Fitlife Hub: Web-Based Gym Management and Community Platform

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FINAL YEAR DESIGN PROJECT REPORT

This Report Presented in Partial Fulfillment of the Requirements for the **Degree of Bachelor of Science in Computer Science and Engineering**

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September 16, 2025

APPROVAL

This Project titled **"Fitlife Hub: Web-Based Gym Management and Community Platform"**, submitted by Shuvo Halder, ID No: **213-15-4369** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **16 September, 2025**.

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DECLARATION

I hereby declare that this project has been done by us under the supervision of **Arpita Ghose Tusi, Lecturer**, Department of Computer Science and Engineering, Daffodil International University. I also declare that neither this projectnor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ACKNOWLEDGEMENTS

This work would not have been possible without the support and contributions of many individuals over the past two semesters. I am deeply grateful to everyone who has assisted us in one way or another.

First, I express our heartfelt thanks and gratefulness to the almighty for His divine blessing making it possible for us to complete the **Final Year Design Project (FYDP)** successfully.

I am grateful and wish our profound indebtedness to **Arpita Ghose Tusi,** Lecturer, Department of Computer Science and Engineering, Daffodil International University, Dhaka, Bangladesh. Deep knowledge and keen interest of our supervisor in the field of Web Application Development to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts, and correcting them at all stages have made it possible to complete this project.

I would like to express our heartfelt gratitude to the Head of the Department of Computer Science and Engineering, for his kind help in finishing our project and also to other faculty members and the staff of the Department of Computer Science and Engineering, Daffodil International University.

I would like to thank our entire course-mates at Daffodil International University, who took part in this discussion while completing the coursework.

Finally, I must acknowledge with due respect the constant support and patience of our parents.

ABSTRACT

Most fitness apps today are centered on a single feature, whether that is logging workouts, booking classes or purchasing gym products. This renders it impossible for users to combine all fitness requirements over one platform. Fitlife Hub solves this problem by delivering everything in one platform, on the web.
Through Fitlife Hub, users can make and manage profiles, connect with trainers, participate in community discussions, and purchase fitness products online. It also comes with an exercise library, and it even allows customers to book online consultations with health professionals.
Developed with HTML, CSS, JavaScript, PHP and MySQL, with JSON and APIs to connect between the different parts of the platform. A step-by-step, iterative project development and regular prototyping is carried out on an Agile basis. The final prototype demonstrates how this platform can make fitness management easier, more convenient and connected for everyone.

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Chapter 1

Introduction

1.1 Introduction

The fitness industry is booming but people often have to cobble together myriad apps or log into multiple websites in order to take care of their health and fitness needs. For instance, one app may monitor workouts, another help book gym classes and another sell fitness products.
Fitlife Hub is designed to address this and integrates these aspects into one platform. It allows users to track their fitness journey, interact with trainers and other users, make purchases and even receive online health consultations. This keeps your fitness under control and life more interesting.

1.2 Motivation

When I was redesigning for the new landscape I looked at what the current fitness apps and online websites do and do well, but none of them do everything in one place. For one, there's no easy way for users to interact with trainers through the app, and most current apps are missing things like e-commerce or health services.
One simple platform that encompasses all these features is the driving force behind Fitlife Hub. This would be a time saving feature for users and to make their journey of fitness more smoother and fun.

1.3 Objectives

This project has the following objectives:

1.Build a safe mechanism for user registration, log in, and profile management.

2.Create a public forum and private messaging platform for users to communicate with trainers.

3.Integrate an e-commerce module so your users can shop for fitness products online.

4.The exercises can be uploaded to a library for later use in step-by-step guides and demos.

5.Enable users to book online healthcare consultations.

6.Ensure the platform is easy to use, responsive, and extensible.

1.4 Methodology

The project was built by the Agile principle creating of the stages, with the testing

of the system at each stage.
Front End: Developed UI with HTML, CSS and JavaScript.
Server side: I built up the logic in php and used MySQL for the database.
Data interchange: JSON and APIs were utilized to link various components of the system.
All modules were developed and tented individually before integration to the final system.
.

1.5 Project Outcome

1.The end-result An MVP of Fitlife Hub! It includes:

2.User registration and login

3.Profile management

4.Messaging system

5.Product catalog and shopping cart

6.Exercise guide

7.Minimal health booking system for appointments

Even more comes with this prototype and it shows everything is possible on one platform.

1.6 Organization of the Report

This report has six chapters:
Chapter 1: Describes the project through background, motivation, objectives, and methodology.
Chapter 2: Current solutions in the app stores are discussed and why this project is necessary.
Chapter 3: This system design, its development plan, and the tasks necessary to accomplish it are described.
Chapter 4: Presents how the system was applied and the results.
Chapter 5: Addresses the standards, challenges, and the social dimensions.
Chapter 6: Summary, conclusions, and recommendations This chapter recapitulates the report and recommends further development.

Chapter 2

Background

2.1 Introduction

For context setting within health and fitness applications, examination of existing platforms, their approaches, methodology and shortcomings is required. In this chapter I described starter applications and websites for exercising and explained the pros and cons to find which gap Fitlife Hub would like to fit.

2.2 Literature Review

Table 2.1: Summary of Literature Reviewed.

Author (s)	Year	Title	Methodology	Key Findings
MyFitnessPal	2005	Diet & Exercise Tracking	Calorie counting Database	Excellent for nutritional logging but lacks direct trainer interaction and community.
Fitbit community	2009	Activity Tracking & Social	Wearable integration	Strong community features based on device data, but no e-commerce or trainer booking.
ClassPass	2013	Gym & Class Reservation	Subscription Model	Provides access to physical classes but offers no exercise guidance or product marketplace.
Gymshark	2012	Fitness Apparel E-commerce	E-commerce Platform	Sells fitness products but lacks any community, training, or health consultation features.

2.2.1 Similar Applications (Mandatory for project, optional for research)

The apps we analyzed have similar aims in supporting fitness, but targeted different audiences, as illustrated below:

1. **MyFitnessPal**: Centers on diet and counting calories.

2. **Fitbit Community**: Focuses on wearable data and social challenges.

3. **ClassPass**: A marketplace for booking physical classes.

4. **Gymshark**: Is an exclusively e-commerce brand for fitness wear.

5. **JEFIT/Strong**: Emphasis on exercise logging and exercise libraries.

No one is offering you a cobbled together solution of community, e-commerce, trainer interaction and health services in their platform.

2.3 Gap Analysis

Table 2.3: Summary of Gap Analysis

Features	MyFitnessPal	Fitbit	ClassPass	GymShark	Fitlife Hub
User Profile Management	Yes	Yes	Yes	Yes	Yes
Public Community Forum	Limited	Yes	No	No	Yes
Private Trainer Messaging	No	No	No	No	Yes
E-Commerce Marketplace	No	No	No	Yes	Yes
Detailed Exercise Library	Basic	Basic	No	No	Yes
Online Health Consultation	No	No	No	No	Yes
Integrated Experience	No	No	No	No	Yes
Multiple payment options	Yes	Yes	Yes	Yes	Yes
Quick view	Yes	Yes	No	No	Yes

2.4 Summary

This chapter demonstrated that there are many fitness apps but they have niche applications. An absence of a conglomerate platform results in a scratchy experience that forces its users to jump from app to app. Fitlife Hub mkinen1964's insight: That's where Fitlife Hub comes in to connect these dots together and provide a seamless end-to-end experience for its users, where most of the features are integrated and accessible in one place rather than on multiple applications.

Chapter 3

Research Methodology

3.1 Methodology/Requirement Analysis & Design Specification

3.1.1 Overview

The project is developed following an organized software development life cycle. The first step in the process was to gather both functional and non-functional requirements by identifying the gaps in the current system. This was further developed towards an architecture design, database design, and user interface design.

3.1.2 Proposed Methodology/ System Design

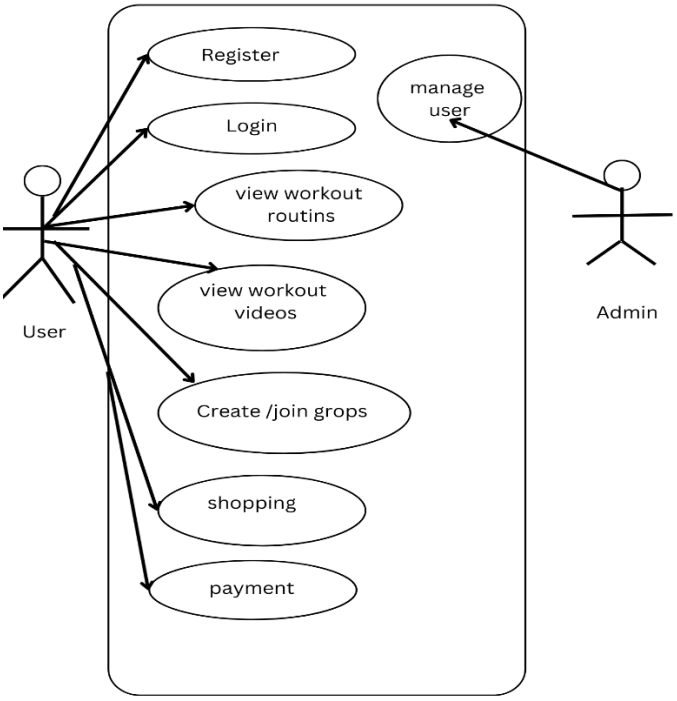

Figure 3.1: Use case diagram

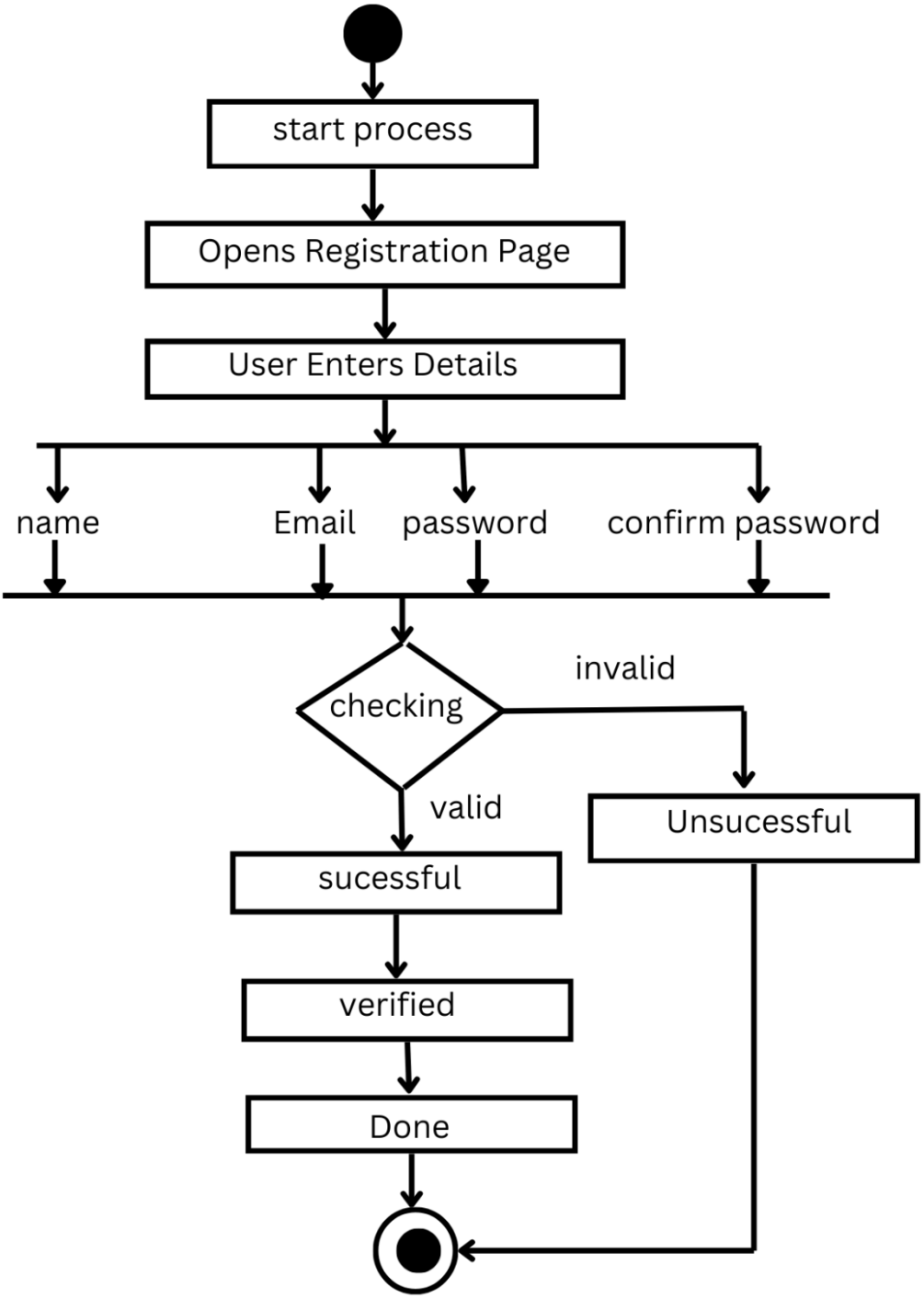

Figure 3.2: Register activity diagram

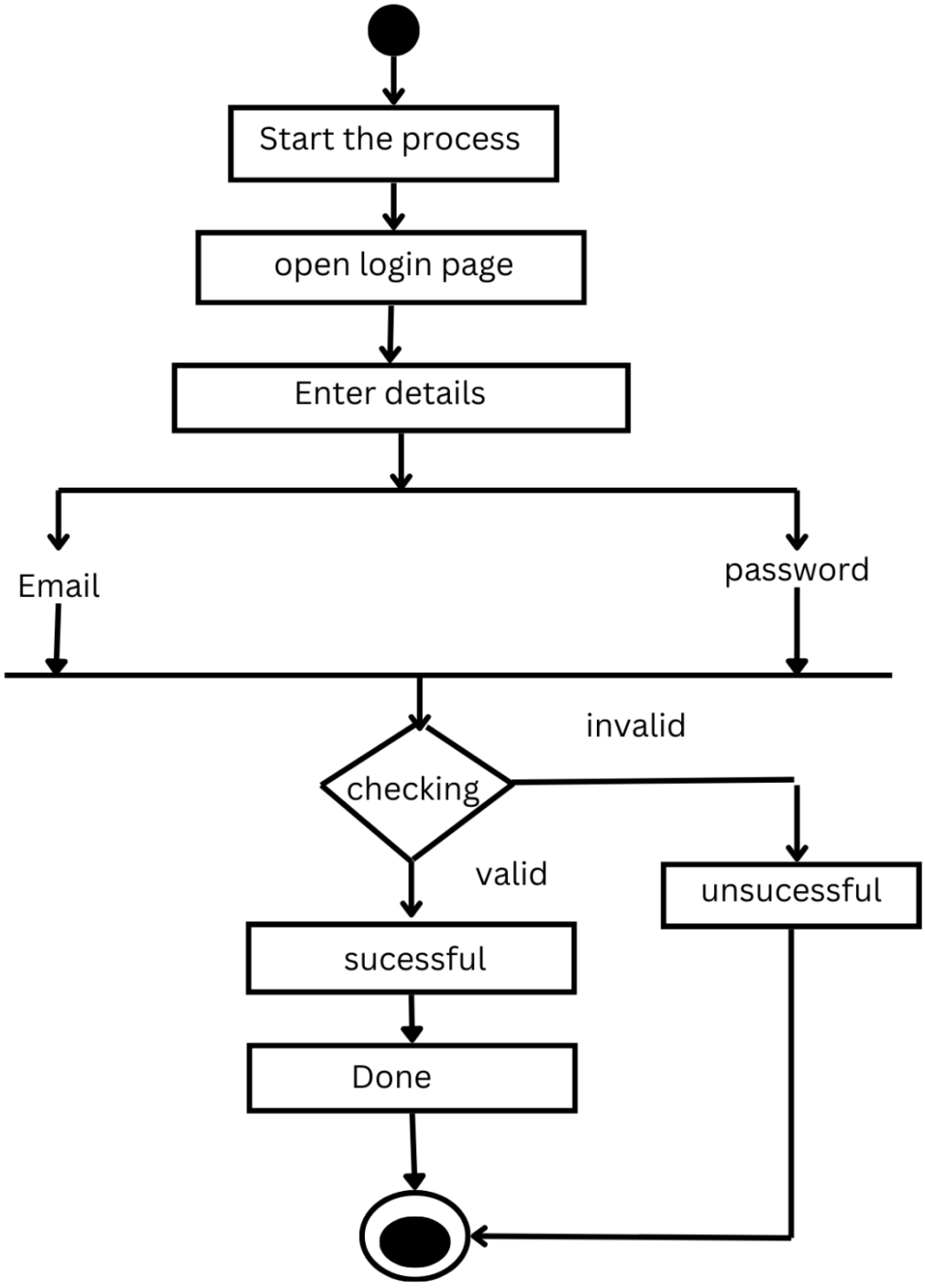

Figure 3.3: Login activity diagram

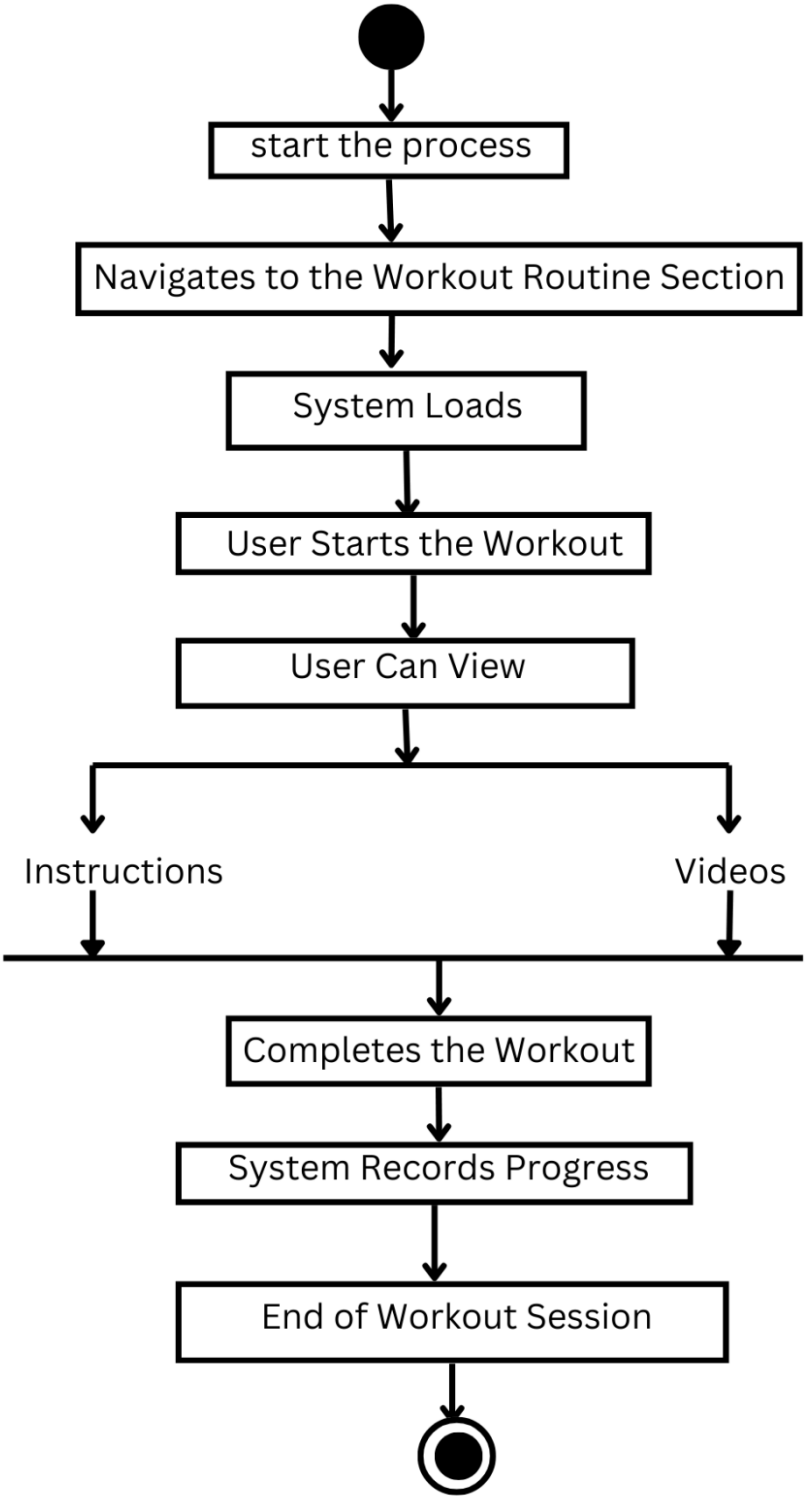

Figure 3.4: Workout routine activity diagram

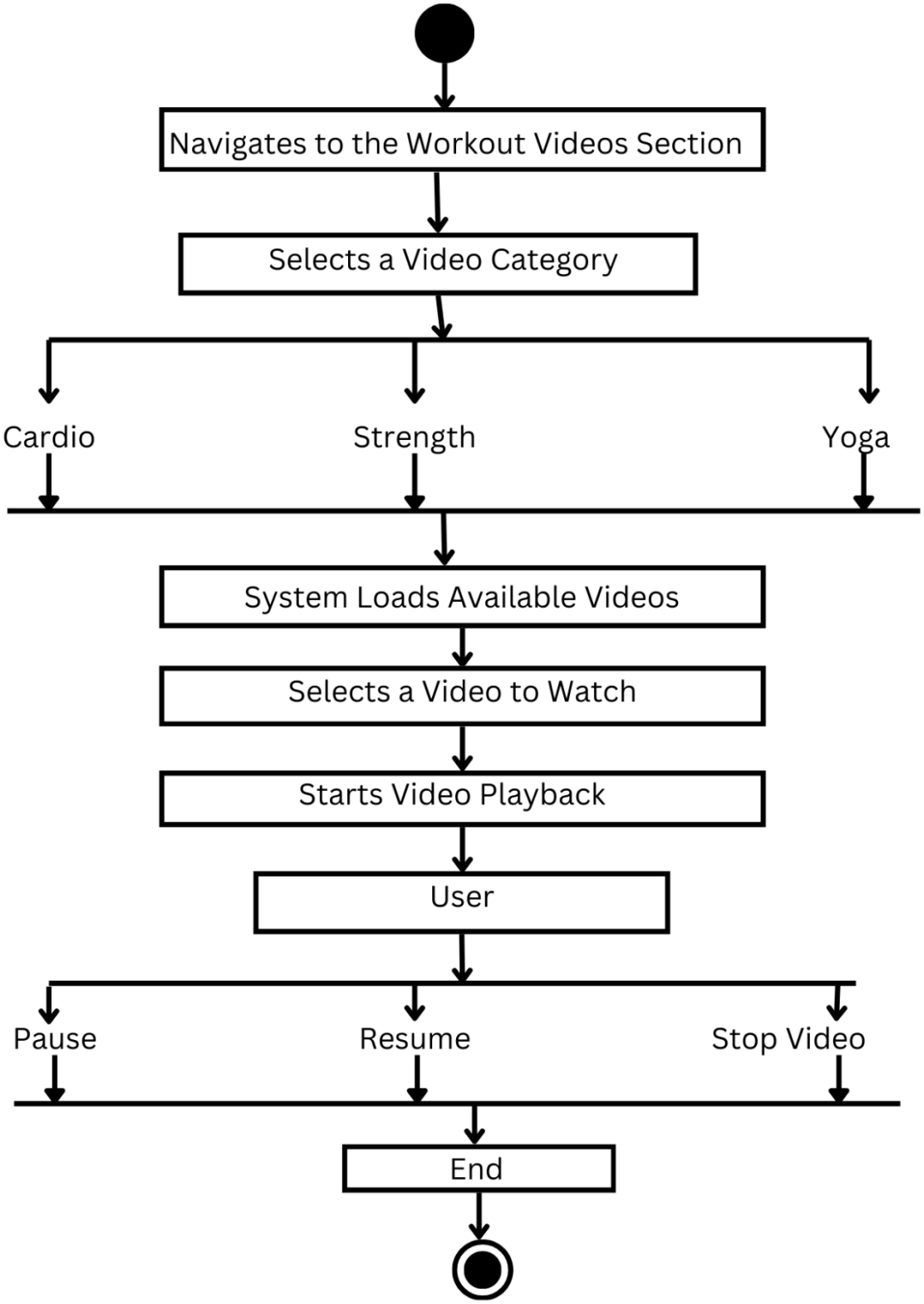

Figure 3.5: Workout videos activity diagram

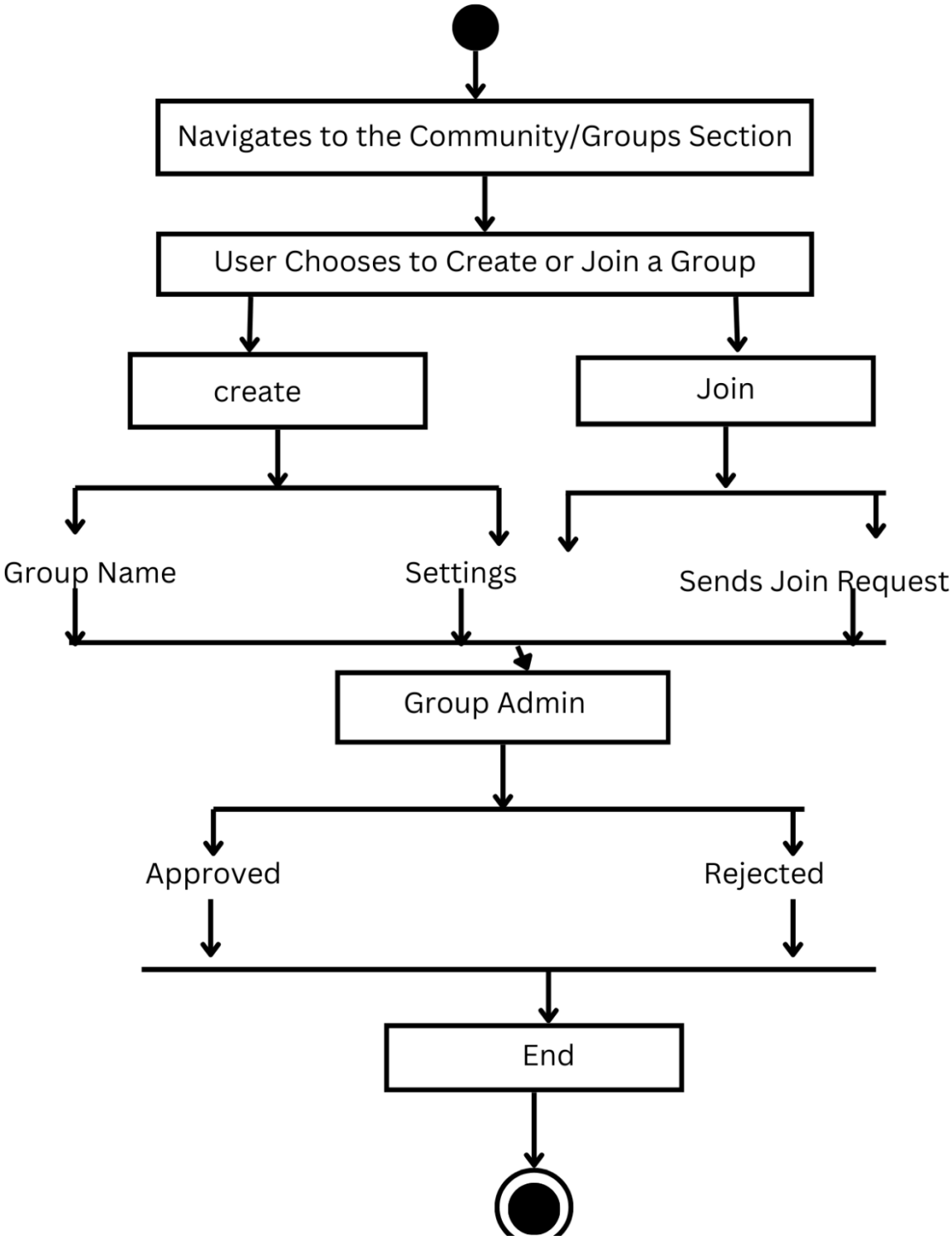

Figure 3.6: Create/join activity diagram

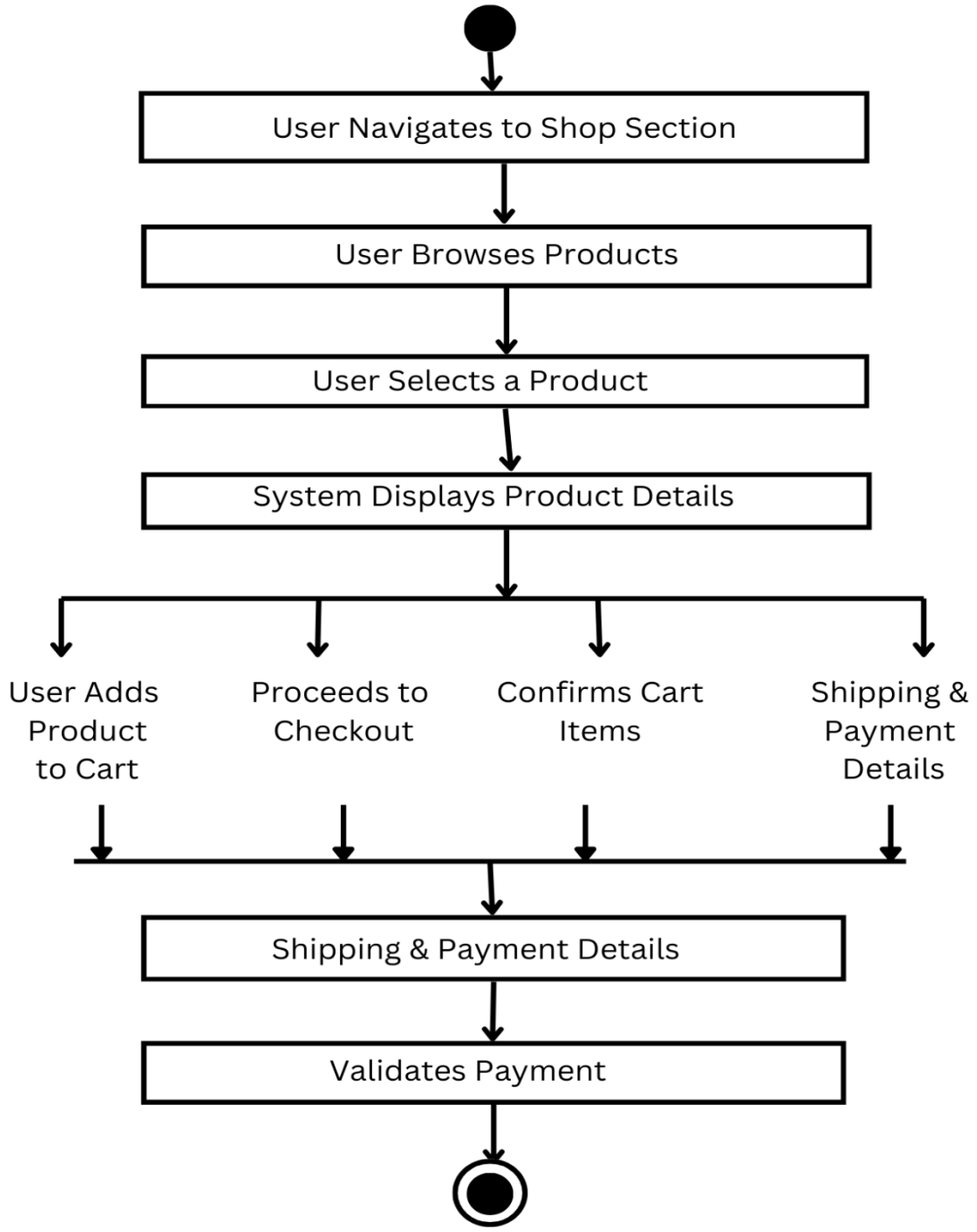

Figure 3.7: Shopping activity diagram

3.1.3 Functional and Nonfunctional Requirements

- **The functional requirements** describe the exact activities and functionalities that the Fitlife Hub system is supposed to execute. These needs are the direct result of the main goals of having an all in one fitness platform. The system should enable secure registration and authentication of users, and allow them to manage their profiles containing fitness preferences and contact information. Central to this is development of a dual-mode communication system: this includes an open public facing forum, a platform for community discussions, and a private messaging system, a secure context for discussions between individuals (users) and certified trainers. Additionally, this system will have an ecommerce functionality that allows users to view a specific fitness products catalog, maintain an online shopping cart, and proceed with their shopping process, i.e., payment. As a fully featured fitness manual, the tools is expected to be complemented by a search-able database of exercises with detailed instructions and media. Finally, an appointment system, to manage scheduling and attendances of online consultations, incorporating a calendar interface for users and professionals, is necessary.
- **The non-functional requirements** describe the quality attributes and constraints that the Fitlife Hub system must comply with informing how the system should behave, rather than what it does. Usability is key; the interface has to be intuitive, smooth, and easy for everyone---including less-technical types---to get around (minimizing the learning curve). Performance is essential, as all the basic system operations: page loading, data submission, etc., have to be performed in less than three seconds for the users not to lose interest. Security is tight, and measures such as hashing all user passwords, protection against common vulnerabilities (SQL injection, Cross-Site Scripting (XSS)) with parameterized queries and input cleaning, and sensitive data handling are a priority. Finally, the system has to be reliable, ie 99% uptime for it's core services once users are able to find more personal relevance in the system, which may reduce its meaning (Hawthorne effect), therefore, higher reliability will contribute to a better perception of trustworthiness from the system.

3.1.4 Data Flow Diagram

The Data Flow Diagram shows how users interact with the system through the website API Interface for login,workouts,shopping,payments and group activities.The API validates accounts,connects with the LLM interface for smart responses and stores user corrections to improve accuracy.Admin use the API to manage and control the system ,ensuring secure and efficient operation.

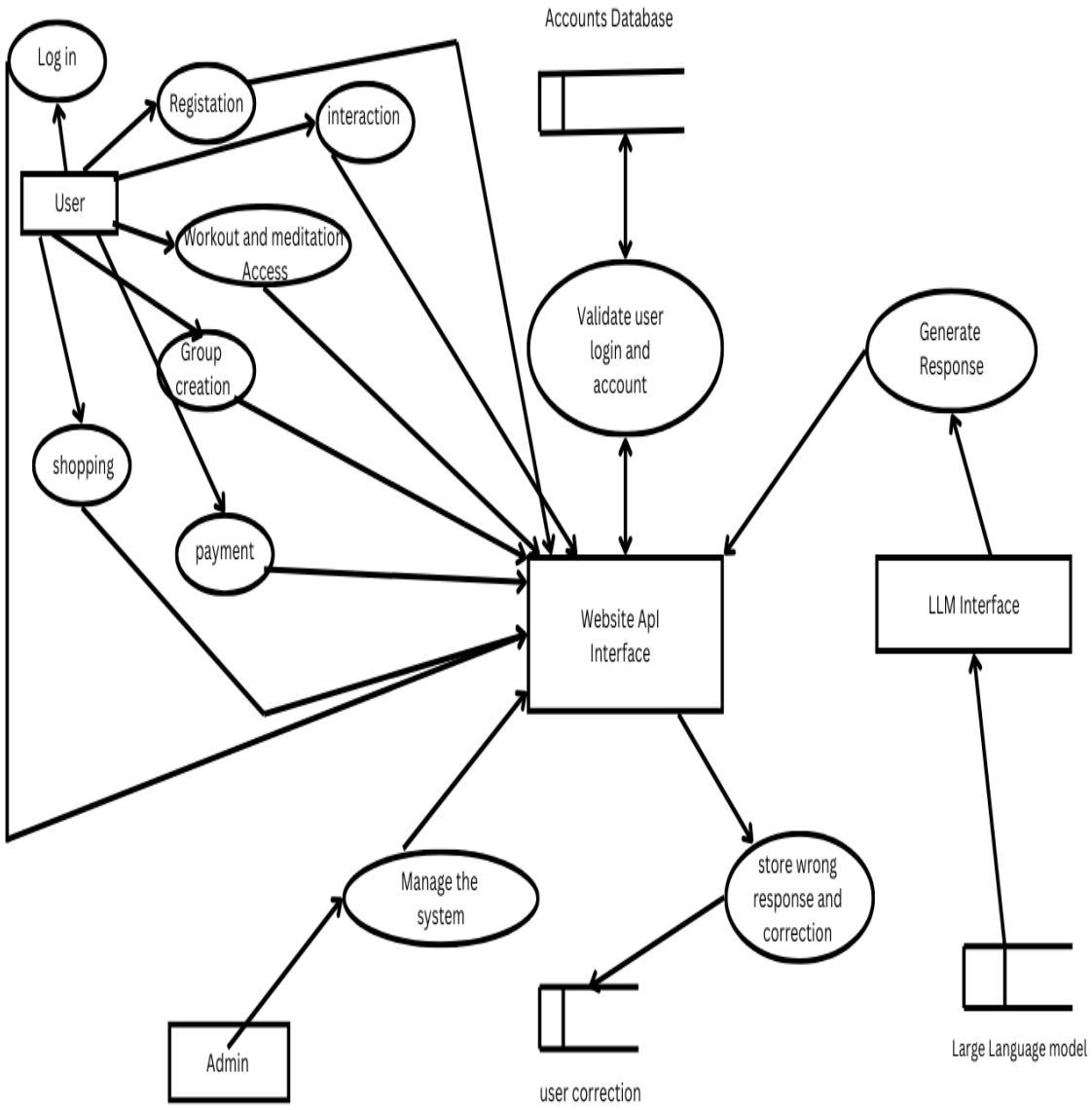

Figure 3.8: Data flow diagram

3.1.5 UI Design

It has a new sleek, modern look, and the UI is easy to use. Wireframes were developed for main pages including the home page, login page, and messaging interface. There should be a uniform design and layout within the app.

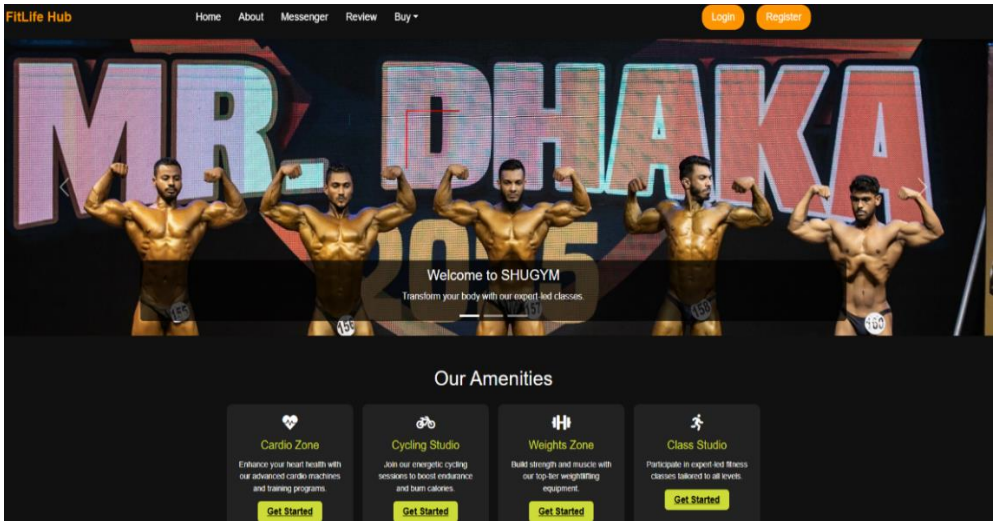

Figure 3.9: Home page

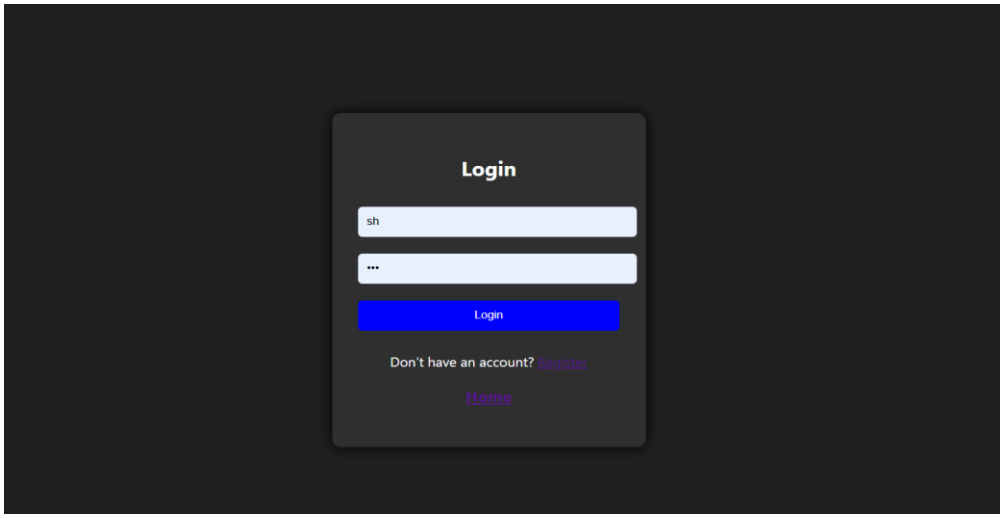

Figure 3.10: Login page

Figure 3.11: Public chat page

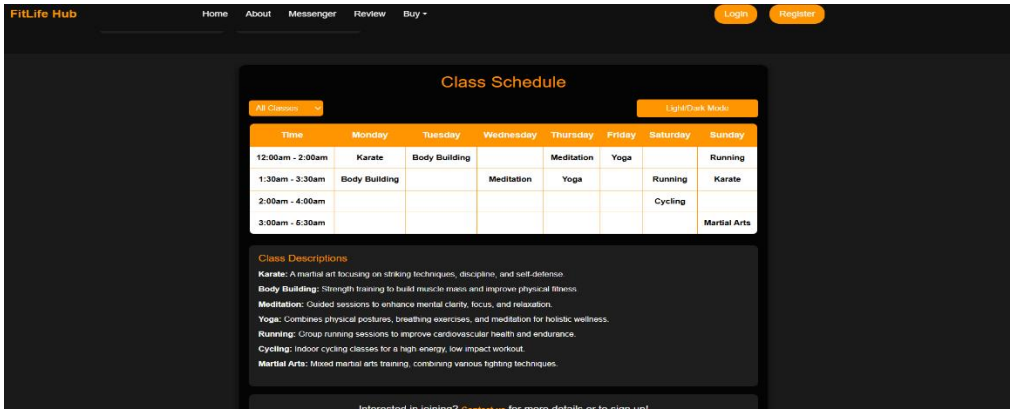

Figure 3.12: Workout routine page

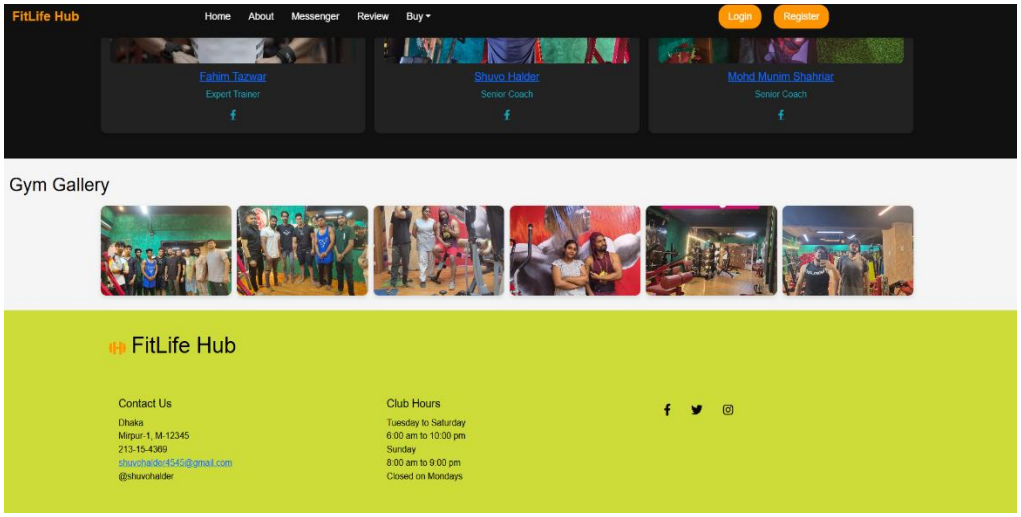

Figure 3.13: Footer page

3.2 Detailed Methodology and Design

The development will be based on Object-Oriented Programming with PHP which will give a cleaner code and reusability of code. The Database will be de-normalized to reduce redundancy. I intend to leverage jQuery to aid in DOM fiddling and asynchronous requests for a little AJAX. We thought about using Python-Django stack but eventually decided to not to use it, because we are more familiar with LAMP (Linux, Apache, MySQL, PHP) stack, which will have shorter development time.

3.3 Project Plan

The work is to be completed over a 14-week period, dividing into following four primary phases: Planning and Design (2 weeks), Core Module Development (6

weeks), Additional Module Development (4 weeks), and Testing and Deployment (2 weeks).

3.4 Task Allocation

This table depicts the timeline of the principal activities in each period of the project, from week 12 to week 48.

Table 3.4: Summary of Task Allocation

Tasks	Weeks																		
	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
Planning & Design																			
User Auth &profile module																			
Messaging Module																			
E-commerce Module.																			
Exercise/Health Modules																			
Integration &Testing																			

3.5 Summary

This chapter described the structured process of developing Fitlife Hub, which ranges from analysis of requirements, system design and scheduling of the project. The selected technologies and architecture have the capability to fulfill the project requirement effectively.

Chapter 4

Implementation and Results

4.1 Environment Setup

The working space was configured by following:

1.**Host server**: XAMPP stack running on Windows 10.

2.**Front-end**: HTML5, CSS3, Bootstrap 5, JavaScript, jQuery.

3.**Back-end**: PHP 7.4, MySQL 5.7.

4.**IDE**: Visual Studio Code.

5.**Version Control**: Git with GitHub.

4.2 Testing and Evaluation/Performance/ Comparative Analysis

In this process, testing was performed continuously during development.

1.**Unit Testing**: I tested each module (login script, database connection, etc) individually only.

2.**Integrated Testing**: When elements are assembled and tested as a group (e.g logging in and product to cart).

3.**User Acceptance Testing (UAT)**: A subset of likely users was asked to complete main tasks to assess usability.

Examples of key test cases were user registration, login authentication, send a message, add a product to cart and search the exercise library. All use cases tested passed without error.

4.3 Results and Discussion

The execution led to a prototype of a working web application. The core objectives were met:

1.Login and registered users were stored securely hashed.

2.A message system is implemented so users can mail trainers privately.

3.An elementary e-shop catalogue and basket were developed.

4.A static library with exercise descriptions and images was constructed.

5.The UI is reactive and works fine.

The results support the viability of the system proposed. Feedback from UAT was good, in particular the fact that the platform is integrated. Performance was reasonable for a prototype, showing (on average) page load times under the 3 seconds mark we were aiming for.

4.4 Summary

This chapter tested the developed Fitlife Hub prototype demonstrator. The application explains that a combination of community, e-commerce, and coaching features are feasible and lead to a superior fitness management instrument for the user.

Chapter 5

Engineering Standards and Design Challenges

5.1 Compliance with the Standards

Only mention the standards that are related to your project. This list is not complete. For each of the standards discuss the alternates with pros and cons and rationale of selection.

5.1.1 Software Standards

The project is compliant with W3C for HTML and CSS and is cross-browser compatible. Code will be written in PHP according loosely to the PSR (PHP Standards Recommendations) standards for readability. SQL injections attacks are prevented by using parameterized statements (PHP PDO) according to the OWASP standards

5.1.2 Hardware Standards

It's developed for normal web browsers and doesn't rely on any particular hardware. It is accessible on any device that has a modern browser using universal web access standards.

5.1.3 Communication Standards

Client server communication is based on HTTP/HTTPS protocols. For other future real-time features, WebSocket protocols could be applied. JSON is used as data interchange format.

5.2 Impact on Society, Environment and Sustainability

5.2.1 Impact on Life

Fitlife Hub enables people to push the boundaries on their health and well-being by delivering information, community support and scientific knowledge through intuitive products, with the hope of living healthier lives.

5.2.2 Impact on Society & Environment

It can additionally |lead to ease public health stress by fostering health & fitness. It is minimal in its own direct environmental footprint as a digital platform (AV1 2019), so as to between minor visits to the gym to ask basic questions.

5.2.3 Ethical Aspects

User data privacy is paramount. The project follows good practice in the collection of data and makes it clear what data is being collected and how it is being used. Where possible trainer qualifications and product quality need to be confirmed to avoid spreading misinformation and fraud.

5.2.4 Sustainability Plan

The project can be monetized via a freemium model (free basic service and paid premium services like bespoke plans generated by the platform) and a percentage cut from e-commerce sales and trainer bookings. Frequent updates and features answer long-term viability.

5.3 Project Management and Financial Analysis

This work had no financial funding, and was made with free open sources software (FOSS). The main things that they invested were time and effort. A possible budget for a commercial version would be hosting, domain registration, security certs, and possibly some paid for APIs, since we've discussed in the sustainability plan how this system can make money.

Approximate Budget:

Table 5.0: Summary of Approximate Budget

Category	Item	Cost
Development(prototype)	1.Software &Tools(VS Code,XAMPP,Canva) 2.Developer Effort(Time)	2000 2000
Total Prototype Cost		0
Operational Cost	Collect Data	500
Total Estimated Annual Cost		4500

5.4 Complex Engineering Problem

5.4.1 Complex Problem Solving

The challenge is to link several complex subsystems (real-time message processing, e-commerce, database accounting) to one consolidated and safe application. This means solving problems for data consistency, user experience flow, the security of the system.

Table 5.1: Mapping with Complex Engineering Problem.

EP1 Dept of Knowledge	EP2 Range Of Conflicting Requirements	EP3 Depth of Analysis	EP4 Familiarity of Issues	EP5 Extent of Applicable Codes	EP6 Extent Of Stake-holder Involvement	EP7 Interdependence
✓	✓			✓		

Justification of Eps:

EP1 (Depth and generalist learning): The problem solving process involved the synthesis of disparate engineering knowledge. It was based on software engineering principles for system design, web technologies (HTML, CSS, JS, PHP) for development, database management (MySQL) for structuring the data. This fusion of knowledge from various areas of computer science was necessary to develop an integrated and viable system.

EP2 (Variety of Conflicting Requirements): There were many conflicting requirements in the development process. One of the biggest tradeoffs to consider was security versus usability: we had to weigh adding strong security features (such as very strong password hashing) against making the user registration and login processes as easy and frictionless as possible. In addition, there was a tradeoff between feature richness and performance, adding lots of features (i.e.: e-commerce stuff, chat, forums) had to be carefully balanced in order to keep the app fast and snappy, in particular on the LAMP stack we chose.

EP5 (Extent of Applicable Hydrologic Codes): Moderate coverage of the codes and standards limited the advances in development. The project followed appropriate web standards (W3C HTML/CSS). However, as a new application, it was not heavily constrained by extensive, pre-existing industry-specific regulations for fitness platforms, which meant there was more flexibility in design decisions under the framework of generic software engineering ethics and standards.

Mapping with Knowledge Profile

This section is designed to map the overall problem and EP1 ***(multiple between K3, K4, K5, K6, K8 for attaining EP1)*** to the Knowledge Profile.

Table 5.2: Mapping with knowledge Profile.

K1 Natural Science	K2 Mathematics	K3 Engineering Fundamentals	K4 Specialist Knowledge	K5 Engineering Design	K6 Engineering Practice	K7 Comprehension	K8 Research Literature
-	-	✓	✓	✓			✓

Justification of KPs:

K3 (Engineering Fundamentals): This was basic and directly applied in the project. It's a superset of software engineering that also includes topics such as requirements analysis, system design patterns (3tier architecture), database design (ER modeling, normalization), and basic programming concepts. These basics established the pieces I could use to construct a boned and operational app.

K4(Specialist knowledge): The Fitlife Hub was specialized, and interesting in domains in which the developers needed to have deep specialist knowledge. This includes knowledge of full stack web development technologies (e.g.HTML, CSS, JavaScript, PHP, and MySQL), user experience design principles in order to implement an easy to use interface, an understanding of optimal security practices (eg hashed passwords, prevention of SQL injection) to safeguard user data. This expert knowledge turned the project from theory into a working prototype.

K5 (Engineering Design) :This key competency was integrated into the implementation of the project. It included design of the system from the ground up, such as developing the software architecture, database schema, the systems algorithms, control logic, and the user interface (UI) and user experience (UX) workflows. The design phase translated the project needs into a down-to-the last technical plan to be executed.

K8 (Research Literature): This information helped a lot in early stages on how original the project is. This entailed conducting a literature review and market analysis of related apps (e.g. MyFitnessPal, Fitbit). This study supported the recognition of the market gap, the understanding of the state-of-art, the awareness of not re-inventing the wheel, and the need for the system to make a unique and value-added contribution, which guided the design and goals of Fitlife Hub.

5.4.2 Engineering Activities

In this section, provide a mapping with engineering activities. For each mapping add subsections to put rationale (Use Table 5.3).

Mapping with Complex Engineering Activities

This section is designed to map the overall problem and EA's ***(multiple).***

Table 5.3: Mapping with Complex Engineering Activities.

EA1 Range of re-sources	EA2 Level of Interaction	EA3 Innovation	EA4 Consequences for society and environment	EA5 Familiarity
✓		✓	✓	✓

Justification of EAs:

EA1 (Scope of resources): The project was conducted at a low scope of resources. As a one-man band, the weapons of choice were: clock-in, brain-power, and plethora of open-source technologies (HTML, CSS, PHP, MySQL). There were no separate funds for custom hardware, proprietary software licenses, or Cloud storage. This limitation meant that we had to find creative and effective ways to satisfy the project's intricate, multistage needs.

EA3 (Innovate): There is [a high] level of innovation [in the project] not only in invention of new algorithms, but mainly in the integration of established technologies to address a well-identified market gap. "Features" include e-commerce, forums, exercise libraries all of which do exist in a vacuum but Fitlife Hub is unique in that it brings together these various features in a holistic framework that combines multiple disparate features (community, ecommerce, guidance, health) into one common user-centric, interconnected ecosystem. This combination of fitness attending management is the key novelty of the project.

EA4 (Societal and environmental impacts): Effects of the project are mainly positive. Socially, it benefits the health and wellbeing of society by facilitating access to fitness instruction and community support which may help mitigate public health concerns. It also builds a potential digital marketplace for local trainers and health experts. Environmental - It aspires to be eco-friendly with the least amount of environmental impact as possible as being a digital platform it has a small #physical footprint and reduces people traveling to the local gym for small questions (and to also reduce CO2 emanating out).

EA5 (Familiarity) The project with a moderate level of familiarity. I had the base of web technologies (HTML/CSS and some PHP/MySQL) from school. But integrating them in multi-module, complex system - in using real-time chat concepts, payment gateways, secure storing of user data for various functionalities were non-trivial and involved a lot of self-learning and problem solving beyond standard curriculum.

5.5 Summary

Chapter 4 described how Fitlife Hub meets applicable engineering criteria, its potential impact on society, and the intricate engineering problems resolved when developing it that relate to established engineering competencies.

Chapter 6

Conclusion

6.1 Summary

Fitlife Hub built and prototyped a full-feature web-based fitness platform. It filled a visible hole in the market by combining aspects of user management, social messaging, e-commerce, an exercise library and health service booking into one application. The work was based on a well-defined development process, which, regarding the functionality of the system, validates the basic idea.

6.2 Limitation

Although the current prototype effectively demonstrates the proposed concept and the integration of essential modules, there are a number of acknowledged limitations, which provide clear directions for future work. Most of all the ecommerce integration is not entirely integrated with a full payment gateway and it cant handle real transactions. Additionally, the messaging system uses a request-response mechanism instead of a live chat system, which is disavowed not real-time chat system such as those based on WebSockets and hence the immediacy on messaging. The exercise library and health consultation modules are presently static or demo versions as presently implemented filled with static information instead of dynamic, user-entered or professionally entered data. The system has received only simple security and performance testing, and heavy load testing and deep penetration testing for security vulnerabilities are still to be realized for server grade scalability and security. These constraints are deliberate as strategic deferments, not as being lacking, in pushing forward the integrated concept of platform, and facilitating the validation of the latter before going deeper in more resource-demanding features.

6.3 Future Work

The next phase in the development of the Fitlife Hub software will be a conversion of the functional prototype into a fully robust and scalable commercial application. At present, we must incorporate a safe in-country payment processor, for example, SSLCommerz, in managing credible monetary transactions in the E-commerce section. To greatly improve user interaction the current messaging will be replaced with a real-time bidirectional communication mechanism, synchronized through WebSockets or by a dedicated service (e.g. Pusher). The static workout library will grow into a dynamic, user-centric community feature set with video tutorials and the ability for users to create and share their own workout plans. It is also important to collaborate formally with clinicians and fitness centers in the community in order to implement and validate actual services of the online consultation and booking system. To ensure the app is accessible to all staff, it is built as a Progressive Web App (PWA) which allows a website to offer a mobile app like experience on a mobile device without being downloaded or installed from an app-store. This would be followed by intense load

testing and enhanced security penetration testing to introduce the platform to industrial scale of traffic and to ensure data is secure according to the industrial standards, that tests both security and performance in the industry deployment.

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