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Software Engineering 1

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Activity Name: Practical Exam for Software Engineering 1/Web App 1

Computer Shop Management System Documentation

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1. Introduction

1.1 Overview of the System

The Computer Shop Management System is a web-based platform designed for management of a computer retail store's inventory. It enables store managers to efficiently handle computer product details, including adding, updating, and deleting records of available computers. The system is designed to improve operational efficiency and enhance data organization.

1.2 Objectives

The Objectives of this system is to provide an easy-to-understand interface for managing computer inventory data. By having a centralized management process, this system helps in reducing manual errors, maintain real time inventory data and enhances the productivity and efficiency of the shop's workers.

1.3 Scope of the Document

This document provides a detailed overview of what the system's designs are, its requirements, and its architecture and functionality. It also covers both the functional and the non-functional requirements, the schematics of the database, the user interface design and also the implementation details. This document focuses on giving a clear guide to the shop's staff for understanding, deploying and maintaining the system.

2. System Overview

2.1 Prototype Description

The CSMS prototype is a web-based application designed to manage a computer retail store's inventory. It serves as a centralized platform where the store staff can maintain up to date records of available computers. This includes essential details such as model, brand, price, and stock quantity. The system ensures secure access through user authentication and provides an organized interface for inventory management.

2.2 Modules/Features

The Computer Shop Management System features the following:

User Authentication – Secure login/logout functionality to ensure that only authorized personnel can access and manage the inventory.

Computer Inventory Management:
- **–** Allows users to add new computer records with details like model, brand, price, and stock.
- **–** Enables modification of existing computer records to keep information up to date.
- **–** Provides the option to remove outdated or unnecessary records from the inventory.
- **–** Displays a list of all available computers with details, allowing for quick reference and inventory checks.

Session Management – Manages session duration to ensure user security, with automatic logout after a period of inactivity.

3. Requirements

Software Requirement Specifications (SRS)

3.1 Functional Requirements

User Authentication – The system must allow users to log in securely and restrict access to authenticated users.

Computer Inventory Management –
- **Add Computer:** The system must provide a form to add new computer entries with fields for model, brand, price, and stock.
- **Edit Computer:** The system should allow users to modify

details of existing computer records.
– **Delete Computer:** Users should be able to delete computer records that are no longer needed.
– **View Inventory:** The system should display a list of all computers in the inventory with relevant details.

Session Management – Automated session expiration after a set period of inactivity of users, enhancing security.

3.2 Non-Functional Requirements

Performance – The system should be able load inventory data efficiently, supporting fast access to the database.

Usability – The interface should be user-friendly and intuitive for a quick implementation to the store

Security – User passwords must be stored securely, and the system should prevent unauthorized access through session management.

Reliability – The system should maintain accurate data storage and retrieval, even under concurrent access.

3.3 Constraints

Browser Compatibility – The system should be accessible through modern web browsers including Google Chrome, Firefox, and Microsoft Edge

Database Compatibility – The system operates with a MySQL-compatible database to manage inventory data.

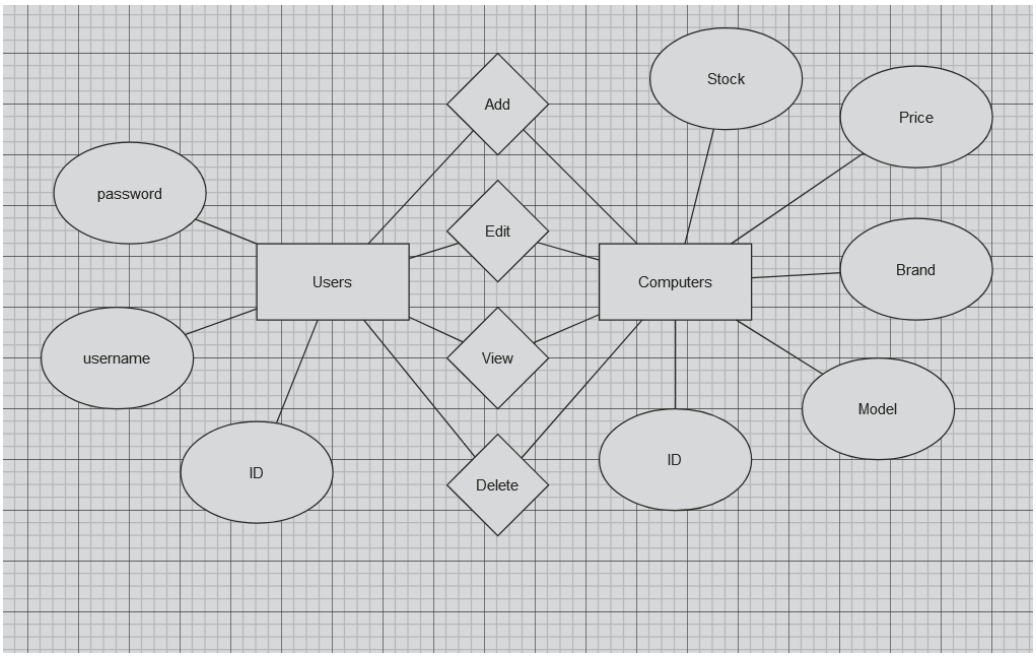
Web Server – The application is hosted on a PHP-enabled server, compatible with PHP 7.4 or higher.

Limited Resources – It should operate efficiently within limited hardware and network resources available to small retail stores with limited budget.

4. System Design

4.1 ERD, DFD and Block Diagrams

ERD



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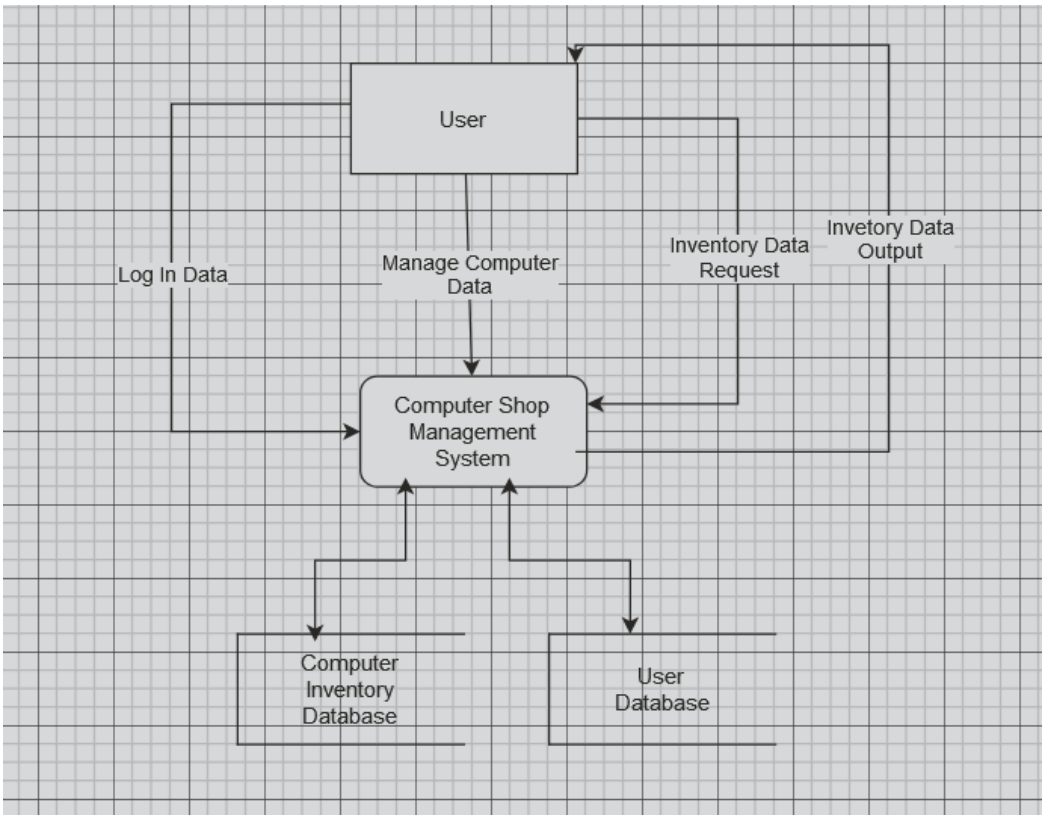
DFD Lvl 0



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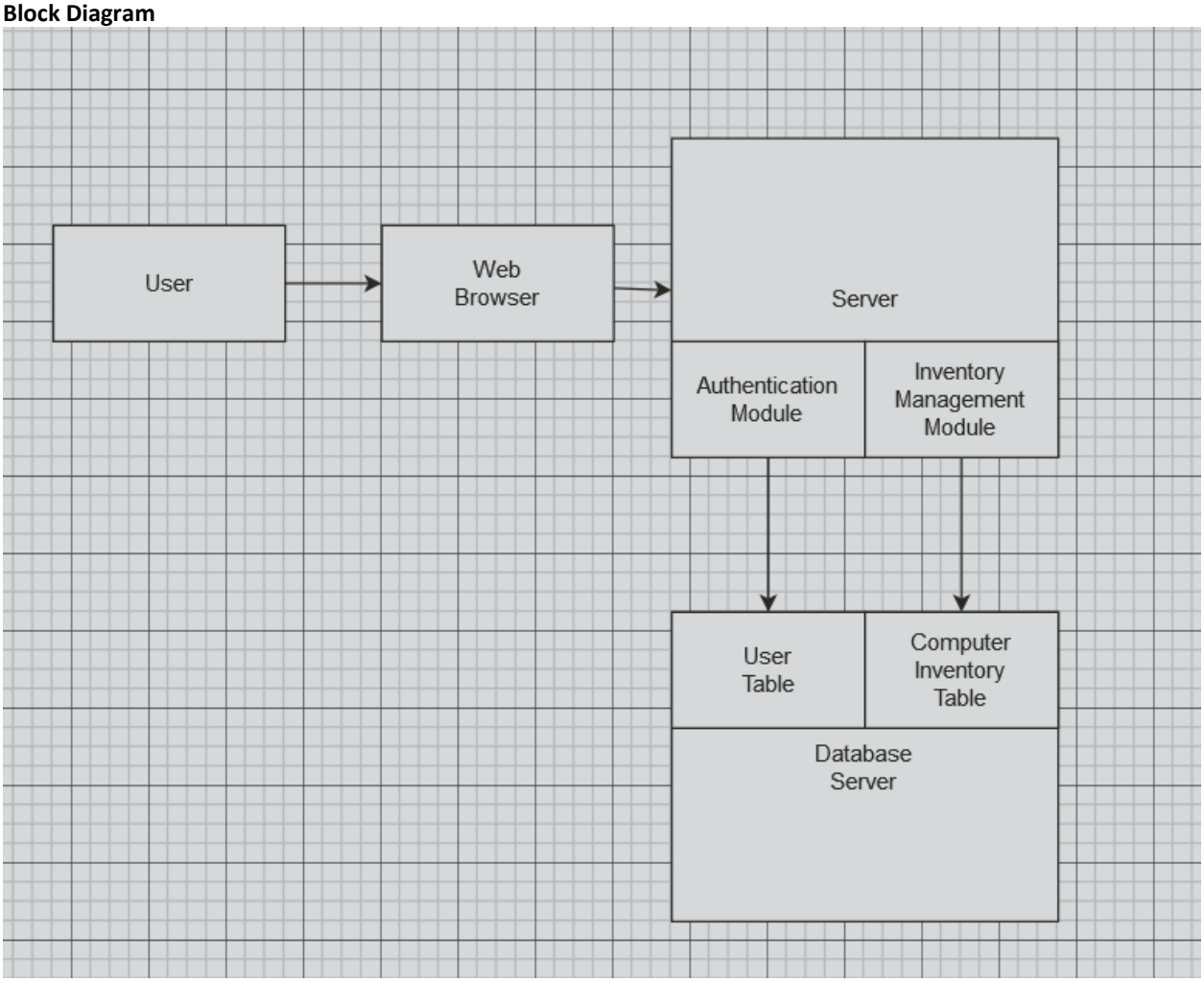
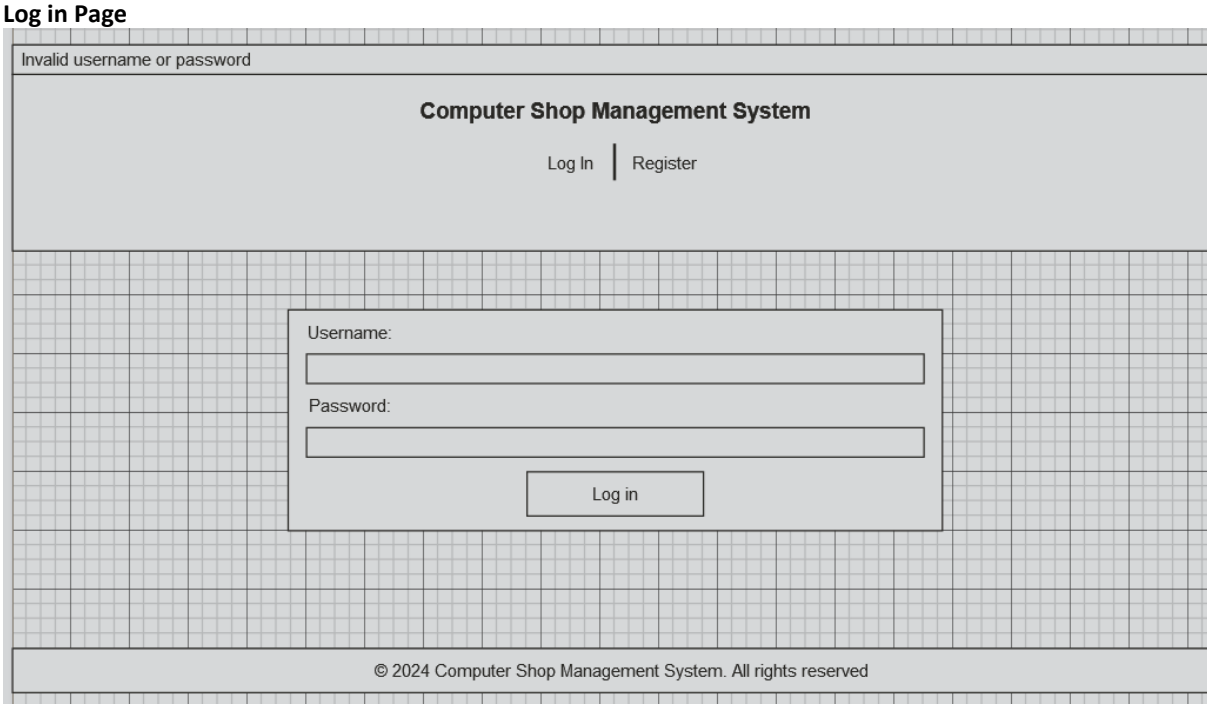
Block Diagram



4.2 Wireframes and UI Design

Log in Page



Purpose: Allows Users to Log in with their credentials, and if no account yet, then create through the Register button

Layout: **1.)** Username Field – a text field for inputting the staff's username
2.) Password Field – a text field for inputting the staff's password
3.) Log in button – a button to log in once the credentials has been filled up
4.) Error Message – Display for error message if the login credentials are invalid
5.**)** Title – title of the website
6.) Log in link – move to the page for logging in staff members
7.**)** Register link – move to the page for registering staff members
8.) Footer

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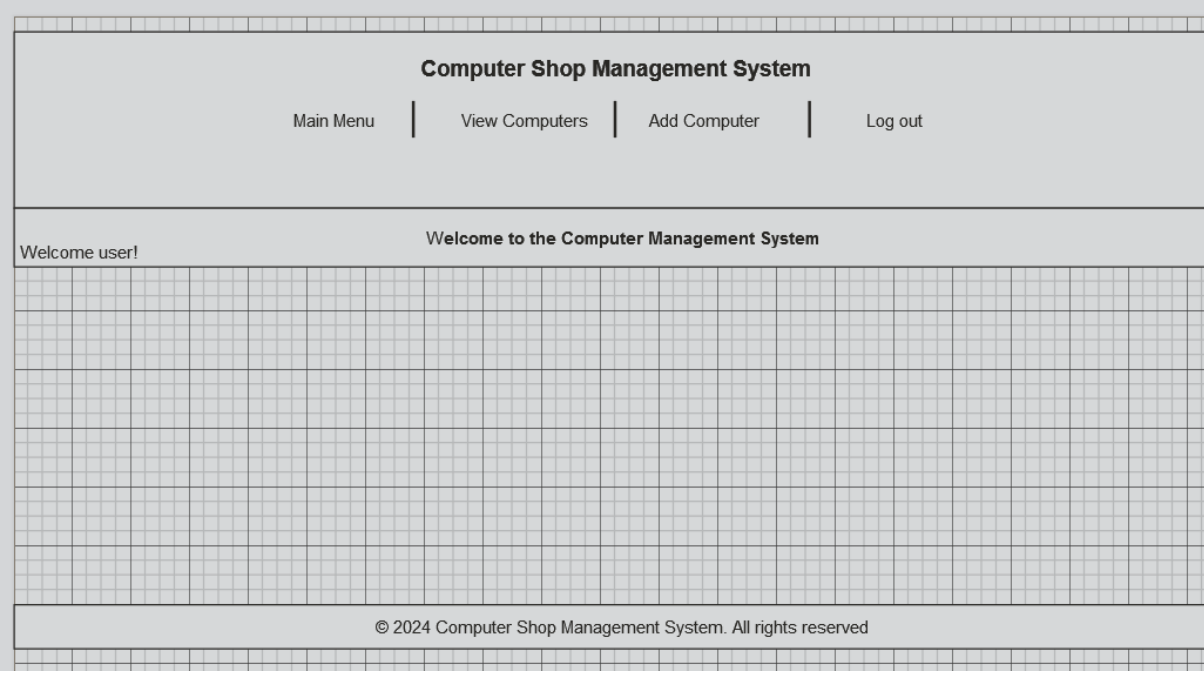
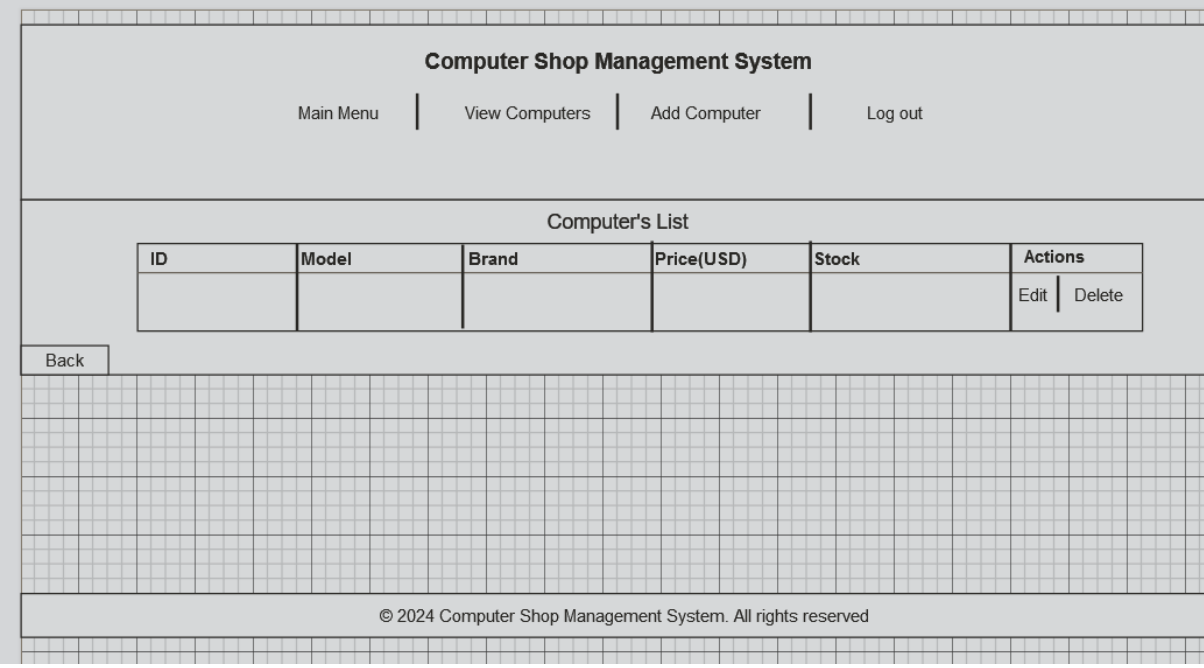
Menu Page



Purpose: Welcome users and has the view computer, add computer and log out
Layout: **1.)** View Computers – Move to the view computer page
2.**)** Add Computer – Move to the Add Computer page
3.**)** Log out – Destroys the user's session and move them to the Log in Page

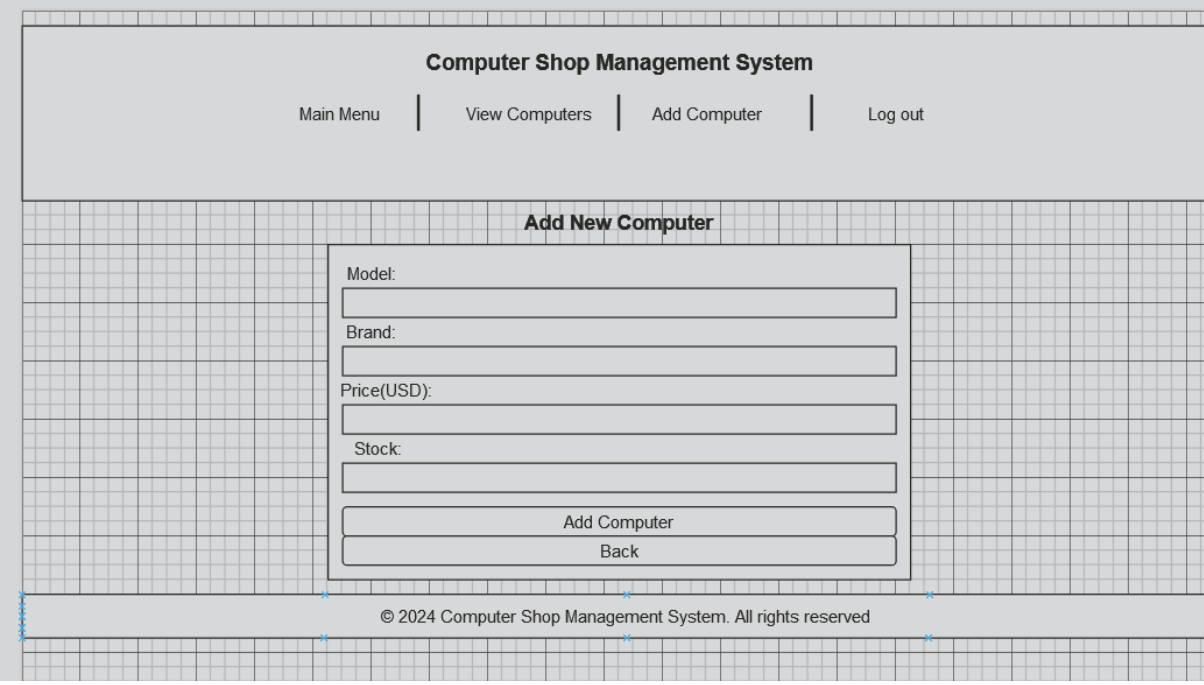
View Computer Page



Purpose: View the available computers, and also allows editing and Deleting of the Stock
Layout: **1.)** View Computers – Move to the view computer page

2.) Main Menu – Move to the Menu page
3.) Log out – Destroys the user's session and move them to the Log in Page
4.) Add Computer – Move to the Add Computer page
5.) Edit button – Moves to the Edit Computer page
6.) Delete button – Deletes the Computer
7.) Back button – Moves back to the previous page

Add Computer Page



Purpose: Add a new computer, that also allows to input their model, brand, price In USD and stock available

Layout: **1.)** View Computers – Move to the view computer page
2.) Main Menu – Move to the Menu page
3.) Log out – Destroys the user's session and move them to the Log in Page
4.) Add Computer – Move to the Add Computer page
5.) Model Text box – Allows input of Model of the computer
6.) Brand Text box – Allows input of Brand of the computer
7.) Price(USD) Text box – Allows input of Price of the computer in USD
8.) Stock – Allows input of number of that computer in stock
9.) Add Computer – A button that submits all the credentials of the computer
9.) Back button – Moves back to the previous page

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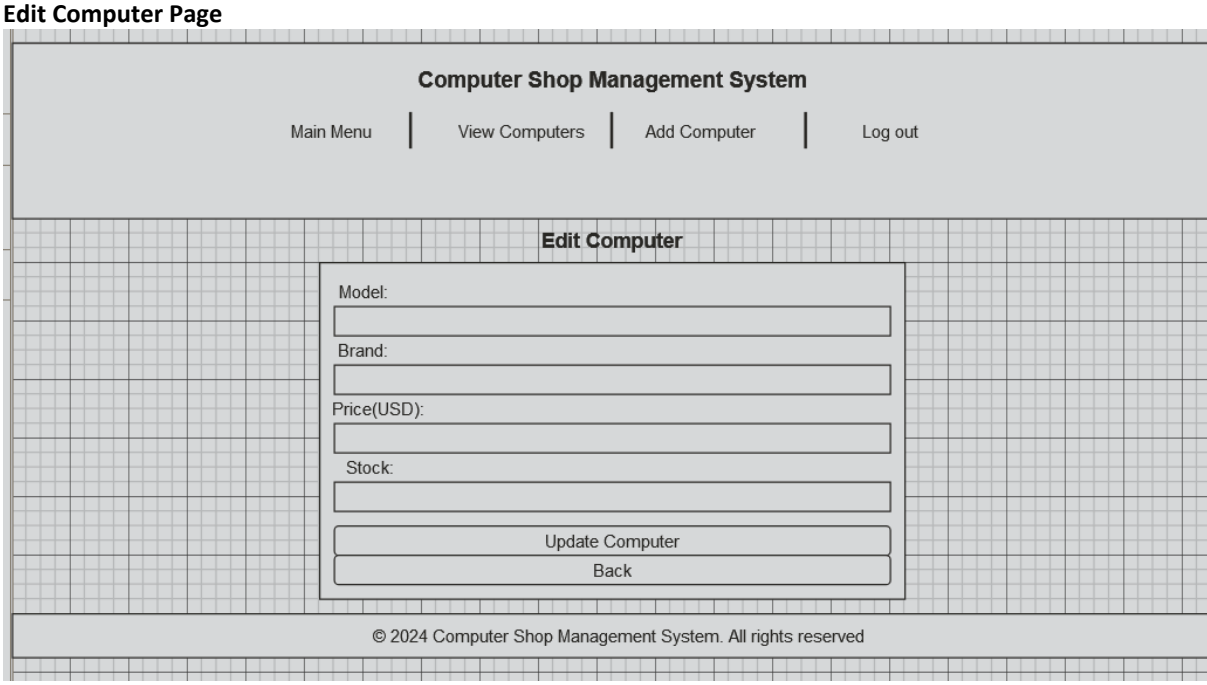
Edit Computer Page



Purpose: Add a new computer, that also allows to input their model, brand, price In USD and stock available

Layout: **1.)** View Computers – Move to the view computer page
2.**)** Main Menu – Move to the Menu page
3.**)** Log out – Destroys the user's session and move them to the Log in Page
4.) Add Computer – Move to the Add Computer page
5.) Model Text box – Allows input of Model of the computer
6.) Brand Text box – Allows input of Brand of the computer
7.) Price(USD) Text box – Allows input of Price of the computer in USD
8.) Stock – Allows input of number of that computer in stock
9.) Update Computer – A button that submits all the credentials of the computer
9.) Back button – Moves back to the previous page

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5. Software Processes

5.1 SDLC Overview

The chosen SDLC model for the Computer Shop Management System is the Waterfall Model due to its structured, straightforward, linear and systematic approach in developing the application.

Below are the SDLC phases of the project.

Requirement Gathering and Analysis – Understanding the requirements for the system which includes user roles, inventory management and database requirements
– Identify both the functional and non-functional requirements

System Design – Create the design of the system and it's architecture, which includes the ERD, DFD and the block diagrams of the system
– Design the schematics of the database, the wireframes and user layout of the website

Implementation – Develop the code for the system using HTML, CSS, PHP and MySQL
– Develop and implement security measures like password hashing and automated session closing after a certain time

Testing – Integrates various modules and testing the system's functionality, performance and security
– Conducts unit and integration testing to ensure reliability

Development – Deploy the system on hosting provider, which is Hostinger, making it accessible at https://mycomputershopmanagement.com
– Configures the server environment through Hostinger for optimal performance and security

Maintenance – Provides ongoing support for bug-fixes, security patches and system updates
– Occasional database maintenance and optimization to cater the needs of the user

5.2 STLC and its phases

Requirement Analysis – Reviews the requirements as to create a testing strategy
– Ensures all requirements has corresponding test cases for verification

Test Planning – Creates a test plan that outlines the test objectives, scope, resources, schedule and deliverables
– Determine the type of tests required

Test Case Development – Writes detailed test cases for each feature
– Prepares test data to simulate the user's interactions and data flows

Test Environment Setup – Configure the test environment to mirror the user's environment

Test Execution – Execute the tests and record its results
– Document any issues, bugs or unexpected behavior from the system

Test Cycle Closure – Analyze and summarize test findings
– Fix any bugs and confirm that the system meets all its requirements and standards

Software Testing Model Used

The chosen Testing Model to use for CSMS is V-Model due to its alignment with the waterfall model, its emphasis on verification at early stages and its clear and structured testing phases.

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6. System Architecture

6.1 Client-Server Model

The CSMS structure provides a scalable, secure and manageable approach for handling user interactions and data storage

Client (Front-end):

Description – The client is accessed through a web browser, enabling users (shop staff) to interact with the system's functionalities, such as adding, editing and viewing the stock

Technologies used – HTML, CSS and PHP were used to create a simple yet intuitive interface

Responsibilities – Sends user requests to the server
– Displays information received from the server, such as inventory lists

Server (Back-end):

Description – The server processes client's requests, interacts with the database and send responses back to the client

Technologies used – PHP were used for server-side scripting, managing requests, session-handling and secure data handling

Responsibilities – Verifies user credentials and manages session and access
– Process CRUD operations on handling computer records
– Ensures inactive users to be logged out automatically as to secure the system

Database Server:

Description – The database stores and manages persistent data for the system, which includes user information and computer inventory

Technologies used – MYSQL is used for reliable, scalable and efficient data storage

Responsibilities – Stores user information
– Stores each computer information
– Ensures data integrity and security

6.2 Database Design

User Table:

id (Primary key) – Unique identifier for each user
username – user's login name
password – Hashed password of the user for security

Computer Table:

id (Primary key) – Unique identifier for each computer record
model – Model of the computer
brand – Brand of the computer
price – Price of the computer
stock – Quantity available in stock

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7. Development and Testing

7.1 Technologies and Tools Used

Frontend Technologies – HTML and CSS for structuring and styling the user interface
– PHP for adding interactivity
Backend Technologies – PHP for handling requests, processing business logic and managing sessions
Database – MySQL for managing persistent data storage, handling tables for user credentials and computer inventory
Development Tools – Notepad++ for developing and organizing project files
– phpMyAdmin as database management tool for interacting with mySQL and perform queries
– XAMPP for providing a local development environment for both PHP and mySQL
Testing Tools – Firefox Dev Tools for debugging, inspecting elements and testing responsive design
– Manual testing for end to end functionality testing

7.2 Test Cases and Results

Login and Logout module:

https://docs.google.com/spreadsheets/d/1oN7KKE8Nvo8_pmIACjQolldw50r46bnm2olQKHGWhSs/edit?gid=0#gid=0

Register module:

https://docs.google.com/spreadsheets/d/1QcAKv3NuMEPVtVfmYz9cMQR6VEFd9xckKPAJZKd0yAU/edit?gid=0#gid=0

Menu module:

https://docs.google.com/spreadsheets/d/1EV6de63uYDEBwxDU1cqPRBx-sr6j6uWr9GVHp6r3kxM/edit?gid=0#gid=0

Add Computer module:

https://docs.google.com/spreadsheets/d/1t9aGfB8MxRn1ne1lAs1N6LV0kfrz41Y6qdi-EIYRrdY/edit?gid=0#gid=0

View Computers module:

https://docs.google.com/spreadsheets/d/1p6jqx7qY_3x7_-RSHsqs-VH2X0GbXwy4eokjGug9oNM/edit?gid=0#gid=0

Edit Computer module:

https://docs.google.com/spreadsheets/d/1GSe_5tNWgXzql0qPQJK7CTOQ24uwVijcIHrxLvGYkHQ/edit?gid=0#gid=0

7.3 Summary of Testing

Testing of the CSMS focused entirely on functionality and usability aspects to ensure a reliable user experience. Some security aspects were also tested.

Functionality testing – Verified that all the CRUD operations work as expected, allowing users to manage the inventory without errors

Security testing – Ensures session management works to protect user data
– Verifies that only correct credentials can start the session

Usability testing – Ensures that the user interface is intuitive and responsive to provide a smooth experience for future users

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8. Cost-Benefit Analysis

8.1 Cost Estimation

Development Costs:

Developer Time – Estimated at 8 hours at $5/hr = $40
Design and Wireframing – Estimated at 4 hours at $2.5/hr = $10

Hosting and Deployment Costs:

Domain Registration – $14/year
Premium Web Hosting – $4.39/month or $52.73
SSL Certificate – free as it is included in the Domain Registration

Total Annual Costing = $66.73

Maintenance and Support:

Bug Fixes and Updates – Estimated at $5/hr

Total estimated Cost (Initial Development + 1 year of hosting) = $116.73

8.2 Benefits and ROI

Increased Efficiency – By using the system, store staff can manage inventory efficiently without manual inventory-keeping. This reduces the time spent on data entry and searching for the information, translating into cost savings on labor

Data Accuracy – Automated inventory management reduces human error, ensuring accurate stock levels, which can improve ordering decisions and reduces losses due to stockouts or overstocking.

Scalability – The system provides a scalable solution that can grow with the business accommodating additional staff and inventory without extra costs
– Upon request, the system can be improve to include record keeping of customers

Return on Investment – Assuming that the system will be used in the Philippines, an average cost of labor is $10.94 per day, at least 10 hours of labor is saved per month, thus the store has a monthly saving of $13.68 and an annual savings of $164.10
– With the total annual savings of $164.10, the initial investment of $116.73 could be recouped in approximately 8 and a half months.

9. Risk and Project Management

9.1 Risk Analysis and Mitigation Strategies

Risk: Security Vulnerabilities

Description – The website may be susceptible to security threats like SQL injection, unauthorized access and data breaches
Mitigation Strategy – Implement input validation, use prepared statements, enforce strong password policies on the staff and regularly update the system for security patches

Risk: Data Loss

Description – Risk of losing data due to server failure, accidental deletion and etc
Mitigation Strategy – Implement regular database backups, use transaction controls for critical operations and set up data recovery procedures

Risk: System Downtime

Description – Server downtime, network issues and electrical disruption may lead to the system being inaccessible, affecting productivity of the staff
Mitigation Strategy – Use a reliable hosting provider, establish contingency plan for network issues and electrical disruption (use of mobile data and generator on standby)

Risk: Usability Issues

Description – If the system is not intuitive, it may take some time for staff to learn using the system, increasing cost in training
Mitigation Strategy – Conduct user testing, gather feedback and ensure a simple and intuitive design.

9.2 Project Timeline

https://docs.google.com/spreadsheets/d/1hAONqy0ek2CFb50K8-EKdLRAWQ6WY3-CY-cwFcmGFVc/edit?gid=0#gid=0

9.3 Resource Allocation

https://docs.google.com/spreadsheets/d/1Y6Pc59GVwMuQg8KhF8E9lQv-1YA5qIGb_Wjq5CRUG-o/edit?usp=sharing

10. Conclusion

10.1 Summary

The CSMS is a comprehensive solution designed to help manage the management of a compute store's inventory. Through its client-server interaction, it provides a secure and a intuitive platform for handling tasks such as adding, editing, viewing and deleting computer records. The system thus ensures data integrity of the shop and optimizes it's inventory management saving time and cost for the shop. It uses mainly PHP with HTML and CSS for is designing and MYSQL for database management. With these proven programs used, the system much more reliable and scalable than manual labor.

10.2 Future Enhancements and Improvements

Reporting and Analytics – Adding features for sales inventory reports would give the managers or the owner of the shop insights into trends, stock levels, and demand, helping in improving the shop

Role-Based Access Control – Implementing roles for different user levels, for example admin, owner, staff, as to restrict access to certain functionalities

Inventory Alerts – Implement a notification alert whenever the stock levels are low as to help staff manage inventory proactively

Search and Filter – Implement search and filter as to make it easier for users to find specific records in the inventory

11. Appendix

11.1 Acronyms and Abbreviations

Acronyms/Abbreviations	Full Form
CSMS	Computer Shop Management System
CRUD	Create, Read, Update, Delete
DFD	Data Flow Diagram
ERD	Entity Relationship Diagram
SDLC	Software Development Life Cycle
STLC	Software Testing Life Cycle
UI	User Interface
ROI	Return on Investment

11.2 References

PHP Documentation: https://www.php.net/docs.php

MySQL Documentation: https://dev.mysql.com/doc/

HTML and CSS Standards: https://www.w3.org/standards/webdesign/htmlcss

Software Engineering 1 PPTs:

https://www.canva.com/design/DAGPzQsx0SM/2IxHcrNNs9L8Kkg2vtKJAQ/edit?u

tm_content=DAGPzQsx0SM&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton&authuser=0

https://www.canva.com/design/DAGQyAkpeyw/GSJxyCt2RAsYCAIyJ1Pnhw/edit?authuser=0

https://www.canva.com/design/DAGUuN2kSw0/KQ9lBm4MiQjFMsdlDcSbEA/edit?utm_content=DAGUuN2kSw0&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton&authuser=0

https://www.canva.com/design/DAGRb4xy3vU/sq4tz-AKuoU5-WTtnNnb4g/edit?authuser=0

https://www.canva.com/design/DAGTPtNZEMU/0XVDVGxSZEqYac3ZjPZokw/edit?authuser=0

11.3 Glossary of Terms

Client-Server Model – A network architecture where client devices interact with server resources

Data Flow Diagram (DFD) – Diagram showing how data flow through a system

Entity Relationship Diagram (ERD) – Diagram used to visualize relationship between different entities in a database

Inventory Management – Process of ordering, storing and managing inventory of a shop

Scalability – Ability of a system to handle growth