Long answer text

After section Continue to next section

5.2.4.3 Final Feedback

1. Would you like to share any additional comments, expectations, or suggestions to help us improve Care4purrt before its official development?

Section 4 of 4

Section C: Final Feedback

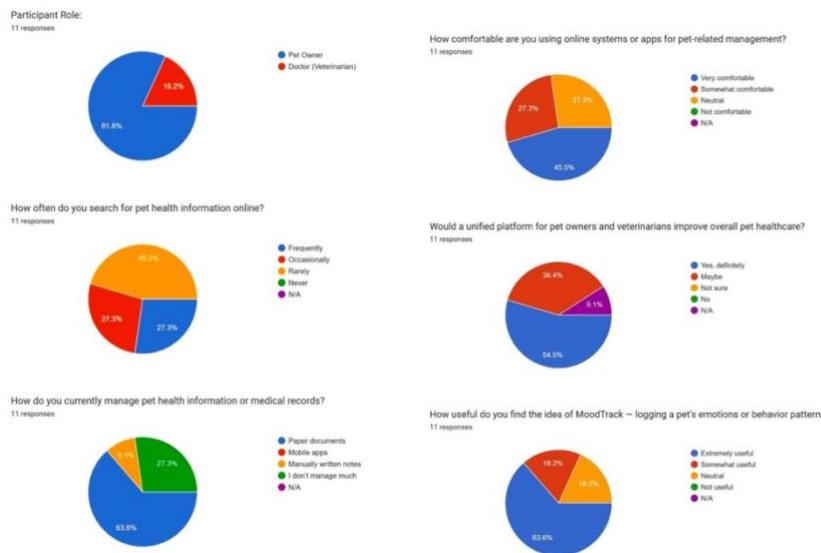
Description (optional)

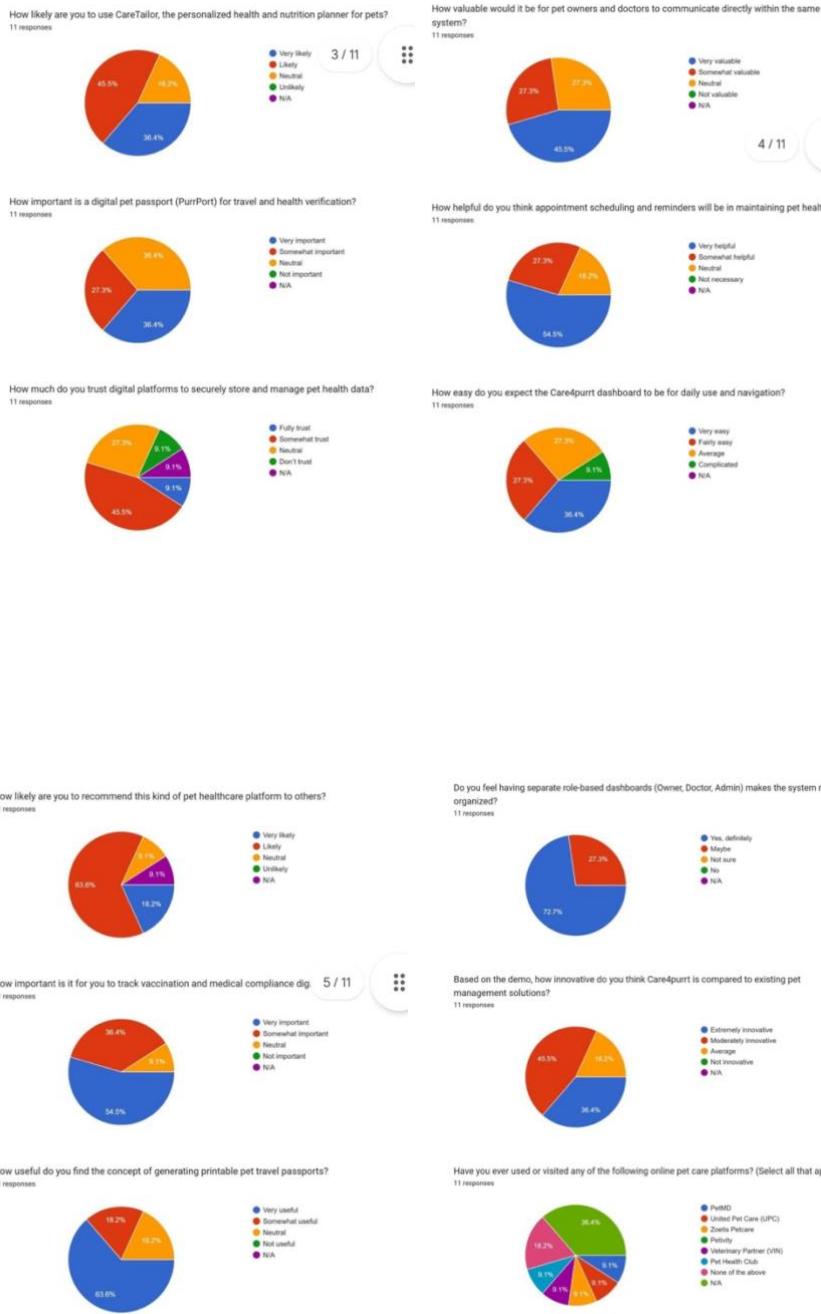
Would you like to share any additional comments, expectations, or suggestions to help us improve Care4purrt before its official development?

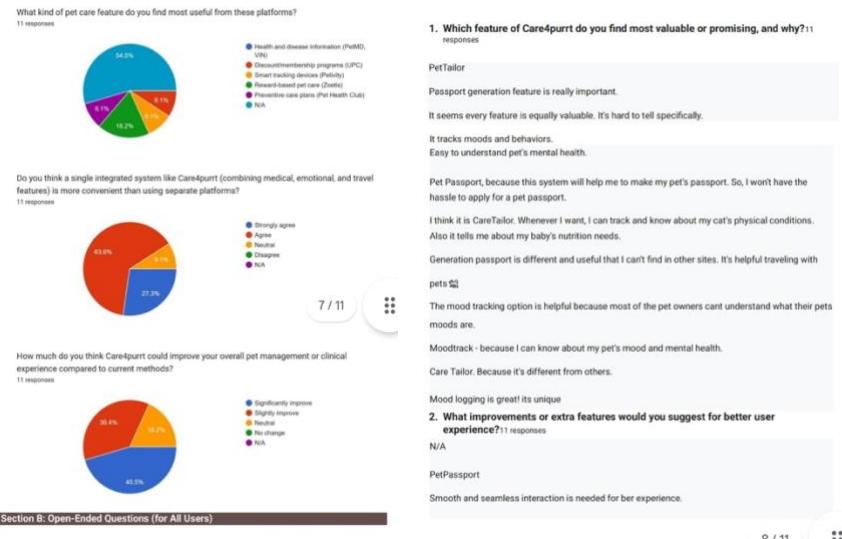
Long answer text

5.2.5 Outcomes from Requirement Analysis

The outcomes of the requirement gathering process emphasized the need for a centralized, role-based, and user-friendly pet healthcare management system. These outcomes directly influenced the final design and implementation of Care4Purrt.







If pet adoption option was there then many innocent soul would find a safe home. I know it is a health care system but still it can be added.
Exercise plan and nutrition information should be valid.
You can add a section where pet medical records will be stored .
I guess everything is fine so far.
Keep the buttons and interface simple .
A reminder system for vet visits and meds would be super helpful
3. How do you feel about the system's user interface (UI) and dashboard layout from what you've seen?

11 responses
Excellent
Appealing.
Great!
I feel it is fine.
The UI & dashboard looks easy and comfortable for an user.
Easy to use
Simple and Easy to use .
I think it could be user friendly.
It's impressive
Fair enough.
It's clean and easy to use, even for first time user
4. What potential challenges or limitations do you think users might face when using Care4purr? 11 responses

N/A
PetPassport
If the records can not be saved properly, users may suffer.
Difficulty may arise but can not think of any.
Maybe taking appointments if they don't manage the vet's appointment schedule properly.
Don't know.
I can't find any.
I guess nothing.
I think if the design is complex, new users may suffer .
data slow if internet is weak
5. How do you feel about integrating Care4purr with wearable or smart tracking devices for pets in the future? 11 responses
Excellent
I don't understand this feature.
Safe and reliable.
Obviously that will be great.
That would be really a nice idea!
N/A
Innovative.
Very appealing.
No need
Have little knowledge about it.
sounds amazing

Section C: Final Feedback
Would you like to share any additional comments, expectations, or suggestions to help us improve Care4purr before its official development?

11 responses
Manage Petpassport
I hope this will be one of the most helpful online health care systems in Bangladesh.
I am eagerly waiting to see it working.
I am excited to see the final output .
N/A
I would expect them to offer the service for free.
Good luck guys!!
The features are good enough. Make sure The UI is easy to use.
Good luck!
I hope it will be a great project.
Just make it easy to use and nice to look at. Adding some pet care tips or reminders would be really helpful too.

Chapter 6

Designing the System

The Care4Purrt system is designed to provide a structured, reliable, and user-friendly pet healthcare management experience for Pet Owners, Doctors, and Admins. The system design focuses on role-based functionality, modular architecture using Object-Oriented Programming (OOP) principles, and secure database-driven operations. Proper system

design ensures that the application remains easy to use, maintainable, and scalable for future enhancements.

6.1 Features of the Proposed System

Care4Purrt is designed with a set of core features that address the practical needs of modern pet healthcare management. These features ensure smooth interaction between users and efficient handling of pet-related data.

Key features of the proposed system include:

1. User-friendly interface for all user roles (Pet Owner, Doctor, Admin).
2. Role-based dashboards with controlled access to features.
3. Comprehensive pet profile management system.
4. Appointment scheduling and management.
5. Medical record handling with doctor-only write access.
6. Emotional behavior tracking through MoodTrack.
7. Personalized care planning using CareTailor.
8. Travel compliance verification and pet passport generation through PurrPort.
9. Secure database integration for reliable data storage.

These features collectively ensure that Care4Purrt delivers a complete and organized pet healthcare solution.

6.2 Features in Details

The Care4Purrt system offers a combination of basic and advanced features to support holistic pet healthcare management. The system allows pet owners to manage daily healthcare activities, doctors to maintain professional medical records, and admins to oversee compliance and system operations. Each feature is designed to align with real-world pet healthcare workflows while remaining suitable for academic demonstration.

6.2.1 Admin Features

The Admin plays a critical role in maintaining system integrity and compliance. The admin dashboard provides full control over system operations.

Key admin features include:

1. **User Management:** Admin can view and manage all users, including Pet Owners and Doctors.

2. **Health and Travel Compliance Verification:** Admin verifies vaccination records, microchip details, and health certificates.
3. **Pet Passport Generation (PurrPort):** Admin can generate printable pet travel passports for eligible pets.
4. **System Monitoring:** Admin monitors overall system activities, including user actions and data consistency.
5. **Report Generation:** Admin can generate summary reports related to pet health and system usage.

6.2.2 Pet Owner Features

Pet Owners are the primary users of the Care4Purrt system and interact with most of its features.

Key pet owner features include:

1. **User Registration and Login:** Pet owners can securely register and log into the system.
2. **Pet Profile Management:** Add, edit, view, or delete pet profiles with detailed information.
3. **Appointment Management:** Book, update, or cancel appointments with doctors.
4. **MoodTrack – Emotional Logging:** Log daily moods and behavioral changes of pets.
5. **CareTailor – Personalized Health Plans:** View suggested nutrition, exercise, and preventive care plans.
6. **Medical Record Viewing:** View medical records added by doctors in read-only mode.
7. **PurrPort Status Viewing:** Check pet travel readiness and passport status.

6.2.3 Doctor Features

Doctors interact with the system from a professional and clinical perspective.

Key doctor features include:

1. **Doctor Login:** Doctors log in using authorized credentials.
2. **View Pet Profiles and Appointments:** Access assigned pet profiles and scheduled appointments.
3. **Medical Record Management:** Add diagnoses, prescriptions, and treatment notes.
4. **Review MoodTrack Logs:** Analyze emotional behavior logs to assess mental well-being.
5. **Suggest Care Plans:** Provide health recommendations or follow-up advice.

6.2.4 How Admin Uses the Dashboard

1. Admin logs into the system using secure credentials.
2. Admin accesses the dashboard displaying system overview information.
3. Admin reviews user accounts and verifies data authenticity.
4. Admin checks vaccination and health records for travel compliance.
5. Admin generates pet travel passports when requirements are met.
6. Admin monitors overall system activity and logs out securely.

6.2.5 How Users Use the System

For Pet Owners

1. Register or log in to the system.
2. Add and manage pet profiles.
3. Book appointments with doctors.
4. Log pet moods using MoodTrack.
5. View medical records and personalized care plans.
6. Check travel readiness and passport status.

For Doctors

1. Log in to the doctor dashboard.
2. View assigned pets and appointments.
3. Update medical records and prescriptions.
4. Review emotional behavior logs.
5. Provide care suggestions or follow-ups.

6.3 Use Case Diagram

A use case diagram illustrates how different users interact with the system. In Care4Purrt, the use case diagram represents the interactions between Pet Owners, Doctors, and Admins with the system's core functionalities such as pet management, appointment scheduling, medical record handling, and passport generation. This diagram helps visualize the system's functional boundaries and user responsibilities.

6.3.1 Admin Use Case Description

1. **Login**
Admin logs in using valid credentials.
2. **Manage Users**
Admin views and manages Pet Owner and Doctor accounts.
3. **Verify Health Records**
Admin verifies vaccination and medical compliance data.
4. **Generate Pet Passport**
Admin generates travel passports for eligible pets.
5. **Monitor System Activities**
Admin reviews system usage and reports.

Use case Diagram:

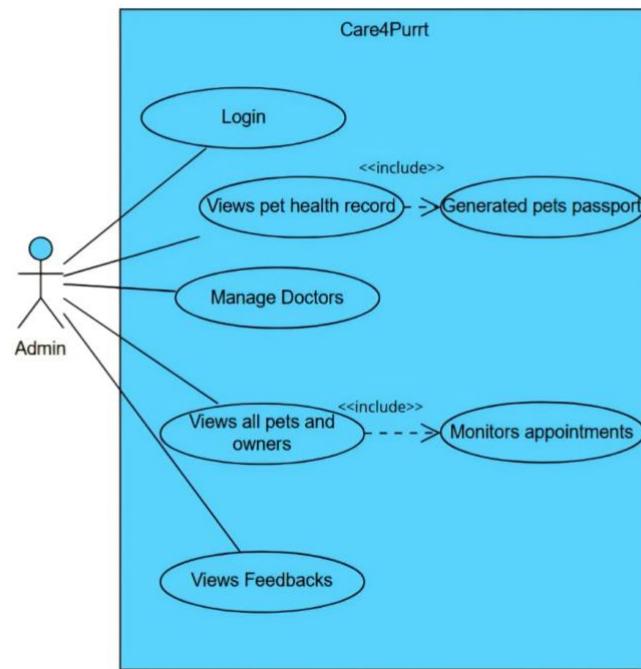


Figure 6.3.1: Use Case Diagram for Admin

6.3.2 User Use Case Description

Pet Owner

1. Register and login.
2. Manage pet profiles.
3. Book and manage appointments.
4. Log pet moods.
5. View medical records and care plans.
6. Check travel compliance status.

Doctor

1. Login to the system.

2. View pets and appointments.
3. Update medical records.
4. Review mood logs.
5. Suggest care or follow-ups.

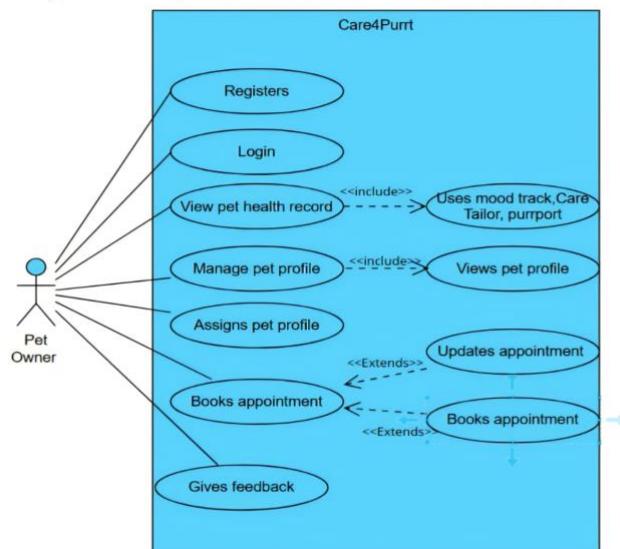


Figure 6.3.2: Use Case Diagram for Pet Owner

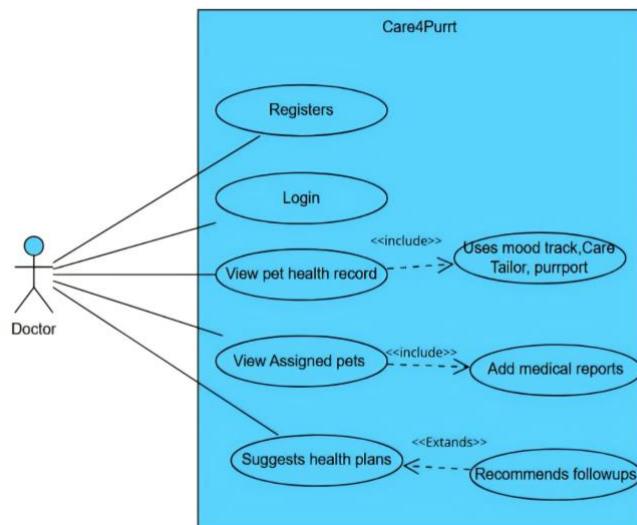


Figure 6.3.2: Use Case Diagram for Doctor

6.4 Activity Diagram

An activity diagram shows the flow of actions within the system. For Care4Purrt, the activity diagram illustrates user authentication, role-based access, and the sequence of operations performed by Pet Owners, Doctors, and Admins. It helps understand how tasks flow from start to end within the system.

6.4.1 Activities in the Care4Purrt Activity Diagram

1. User accesses the system and logs in.
2. System verifies user role.
3. User is redirected to the appropriate dashboard.
4. Pet Owner manages pet data and appointments.
5. Doctor updates medical records and reviews mood logs.
6. Admin verifies records and generates passports.
7. User logs out of the system.

Activity Diagram:

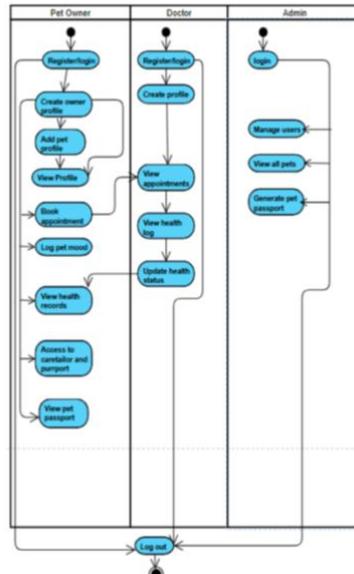


Figure 6.4: Activity Diagram

6.5. Class Diagram

The class diagram represents the Object-Oriented structure of Care4Purrt. It shows classes such as User, Pet, Appointment, MedicalRecord, MoodLog, and Passport along with their attributes and relationships. This diagram demonstrates the use of OOP concepts like encapsulation and abstraction.

6.5.1 Activities in the Care4Purrt Class Diagram

1. User class manages authentication and role identification.
2. Pet class stores pet-related information.
3. Appointment class handles scheduling details.
4. MedicalRecord class stores diagnosis and treatment data.
5. MoodLog class tracks emotional behavior.
6. Passport class manages travel compliance information.

Class Diagram:

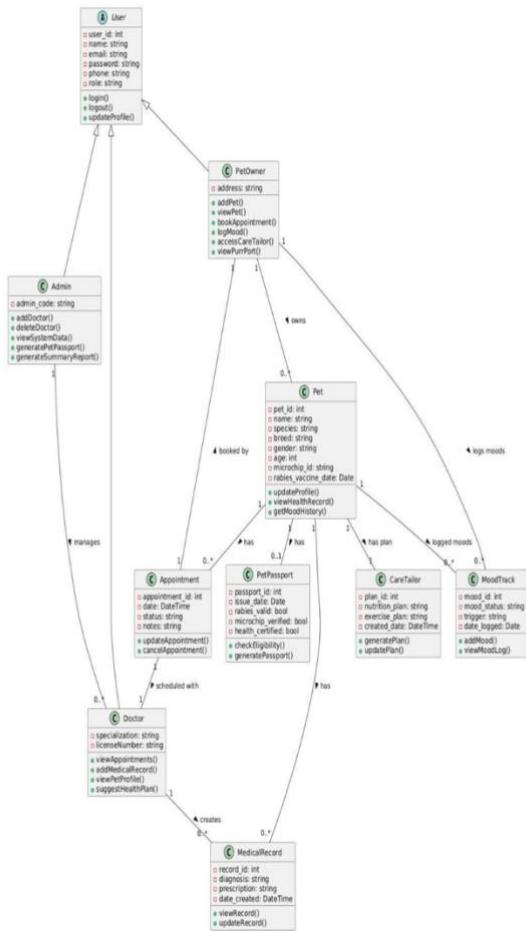


Figure 6.5: Class Diagram

6.6. Entity Relationship Diagram (ERD)

The ERD represents the database structure of Care4Purrt and the relationships between different entities. Entities include Users, Pets, Appointments, MedicalRecords, MoodLogs, and Passports. The ERD ensures data consistency and proper relationship mapping within the database.

6.6.1 Activities in the Care4Purrt ER Diagram

- a. A user can own multiple pets.
 - b. Each pet can have multiple appointments and mood logs.
 - c. Doctors create medical records linked to pets.
 - d. Admin verifies records and generates passports.

- e. All data is stored securely in the database.

ERD:

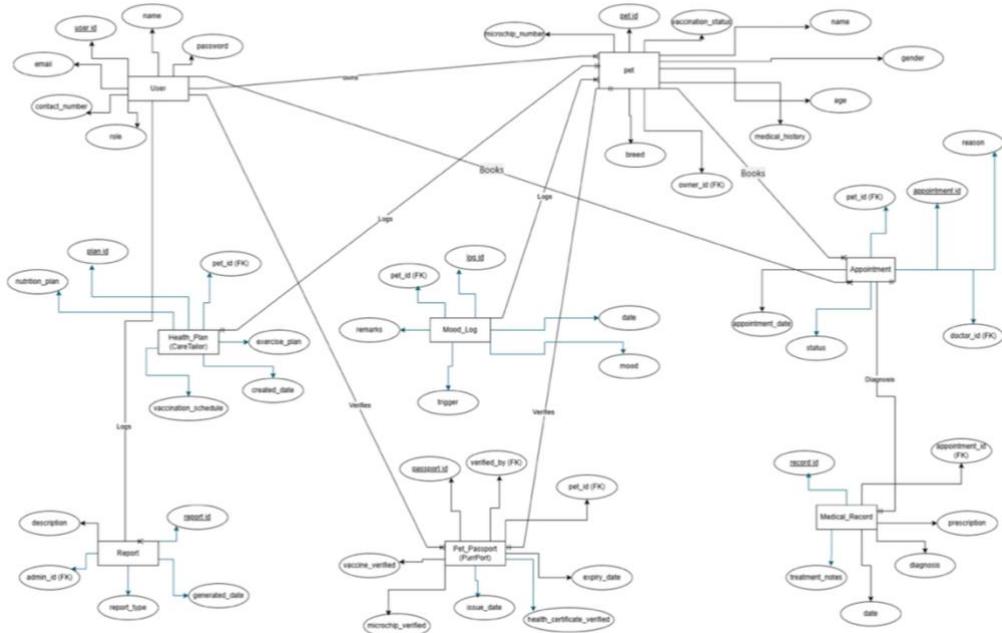


Figure 6.6: ERD

Chapter 7

Implementation Plan

The implementation plan describes how the Care4Purrt system is developed, structured, and executed to ensure smooth functionality and successful completion of the project. This chapter outlines the development phases, team responsibilities, technical planning, and risk considerations involved in implementing the system. A systematic implementation approach ensures that the system meets its design objectives and operates reliably.

7.1 Implementation Plan

The implementation of Care4Purrt follows a structured and phased approach to ensure proper planning, development, testing, and deployment. Each phase is designed to align with the system requirements and academic objectives of the project.

7.1.1 Development Phases

The development of the Care4Purrt system is divided into the following phases:

1. **Planning and Requirement Finalization:** In this phase, system requirements were reviewed and finalized based on the project proposal and requirement analysis. User roles, features, and system scope were clearly defined.
2. **System Design and Architecture:** UML diagrams such as Use Case, Activity, Class, and ER Diagrams were created to define system structure and workflows. The database schema and OOP-based architecture were also planned in this phase.
3. **Frontend Development:** User interfaces were developed using HTML and CSS to ensure a clean, simple, and user-friendly layout for all user roles.
4. **Backend Development:** Backend logic was implemented using PHP following Object-Oriented Programming principles. This phase included user authentication, role-based access control, CRUD operations, and database interactions.
5. **Database Development:** MySQL was used to design and manage database tables for users, pets, appointments, medical records, mood logs, and travel passport data. Data integrity and relationships were ensured through structured design.
6. **Testing and Debugging:** Functional testing was performed to verify that all features worked correctly. Errors and inconsistencies were identified and resolved during this phase.
7. **Deployment Preparation:** The system was prepared for deployment on a local server environment using XAMPP for final testing and demonstration.

7.1.2 Team Structure

The Care4Purrt project was developed collaboratively, with responsibilities shared among team members to ensure efficient progress and quality output.

The team roles include:

1. **Project Coordinator:** Responsible for planning, task distribution, and overall project supervision.
2. **Frontend Developers:** Designed and implemented the user interface using HTML and CSS.
3. **Backend Developers:** Developed server-side logic, implemented OOP concepts, and handled database connectivity using PHP.
4. **Database Designer:** Designed the database schema and ensured proper data storage and relationships.
5. **Tester:** Performed system testing, identified bugs, and validated functionality.

This collaborative structure ensured balanced workload distribution and effective project execution.

7.1.3 Risk Analysis

During the implementation of Care4Purrt, several potential risks were identified along with mitigation strategies.

- 1. Development Delays**

Risk: Project tasks may take longer than planned.

Solution: Tasks were divided into smaller milestones and monitored regularly.

- 2. Technical Errors**

Risk: Bugs or logic errors during development.

Solution: Regular testing and debugging were performed throughout development.

- 3. Data Handling Issues**

Risk: Incorrect data storage or retrieval.

Solution: Database design was carefully structured and tested with sample data.

- 4. Security Concerns**

Risk: Unauthorized access to sensitive data.

Solution: Role-based access control and secure login mechanisms were implemented.

7.2 Technical Specifications

This section outlines the technical requirements necessary for developing and running the Care4Purrt system.

7.2.1 Hardware Requirements

The hardware requirements for Care4Purrt include:

- 1. For Development and Hosting**

- (a) A computer or server with at least 4 GB RAM.
- (b) Minimum 200 GB storage for code and database files.
- (c) Stable internet connection for development and testing.

- 2. For Users**

- (a) Any internet-enabled device such as a laptop, desktop, tablet, or smartphone.
- (b) Standard hardware capable of running a modern web browser.

7.2.2 Software Requirements

The software requirements for the Care4Purrt system include:

- 1. Backend:** PHP

- 2. Frontend:** HTML, CSS

- 3. Database:** MySQL (phpMyAdmin)

- 4. Server Environment:** XAMPP (Apache and MySQL)

5. **Operating System:** Windows, macOS, or Linux
6. **Browser:** Google Chrome, Mozilla Firefox, or similar

7.2.3 System Constraints

The Care4Purrt system has the following constraints:

1. The system requires an active internet connection to function properly.
2. Performance may depend on server capacity and system load.
3. The current implementation is designed for academic and demonstration purposes.
4. Advanced security features may be limited due to project scope.

7.3 Implementation of the System

The Care4Purrt system was implemented by integrating frontend interfaces with backend logic and database operations. The implementation ensures that each user role interacts with the system according to defined permissions. PHP handles business logic and database communication, while HTML and CSS manage user interface presentation.

7.3.1 Web-Based Features and Database Work

The system supports various web-based features such as user authentication, pet profile management, appointment scheduling, medical record handling, and passport generation. All data is stored in a MySQL database and accessed through structured SQL queries to ensure accuracy and consistency.

7.3.2 Web-Based Features (Care4Purrt Platform)

The Care4Purrt platform provides role-based dashboards for Pet Owners, Doctors, and Admins. Each dashboard displays relevant features and information, ensuring efficient system usage and data handling.

7.3.3 System Interface Overview

The system interface allows users to navigate through features such as login, pet management, appointment booking, medical records, and reports. The layout is designed to be simple and intuitive, ensuring ease of use for all users.

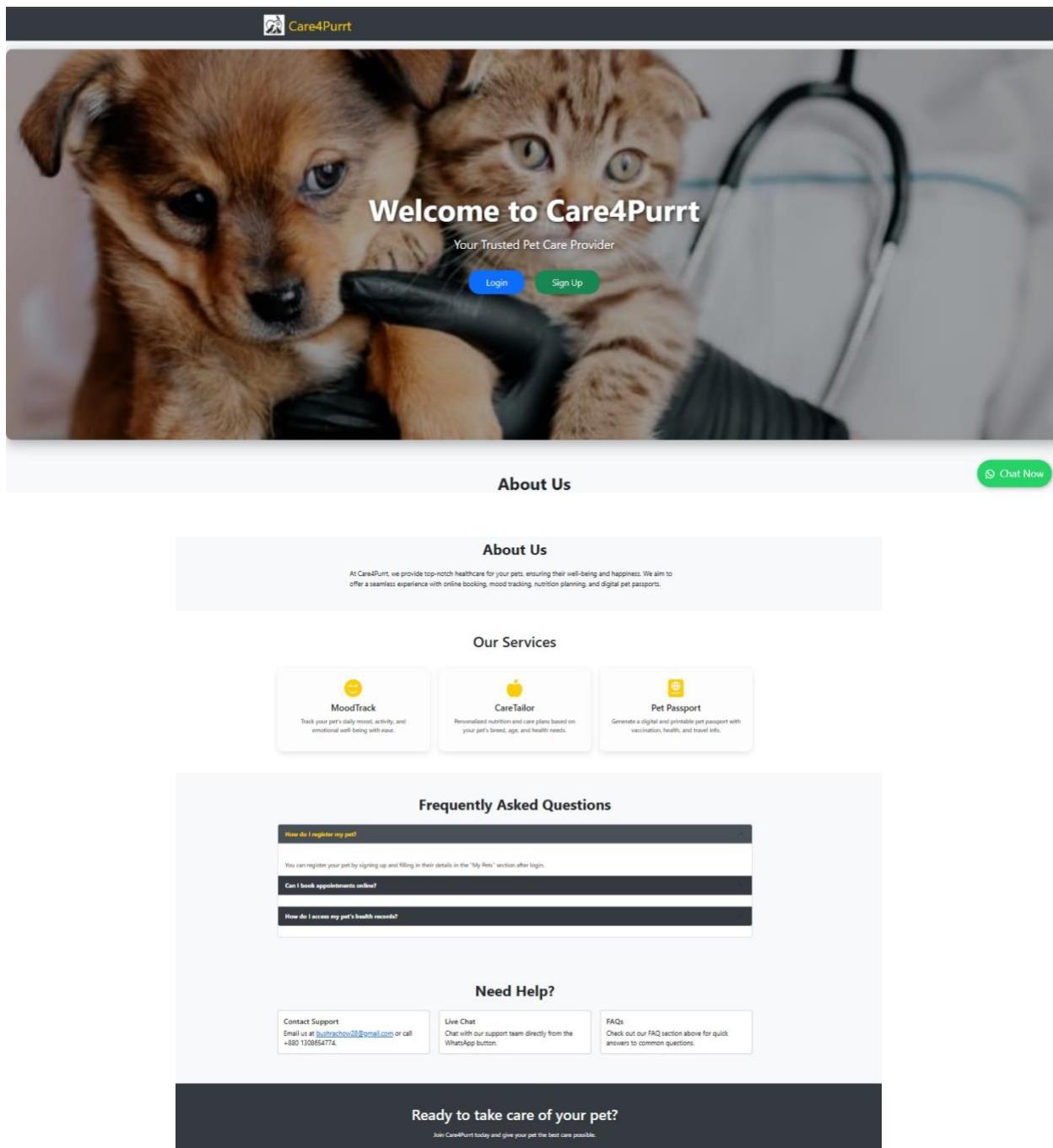


Fig 1: Homepage

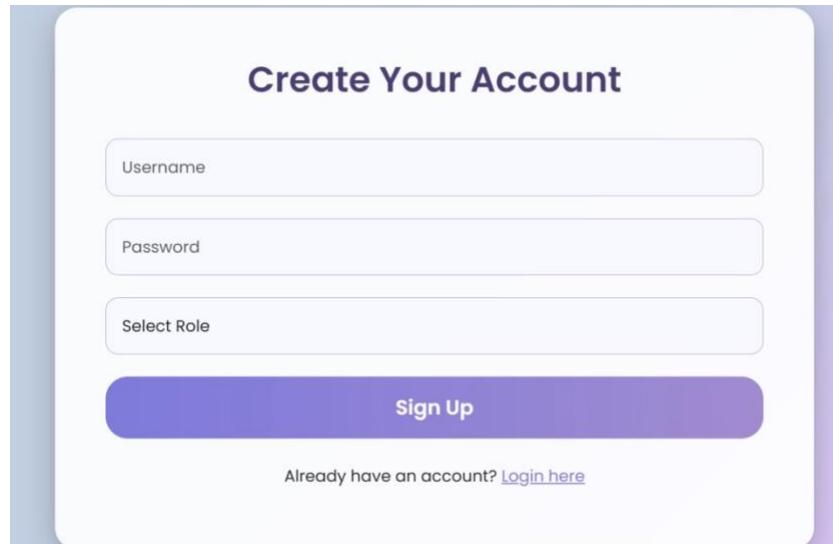


Fig 2: Signup

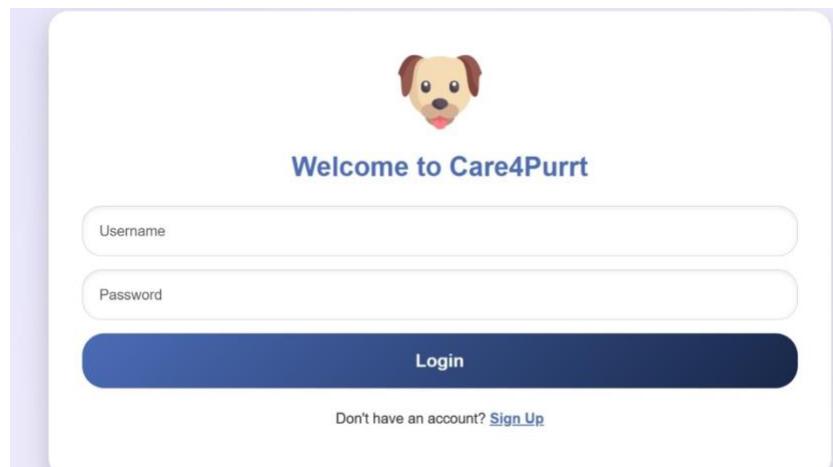
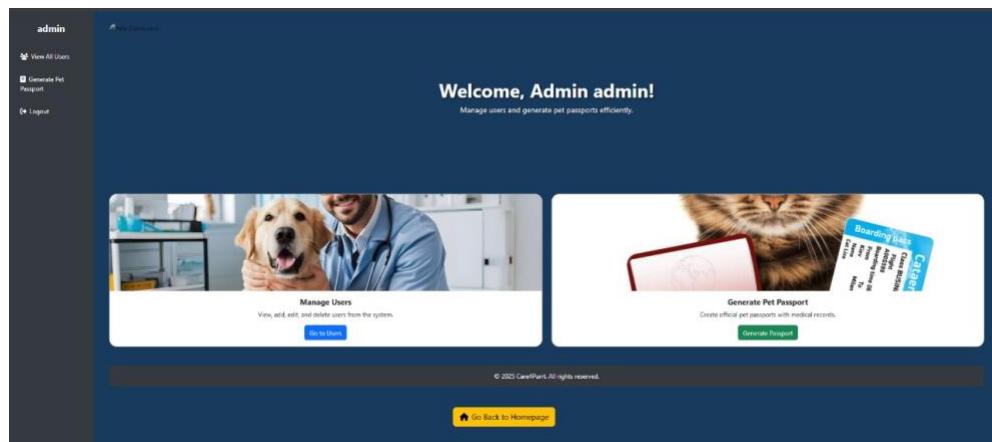


Fig 3: Login



| Registered Users | | | |
|----------------------|----------|--------|------------------------|
| Welcome, Admin admin | | | |
| ID | Username | Role | Actions |
| 2 | doctor | Doctor | Delete |
| 3 | owner | Owner | Delete |
| 5 | bushra | Owner | Delete |
| 6 | abir | Doctor | Delete |
| 7 | zuh | Doctor | Delete |
| 8 | bilkis | Owner | Delete |
| 13 | Tanvir | Owner | Delete |
| 14 | Afshi | Owner | Delete |
| 15 | Doctor1 | Doctor | Delete |

Generate Pet Passport

Select Pet:

Select a Pet:

Vaccination Status:

Vaccinated:

Vaccination Date:

mm/dd/yyyy:

[Generate Passport](#) [Go Back](#)

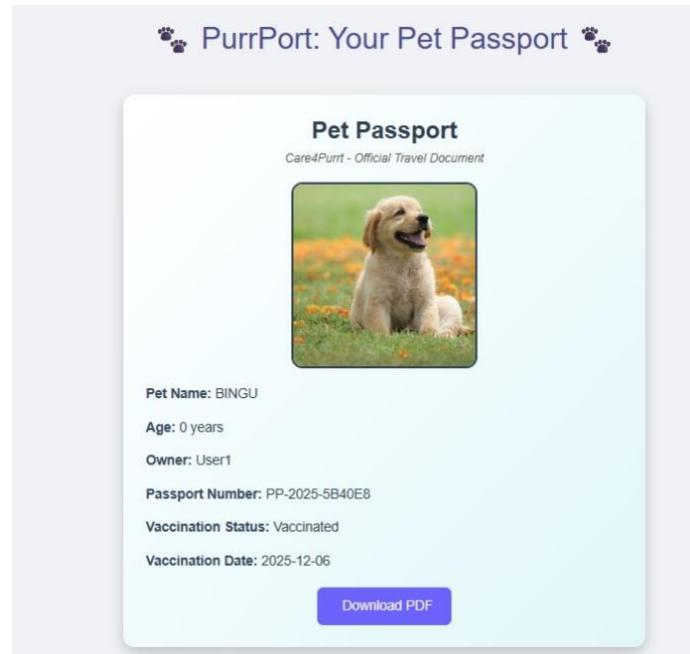


Fig 4: Admin profile

User1

- Homepage
- Pet Owner Profile
- Logout

Welcome, User1!

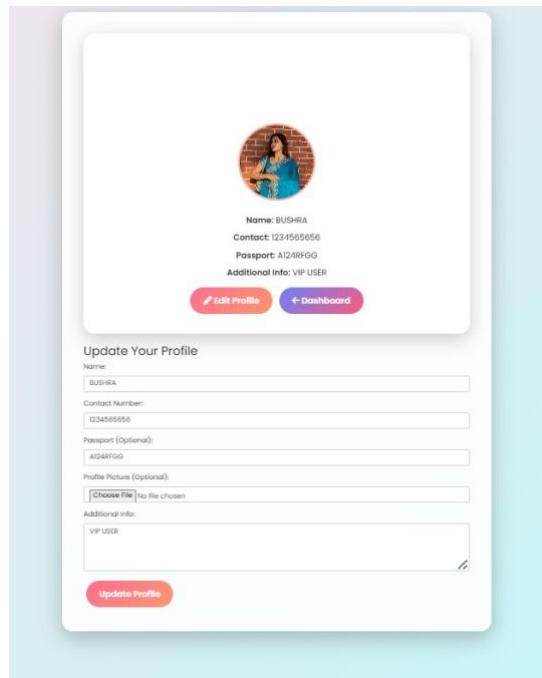
Manage your pets, appointments, and health records easily.

Manage Pets
View, add, edit, or delete your pet profiles.
[View Pets](#)

Book Appointment
Book, update, or cancel appointments with your pet's doctor.
[Book Now](#)

Health Records
Check your pet's medical history and records.
[View Records](#)

Log Pet Mood
Track your pet's mood and behavior patterns.
[Log Mood](#)



Manage Your Pets

Add, edit, or delete pets in a modern colorful interface.

No file chosen

Add Pet



VHU
Age: 2 years
Vaccine: vaccinated
Illness: ERROR



KITTY
Age: 3 years
Vaccine: vaccinated
Illness: SLEEPY HEAD



BINGU
Age: 3 years
Vaccine: vaccinated
Illness: DEHYDRATION

[Go Back](#)

Book Your Appointment

1 2 3

Choose a Doctor

HOVER NUSYBA CHOW - Internal Medicine



Next

Pet Information

Pet Type:

Pet Age:

Pet Problem:

Back Next

Schedule Appointment

Date: mmddyyyy

Time: :--

Back Confirm Booking

Log Your Pet's Mood

Pet Owner

- Dashboard
- Log Mood
- Logout

Energy Level: Very Low

Appetite: Didn't eat at all

Social Interaction: Wanted to be alone

Play Behavior: Ignored toys

Sleep & Rest: Slept almost all day

Vocalization: Quiet

Other Info: Pet name, preferred doctor, notes..

Log Mood

← Back

Theme

Fig 5: Pet owner profile

Welcome, Doctor Doctor1!

Manage appointments, log pet moods and update health statuses.

View Appointments

Log Pet Mood

Update Health Status

Doctor Profile

Logout

Doctor Cheng

Contact: 1234565656

Designation: Consultant Vet

Specialization: Internal Medicine

License No: LIC-987654321

Experience: 3 years

Degree: 0

Institution: DMC

Edit Profile

Back to Dashboard

My Appointments

- Nusyba**
Type: Cat
Age: 2
Problem: Very sick and fat
Date: 2025-08-06
Time: 14:14:00
- Nusyba**
Type: Fish
Age: 2
Problem: sick
Date: 2025-08-12
Time: 16:15:00
- Bingu**
Type: fer
Age: 2
Problem: ferf
Date: 2025-11-19
Time: 22:35:00
- User1**
Type: cat
Age: 2

Pet Mood Logs

| Owner | Energy | Appetite | Social | Play | Sleep | Vocal | Notes |
|--------|-------------|------------|---------------|-----------------|---------------|-----------------|---------------------------------------|
| Owner1 | very_low | didnt_eat | wanted_alone | ignored_toys | slept_all_day | quiet | abc |
| Owner1 | very_low | didnt_eat | wanted_alone | ignored_toys | slept_all_day | quiet | Shiny, 2 years old and eating a lot |
| Owner1 | super_hyper | overeating | overly_clingy | ignored_toys | restless | extra_talkative | Chiku, 2 y old, Doctor 1, Over eating |
| Afshi | very_low | didnt_eat | wanted_alone | ignored_toys | slept_all_day | quiet | RT |
| Zuhaim | very_low | didnt_eat | wanted_alone | ignored_toys | slept_all_day | quiet | bingu |
| Nusyba | low | ate_less | playful | played_little | restless | extra_talkative | NKDJ |
| User1 | very_low | didnt_eat | wanted_alone | ignored_toys | slept_all_day | quiet | |
| User1 | high | overeating | wanted_alone | played_normally | normal_naps | normal_sounds | BINGU |

Fig 6: Doctor profile

Chapter 8

Cost Calculation

Cost calculation is an important part of system development as it helps estimate the financial requirements involved in designing, developing, deploying, and maintaining the system. Although Care4Purrt is developed as an academic project, analyzing development and

operational costs provides a realistic understanding of how such a system could be implemented in a real-world scenario.

8.1 Cost Analysis

The estimated costs for developing and operating the Care4Purrt system are outlined below (all costs are shown in BDT):

1. Development Costs (One-Time)

- a. Frontend development (HTML, CSS): 30,000 BDT
- b. Backend development (PHP, OOP logic): 55,000 BDT
- c. Database design and implementation (MySQL): 35,000 BDT

Total Development Cost:

30,000 + 55,000 + 35,000 = 120,000 BDT

2. Hosting and Maintenance Costs (Annual)

- a. Server hosting and domain services: $7,500 \text{ BDT} \times 12 = 90,000 \text{ BDT}$
- b. System maintenance and updates: 20,000 BDT

Total Annual Hosting and Maintenance Cost:

110,000 BDT

3. Administrative and Miscellaneous Costs (Annual)

- a. Administrative operations and monitoring: 30,000 BDT
- b. Software tools and utilities: 15,000 BDT

Total Administrative Cost:

45,000 BDT

Total Estimated Cost (First Year)

$120,000 \text{ (Development)} + 110,000 \text{ (Hosting & Maintenance)} + 45,000 \text{ (Administrative)}$
= 275,000 BDT

8.2 Benefit Analysis

Although Care4Purrt is an academic system, potential benefits are analyzed to demonstrate its real-world viability.

1. Operational Benefits:

- a. Centralized pet healthcare data management reduces manual effort.
- b. Improved accuracy in medical record keeping and appointment scheduling.
- c. Enhanced pet well-being through emotional behavior tracking and personalized care planning.

2. Financial Benefits (Hypothetical)

- a. Subscription or service fees from pet owners.
- b. Service charges for pet travel passport generation.
- c. System licensing for veterinary clinics.

Estimated Annual Benefit:

Approximately **180,000 BDT**

8.3 ROI Calculation for 2 Years

Year 1 ROI Calculation:

Total Cost (Year 1): 275,000 BDT

Total Benefit (Year 1): 180,000 BDT

ROI =

$$\frac{180,000 - 275,000}{275,000} \times 100$$

ROI = **-34.55%**

The negative ROI in the first year is expected due to initial development and setup costs.

Year 2 ROI Calculation:

In the second year, development costs are excluded.

Total Cost (Year 2):

Hosting & Maintenance (110,000) + Administrative (45,000) = **155,000 BDT**

Total Benefit (Year 2): 180,000 BDT

ROI =

$$\frac{180,000 - 155,000}{155,000} \times 100$$

ROI = 16.13%

This indicates that the system becomes financially viable after the initial development phase.

ROI Summary

- Year 1 ROI: -34.55%
- Year 2 ROI: 16.13%

This analysis shows that Care4Purrt has the potential to become sustainable over time if implemented commercially.

Chapter 9

Testing and Validation

Testing and validation are essential phases in the system development lifecycle to ensure that the Care4Purrt system functions correctly, meets user requirements, and delivers reliable performance. This chapter outlines the testing plan, test cases, and validation methods used to evaluate the system. Proper testing ensures that errors are identified early and that the system performs as expected under normal usage conditions.

9.1 Testing Plan

The testing plan for Care4Purrt focuses on verifying system functionality, usability, and data integrity. The following types of testing were performed during the development process:

1. **Functional Testing:** Functional testing was conducted to verify that all system features operate according to requirements. This includes user registration, login, pet profile management, appointment scheduling, medical record updates, mood logging, and passport generation.
2. **Usability Testing:** Usability testing ensured that the system interface is easy to navigate and understandable for all user roles, including Pet Owners, Doctors, and Admins.
3. **Performance Testing:** Basic performance testing was conducted to ensure acceptable system response times during normal usage.
4. **Security Testing:** Security testing focused on verifying role-based access control and preventing unauthorized access to sensitive data.
5. **Compatibility Testing:** The system was tested on different web browsers to ensure consistent behavior and display.

6. **Regression Testing:** Regression testing was performed after implementing new features to ensure that previously working functionalities were not affected.

9.2 Test Cases

The following test cases were used to evaluate the Care4Purrt system:

Test Case 1: User Registration and Login

Objective:

To ensure that users can register and log in successfully.

Steps:

- a. Access the registration page.
- b. Enter valid user details and select a role.
- c. Submit the registration form.
- d. Log in using registered credentials.

Expected Outcome:

The user should be registered successfully and redirected to the appropriate role-based dashboard.

Test Case 2: Pet Profile Management

Objective:

To verify that pet owners can manage pet profiles.

Steps:

- a. Log in as a Pet Owner.
- b. Navigate to the pet management section.
- c. Add a new pet profile with valid details.
- d. Edit or delete the pet profile.

Expected Outcome:

Pet profile data should be stored, updated, or removed correctly from the database.

Test Case 3: Appointment Scheduling

Objective:

To ensure that appointments can be booked and managed properly.

Steps:

- a. Log in as a Pet Owner.

- b. Book an appointment with a doctor.
- c. Log in as a Doctor and view the appointment.

Expected Outcome:

The appointment should be visible to both the Pet Owner and Doctor.

Test Case 4: Medical Record Management

Objective:

To verify that doctors can update medical records.

Steps:

- a. Log in as a Doctor.
- b. Select a pet profile.
- c. Add diagnosis and treatment details.

Expected Outcome:

Medical records should be saved and visible to the pet owner in read-only mode.

Test Case 5: MoodTrack Logging

Objective:

To ensure emotional behavior logs can be recorded and reviewed.

Steps:

- a. Log in as a Pet Owner.
- b. Log a mood entry for a pet.
- c. Log in as a Doctor and review the mood log.

Expected Outcome:

Mood entries should be stored and displayed correctly.

Test Case 6: PurrPort Generation

Objective:

To verify travel passport generation functionality.

Steps:

- a. Log in as Admin.
- b. Verify pet vaccination and health records.
- c. Generate pet passport.

Expected Outcome:

A pet passport should be generated only when compliance requirements are met.

9.3 Validation

Validation ensures that the Care4Purrt system meets its intended requirements and performs reliably in real-world scenarios.

1. Functional Validation

All core features were validated to ensure they functioned according to system requirements. User actions such as pet management, appointment scheduling, and record updates were tested for accuracy.

2. Performance Validation

The system was tested to ensure acceptable performance under normal usage conditions, including multiple users accessing the system simultaneously.

3. Security Validation

Role-based access control was validated to ensure that users could only access permitted features. Sensitive information such as medical records remained protected.

4. Usability Validation

Feedback was collected through observation to ensure that users could navigate the system without difficulty and understand available features.

5. Cross-Platform Validation

Care4Purrt was tested on multiple browsers to ensure consistent functionality and user experience.

Summary of Testing and Validation

The testing and validation processes confirmed that Care4Purrt functions reliably, meets user requirements, and maintains data accuracy and security. These processes ensure that the system is suitable for academic submission and provides a strong foundation for future enhancements.

Chapter 10

Deployment and Maintenance

After completing the development and testing phases, the Care4Purrt system moves into deployment and maintenance. Deployment ensures that the system is made accessible for use, while maintenance guarantees long-term stability, security, and performance. This chapter outlines the deployment plan, training approach, and maintenance strategies for the Care4Purrt system.

10.1 Deployment Plan

Deployment is the process of making the Care4Purrt system available for users. For this project, the system is deployed in a local server environment for demonstration and academic purposes.

10.1.1 Deployment Steps

1. **Final System Testing:** All features are tested to ensure that the system functions correctly without errors.
2. **Server Setup:** The system is deployed using XAMPP, where Apache handles server requests and MySQL manages the database.
3. **Database Configuration:** The database is configured using phpMyAdmin, ensuring all required tables and relationships are properly set up.
4. **Integration Verification:** Frontend interfaces are tested to ensure smooth interaction with backend logic and database operations.
5. **System Availability:** Once verified, the system is made available for demonstration through the local server.

10.1.2 Timeline

| <u>Tasks</u> | <u>Date</u> | | | | | | | |
|--|-------------|------------|------------|-----------|------------|------------|------------|------------|
| | 19/10/2025 | 26/10/2025 | 02/11/2025 | 9/11/2025 | 16/11/2025 | 23/11/2025 | 30/11/2025 | 07/12/2025 |
| 1. Making use case diagram +sequence diagram | | | | | | | | |
| 2. Designing web pages | | | | | | | | |
| 3. Finalizing Diagrams | | | | | | | | |
| 4. Initial code works | | | | | | | | |
| 5. User login system Development | | | | | | | | |
| 6. Code development | | | | | | | | |
| 7. Database create +homepage finalizing | | | | | | | | |
| 8. Frontend designing | | | | | | | | |
| 9. Backend initialization | | | | | | | | |
| 10. Database finalization | | | | | | | | |
| 11. Backened progress | | | | | | | | |
| 12. Connection checking | | | | | | | | |
| 13. Frontend finalization | | | | | | | | |
| 14. Frontend and backend connection | | | | | | | | |
| 15. Final testing and checking | | | | | | | | |

The deployment process follows a structured timeline:

- Final testing and bug fixing
- Database setup and verification
- Local deployment using XAMPP
- System demonstration and evaluation

This timeline ensures that the system is deployed efficiently and remains stable during evaluation.

10.2 Training

Training is important to ensure that users understand how to use the system effectively.

Admin Training

Admins are trained to:

- a. Manage users and system data.
- b. Verify health records and generate pet passports.
- c. Monitor system activities and reports.

User Training (Pet Owners and Doctors)

Users are guided on:

- a. Logging into the system.
- b. Managing pet profiles and appointments.
- c. Using MoodTrack and CareTailor features.
- d. Viewing medical records and compliance status.

Training can be provided through basic user instructions and system demonstrations.

10.3 Maintenance

Maintenance ensures that the Care4Purrt system remains reliable, secure, and up to date after deployment.

1. Regular Updates

- a. Update system features based on feedback.
- b. Improve performance and usability when necessary.

2. Bug Fixes

- a. Identify and fix bugs reported during system use.
- b. Conduct regular system checks.

3. Performance Optimization

- a. Optimize database queries.
- b. Improve system response time and stability.

4. Security Maintenance

- a. Monitor system access and permissions.
- b. Protect sensitive data through controlled access.

5. Backup and Recovery

- a. Regularly back up the database and system files.
- b. Restore data if system failure occurs.

Summary of Deployment and Maintenance

The deployment and maintenance strategy for Care4Purrt ensures that the system is accessible, reliable, and maintainable. Local deployment supports academic demonstration, while structured maintenance practices ensure long-term system stability and readiness for future enhancements.

Chapter 11

Future Plans

Although Care4Purrt has been successfully developed as an academic project, there are several opportunities for future enhancements and improvements that can increase its functionality, usability, and real-world applicability. The current system provides a strong foundation for a comprehensive pet healthcare management platform, and future developments can further extend its capabilities.

1. Mobile Application Development

One of the major future plans for Care4Purrt is the development of a mobile application. A dedicated mobile app would allow pet owners, doctors, and admins to access the system more conveniently using smartphones and tablets. Features such as appointment reminders, mood logging, and health notifications could be integrated into the mobile platform to enhance user engagement.

2. Real-Time Notifications and Alerts

Future versions of Care4Purrt may include real-time notifications and alert systems. These notifications could remind pet owners about upcoming appointments, vaccination schedules, or missed mood logs. Doctors could receive alerts for new appointments or critical health updates, improving timely response and care delivery.

3. Advanced Health Analytics

Care4Purrt can be enhanced by incorporating advanced analytics and data visualization tools. By analyzing medical records, mood trends, and activity data, the system could provide deeper insights into a pet's health over time. This would support early detection of health issues and more informed veterinary decisions.

4. Integration with Veterinary Clinics and Devices

In the future, the system could be integrated directly with veterinary clinics and smart pet health devices. Such integration would allow automatic updates of medical records and health metrics, reducing manual data entry and improving accuracy.

5. Enhanced Security and Authentication

Future improvements may include stronger security mechanisms such as multi-factor authentication, encrypted data storage, and secure cloud-based hosting. These enhancements would make Care4Purrt more suitable for real-world deployment involving sensitive medical data.

6. Geographic and Feature Expansion

Care4Purrt could be expanded to support multiple regions and countries, especially for pet travel compliance. Additional features such as multilingual support and region-specific health regulations could be introduced to make the system more globally applicable.

Summary of Future Plans

The future plans for Care4Purrt focus on improving accessibility, functionality, and system intelligence. By expanding features, enhancing security, and integrating modern technologies, Care4Purrt has the potential to evolve from an academic project into a fully functional pet healthcare management platform suitable for real-world use.

Chapter 12

Conclusion

The Care4Purrt project aims to provide a structured, user-friendly, and role-based pet healthcare management system that addresses the limitations of traditional and fragmented pet care practices. By integrating medical record management, emotional behavior tracking,

personalized care planning, and travel compliance into a single platform, Care4Purrt offers a comprehensive solution for modern pet healthcare needs. The system successfully demonstrates the practical application of software engineering principles and web-based system development.

12.1 Project Boundaries

12.1.1 Security Issues

Ensuring the security of user data and medical records is a critical concern. While role-based access control and basic authentication mechanisms are implemented, advanced security features such as end-to-end encryption, intrusion detection, and multi-factor authentication are beyond the current project scope. These limitations may affect the system's readiness for large-scale real-world deployment.

12.1.2 Internet Connection Speed Matters

Care4Purrt is a web-based system and therefore depends on a stable internet connection for smooth operation. Slow or unreliable connectivity may impact system performance, user experience, and access to features such as appointment management and real-time data updates.

12.1.3 Data Accuracy and User Dependency:

The accuracy of system data largely depends on user input. Incorrect or incomplete data provided by pet owners or doctors may affect system reliability. While basic validation is implemented, automated verification mechanisms are limited within the current scope.

12.2 Constraints

The Care4Purrt project was developed under certain constraints that influenced system design and implementation.

Budget Constraints: As an academic project, development and deployment were performed using limited resources and free development tools.

Time Constraints: The project was completed within a fixed academic semester, limiting the implementation of advanced features and extensive testing.

Technical Constraints: The system is developed for local deployment using XAMPP and does not currently include cloud hosting or real-time service integration.

12.3 Discussion

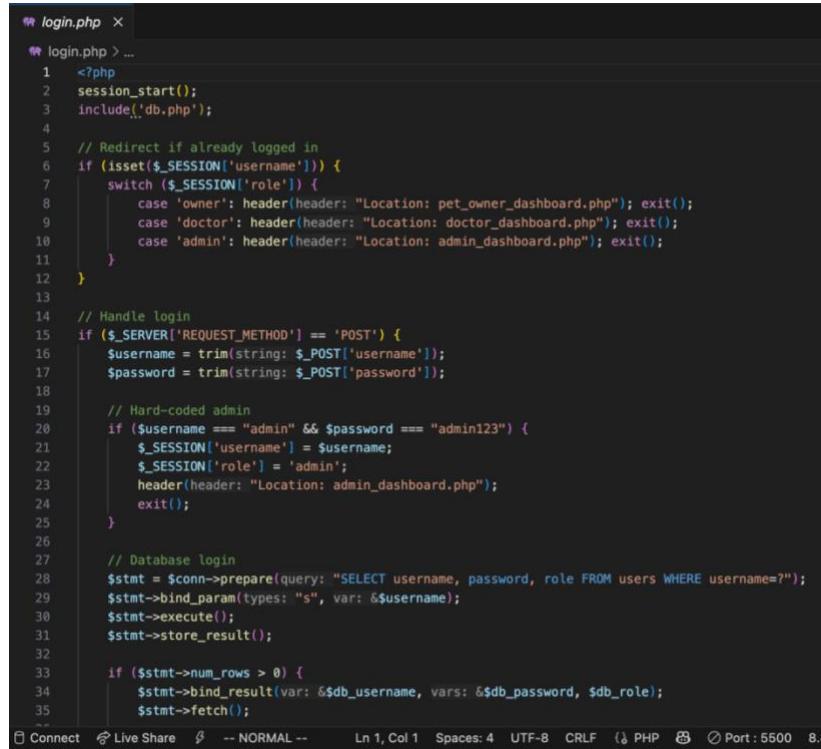
Overall, Care4Purrt successfully achieves its primary goal of creating a centralized pet healthcare management system that supports multiple user roles and integrates both physical and emotional health considerations. The inclusion of features such as MoodTrack, CareTailor, and PurrPort adds real-world relevance and distinguishes the system from traditional pet healthcare applications. Despite certain limitations related to security, scalability, and deployment, the system provides a strong foundation for future expansion. With further development, enhanced security, and broader integration, Care4Purrt has the potential to evolve into a fully functional and commercially viable pet healthcare platform. From an academic perspective, the project effectively demonstrates system analysis, design, implementation, and testing concepts, making it a successful and complete Design Project-II submission.

References

- PetMD. *About PetMD – For Pets. By Vets™*. Available at: <https://www.petmd.com/about>
- United Pet Care (UPC). *Affordable Pet Healthcare Program*. Available at: <https://www.unitedpetcare.com/>
- Zoetis Petcare. *Pet Health Products and Veterinary Resources*. Available at: <https://www.zoetispetcare.com/>
- Petivity. *Smart Pet Health Monitoring Solutions*. Available at: <https://www.petivity.com/>
- Veterinary Partner – VIN. *Veterinarian-Reviewed Pet Health Information*. Available at: <https://veterinarypartner.vin.com/>
- Pet Health Club. *Preventive Healthcare Plans for Pets*. Available at: <https://www.pethealthclub.com/uk>

Extra Codes for Appendix

Login and sign-up code:

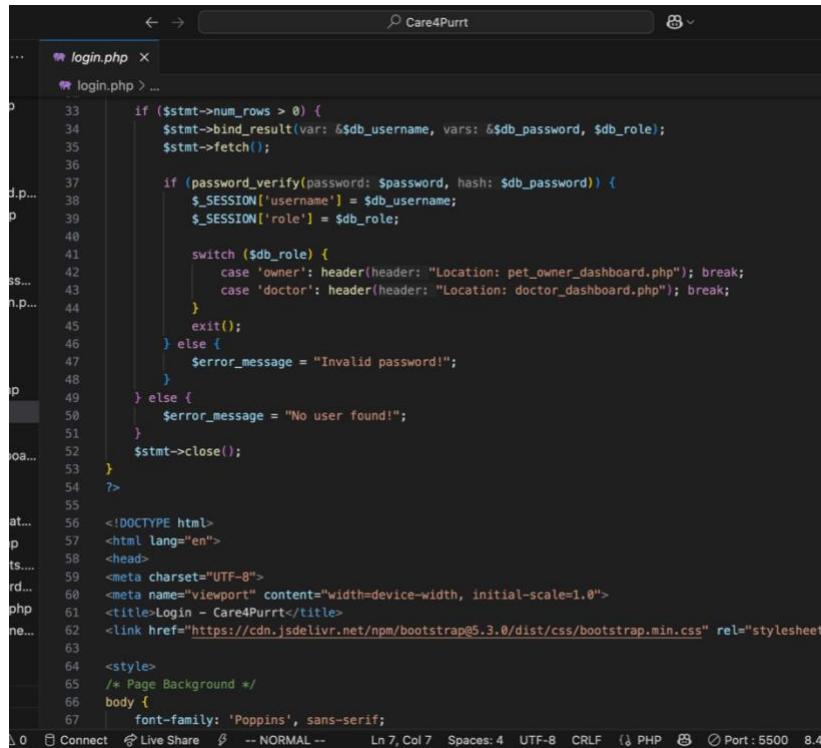


```

login.php > ...
1  <?php
2  session_start();
3  include('db.php');
4
5 // Redirect if already logged in
6 if (isset($_SESSION['username'])) {
7     switch ($_SESSION['role']) {
8         case 'owner': header(header: "Location: pet_owner_dashboard.php"); exit();
9         case 'doctor': header(header: "Location: doctor_dashboard.php"); exit();
10        case 'admin': header(header: "Location: admin_dashboard.php"); exit();
11    }
12 }
13
14 // Handle login
15 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
16     $username = trim(string: $_POST['username']);
17     $password = trim(string: $_POST['password']);
18
19     // Hard-coded admin
20     if ($username === "admin" && $password === "admin123") {
21         $_SESSION['username'] = $username;
22         $_SESSION['role'] = 'admin';
23         header(header: "Location: admin_dashboard.php");
24         exit();
25     }
26
27     // Database login
28     $stmt = $conn->prepare(query: "SELECT username, password, role FROM users WHERE username=?");
29     $stmt->bind_param(types: "s", var: &$amp;$username);
30     $stmt->execute();
31     $stmt->store_result();
32
33     if ($stmt->num_rows > 0) {
34         $stmt->bind_result(var: &$db_username, vars: &$db_password, $db_role);
35         $stmt->fetch();
36     }
37
38     if ($stmt->num_rows > 0) {
39         $stmt->bind_result(var: &$db_username, vars: &$db_password, $db_role);
40         $stmt->fetch();
41
42         if (password_verify(password: $password, hash: $db_password)) {
43             $_SESSION['username'] = $db_username;
44             $_SESSION['role'] = $db_role;
45
46             switch ($db_role) {
47                 case 'owner': header(header: "Location: pet_owner_dashboard.php"); break;
48                 case 'doctor': header(header: "Location: doctor_dashboard.php"); break;
49             }
50             exit();
51         } else {
52             $error_message = "Invalid password!";
53         }
54     } else {
55         $error_message = "No user found!";
56     }
57     $stmt->close();
58 }
59
60 >
61
62
63
64
65
66
67

```

Connect Live Share -- NORMAL -- Ln 1, Col 1 Spaces: 4 UTF-8 CRLF PHP Port: 5500 8.4



```

login.php > ...
1  <?php
2  session_start();
3  include('db.php');
4
5 // Redirect if already logged in
6 if (isset($_SESSION['username'])) {
7     switch ($_SESSION['role']) {
8         case 'owner': header(header: "Location: pet_owner_dashboard.php"); break;
9         case 'doctor': header(header: "Location: doctor_dashboard.php"); break;
10        case 'admin': header(header: "Location: admin_dashboard.php"); break;
11    }
12 }
13
14 // Handle login
15 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
16     $username = trim(string: $_POST['username']);
17     $password = trim(string: $_POST['password']);
18
19     // Hard-coded admin
20     if ($username === "admin" && $password === "admin123") {
21         $_SESSION['username'] = $username;
22         $_SESSION['role'] = 'admin';
23         header(header: "Location: admin_dashboard.php");
24         exit();
25     }
26
27     // Database login
28     $stmt = $conn->prepare(query: "SELECT username, password, role FROM users WHERE username=?");
29     $stmt->bind_param(types: "s", var: &$amp;$username);
30     $stmt->execute();
31     $stmt->store_result();
32
33     if ($stmt->num_rows > 0) {
34         $stmt->bind_result(var: &$db_username, vars: &$db_password, $db_role);
35         $stmt->fetch();
36     }
37
38     if ($stmt->num_rows > 0) {
39         $stmt->bind_result(var: &$db_username, vars: &$db_password, $db_role);
40         $stmt->fetch();
41
42         if (password_verify(password: $password, hash: $db_password)) {
43             $_SESSION['username'] = $db_username;
44             $_SESSION['role'] = $db_role;
45
46             switch ($db_role) {
47                 case 'owner': header(header: "Location: pet_owner_dashboard.php"); break;
48                 case 'doctor': header(header: "Location: doctor_dashboard.php"); break;
49             }
50             exit();
51         } else {
52             $error_message = "Invalid password!";
53         }
54     } else {
55         $error_message = "No user found!";
56     }
57     $stmt->close();
58 }
59
60 <!DOCTYPE html>
61 <html lang="en">
62     <head>
63         <meta charset="UTF-8">
64         <meta name="viewport" content="width=device-width, initial-scale=1.0">
65         <title>Login - Care4Purr</title>
66         <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">
67         <style>
68             /* Page Background */
69             body {
70                 font-family: 'Poppins', sans-serif;
71             }
72         </style>
73     </head>
74     <body>
75         <div class="container">
76             <h1>Care4Purr</h1>
77             <form method="post">
78                 <div>
79                     <label>Username:</label>
80                     <input type="text" name="username" required="required"/>
81                 </div>
82                 <div>
83                     <label>Password:</label>
84                     <input type="password" name="password" required="required"/>
85                 </div>
86                 <div>
87                     <input type="submit" value="Login" />
88                 </div>
89             </form>
90         </div>
91     </body>
92 </html>

```

Connect Live Share -- NORMAL -- Ln 7, Col 7 Spaces: 4 UTF-8 CRLF PHP Port: 5500 8.4

```

... login.php x
... login.php > ...
57  <html lang="en">
58  <head>
63
64  <style>
65  /* Page Background */
66  body {
67    font-family: 'Poppins', sans-serif;
68    background: linear-gradient(135deg, #E6E6FA, #F8F0FF);
69    min-height: 100vh;
70    display: flex;
71    justify-content: center;
72    align-items: center;
73    padding: 30px;
74    font-size: 22px; /* BIGGER base font */
75  }
76
77  /* FULL-SCREEN WIDE CARD */
78  .login-card {
79    background: #ffffff;
80    border-radius: 35px;
81    padding: 70px 60px;
82    width: 95%; /* ALMOST FULL SCREEN */
83    max-width: 1400px; /* But limited for desktops */
84    box-shadow: 0 20px 50px rgba(0,0,0,0.2);
85    text-align: center;
86    transition: 0.3s ease;
87  }
88  .login-card:hover {
89    transform: translateY(-5px);
90  }
91
92  /* Cute Pet Image */
93  .pet-image {
94    width: 150px; /* BIGGER */
95    margin-bottom: 30px;
96  }

```

Connect Live Share -- NORMAL -- Ln 7, Col 7 Spaces: 4 UTF-8 CRLF { PHP Port: 5500 8.4.

```

... login.php x
... login.php > ...
57  <html lang="en">
58  <head>
64  <style>
93  .pet-image {
94
96  }
97
98  /* Title */
99  .login-card h3 {
100    color: #4B6CB7;
101    margin-bottom: 40px;
102    font-size: 3rem; /* HUGE title */
103    font-weight: 700;
104  }
105
106  /* BIGGER Inputs */
107  .form-control {
108    border-radius: 35px;
109    padding: 25px 30px; /* Bigger padding */
110    font-size: 1.6rem; /* Larger text */
111    border: 1px solid #ccc;
112    box-shadow: inset 0 3px 8px rgba(0,0,0,0.08);
113    transition: all 0.3s;
114  }
115  .form-control:focus {
116    border-color: #4B6CB7;
117    box-shadow: 0 0 12px rgba(75,108,183,0.4);
118  }
119
120  /* BIG login button */
121  .btn-login {
122    background: linear-gradient(135deg, #4B6CB7, #182848);
123    border: none;
124    color: white;
125    font-size: 2rem; /* Bigger */
126    font-weight: 700;

```

Connect Live Share -- NORMAL -- Ln 7, Col 7 Spaces: 4 UTF-8 CRLF { PHP Port: 5500 8.4.

```

... login.php < ...
  login.php > ...
  57  <html lang="en">
  58  <head>
  64  <style>
121  .btn-login {
125    font-size: 2rem; /* Bigger */
126    font-weight: 700;
127    border-radius: 40px;
128    padding: 25px;
129    width: 100%;
130    transition: 0.3s ease;
131  }
132  .btn-login:hover {
133    transform: scale(1.05);
134    box-shadow: 0 12px 40px rgba(75,108,183,0.5);
135  }
136
137  /* Error alert */
138  .alert {
139    border-radius: 20px;
140    padding: 20px;
141    font-size: 1.4rem;
142    margin-bottom: 20px;
143  }
144
145  /* Footer Link */
146  .text-center {
147    font-size: 1.6rem;
148    margin-top: 35px;
149  }
150  .text-center a {
151    color: #4B6C87;
152    font-weight: 600;
153  }
154  .text-center a:hover {
155    text-decoration: underline;
156  }

```

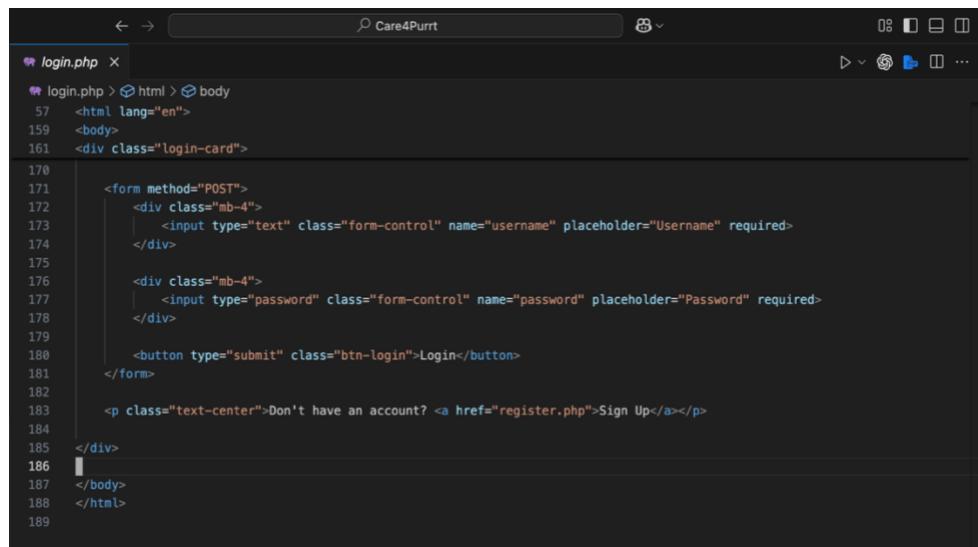
0 Connect Live Share -- NORMAL -- Ln 7, Col 7 Spaces: 4 UTF-8 CRLF { PHP Port: 5500 8.4.11:8.4

```

... login.php < ...
  login.php > ...
  57  <html lang="en">
  58  <head>
  64  <style>
133  .text-center a:hover {
154    text-decoration: underline;
155  }
156  </style>
157  </head>
158  <body>
159
160  <div class="login-card">
161
162    
163
164    <h3>Welcome to Care4Purrt</h3>
165
166    <?php if (isset($error_message)) {
167      echo "<div class='alert alert-danger'>$error_message</div>";
168    } ?>
169
170    <form method="POST">
171      <div class="mb-4">
172        <input type="text" class="form-control" name="username" placeholder="Username" required>
173      </div>
174
175      <div class="mb-4">
176        <input type="password" class="form-control" name="password" placeholder="Password" required>
177      </div>
178
179      <button type="submit" class="btn-login">Login</button>
180    </form>
181
182    <p class="text-center">Don't have an account? <a href="register.php">Sign Up</a></p>
183
184

```

0 Connect Live Share -- NORMAL -- Ln 7, Col 7 Spaces: 4 UTF-8 CRLF { PHP Port: 5500 8.4.11:8.4



The screenshot shows a code editor window with the file 'login.php' open. The code is a simple HTML form for user authentication. It includes fields for username and password, a login button, and a link to sign up. The code is numbered from 57 to 189.

```
login.php
57 <html lang="en">
58   <body>
59     <div class="login-card">
60       <form method="POST">
61         <div class="mb-4">
62           <input type="text" class="form-control" name="username" placeholder="Username" required>
63         </div>
64
65         <div class="mb-4">
66           <input type="password" class="form-control" name="password" placeholder="Password" required>
67         </div>
68
69         <button type="submit" class="btn-login">Login</button>
70       </form>
71
72       <p class="text-center">Don't have an account? <a href="register.php">Sign Up</a></p>
73     </div>
74   </body>
75 </html>
```