

Kang Sheng Fitness Studio Management System

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Abstract

Kang Sheng Fitness Studio Management System (KSFSMS) is a comprehensive web-based management platform specifically designed to address the inefficiencies and challenges faced in the manual management of Kang Sheng Fitness. Challenges like data redundancy and scheduling conflicts necessitated a comprehensive solution. The research aimed to automate tasks, enhance member management, and instructor management, optimize class schedules and booking, and streamline financial processes. KSFSMS is developed using Agile methodology, incorporating phases of planning, requirement gathering, analysis and design, implementation, testing, and evaluation to ensure a user-centric and adaptable system. By leveraging Agile principles, the development process emphasized continuous refinement through iterative cycles, allowing for regular feedback and adjustments. Overall, KSFSMS is expected to transform Kang Sheng Fitness into a more efficient, organized, and member-centric establishment, driving both operational excellence and member satisfaction.

1. Introduction

Fitness studio information management is a critical function that involves the comprehensive handling of data and processes necessary for the efficient operation of fitness studios, such as Kang Sheng Fitness. This encompasses the collection, organization, and utilization of member data, class schedules and booking information, staff and instructor information, payment and billing records, and inventory details. Effective information management is vital for maintaining a positive member experience, optimizing resource allocation, and ultimately driving the studio's profitability. At Kang Sheng Fitness, located in Kampung Abdullah, Segamat, Johor, the need for streamlined operations is paramount. The studio offers a range of exercise and training facilities that cater to various fitness preferences and goals. Given the multifaceted nature of its operations, a centralized system is essential to streamline communication, improve organization and ensure the smooth functioning of the studio.

1.1 Problem Statement

The existing manual methods for fitness studio management at Kang Sheng Fitness pose several critical challenges. The reliance on fragmented processes and multiple spreadsheets or paper documents leads to data redundancy, errors, and inconsistencies in member management. Inefficient member management impacts the member experience and can result in communication gaps and payment discrepancies. Scheduling conflicts are frequent due to the lack of a centralized system, causing disruptions in class organization and inefficient resource allocation, which affects both instructors and studio space utilization. Furthermore, manual payment processing introduces errors and delays in financial management, while inventory tracking inefficiencies lead to

procurement issues. Consequently, these inefficiencies hinder the studio's growth, impact member retention, and strain overall operations. Therefore, transitioning to a centralized information management system is imperative to streamline processes, enhance communication, and ensure the smooth functioning of Kang Sheng Fitness, ultimately transforming it into a more efficient and member-centric fitness studio.

1.2 Objectives

The objectives of this system are to:

1. To design a fitness studio management system using a structured approach.
2. To develop fitness studio management system using web-based application.
3. To test the developed system for Kang Sheng Fitness.

1.3 Scope

The study focuses on the domain of fitness studio management, particularly on refining information management processes at Kang Sheng Fitness. Its primary objective is to design, develop, and implement a Fitness Studio Management System tailored to address Kang Sheng Fitness's distinct operational challenges. This system comprises several key functional modules. The Member Control module facilitates member registration and communication, enhancing efficiency and member satisfaction. The Class and Schedule Management module centralizes scheduling processes to minimize conflicts and optimize resource utilization. The Instructor and Staff Management module streamlines instructor scheduling and assignments for improved coordination and class quality. Inventory Management provides real-time tracking and automated alerts to ensure uninterrupted supply. Payment and Billing automates billing processes and offers online payment options for increased convenience and financial accuracy. By addressing these specific needs, the system aims to streamline operations, enhance member experiences, and boost overall efficiency and profitability at Kang Sheng Fitness.

2. Related Work

Three existing fitness studio management systems like Fitness First [1], KOA Fitness [2], and Anytime Fitness [3] were analyzed. They prioritize secure access, class scheduling, and member engagement tools. KSFSMS aims to adopt similar features to streamline fitness studio operations. The analyzed systems offer several advantages such as Fitness First including online payment and billing services, KOA Fitness providing advanced class scheduling tools and filter options, and Anytime Fitness offering global network access for workout flexibility. These features align with KSFSMS's goals of enhancing security, scheduling, engagement, and financial management. Additionally, Fitness First, KOA Fitness, Anytime Fitness, and KSFSMS were compared based on key features. **Table 1** shows the comparison of the four systems.

Table 1 System's Comparison

Features	Fitness First	KOA Fitness	Anytime Fitness	KSFSMS
Log In	√	√	√	√
Class Scheduling	√	√	√	√
Reminder and Notification	√	√	X	√
Online Billing and Payment	√	X	√	√
Communication Tools	√	√	√	√
Staff Coordination	X	X	X	√
Inventory Management	√	√	√	√
Mobile App	√	√	√	X
Authentication	√	√	√	√
Database Requirement	√	√	√	√

KSFSMS = Kang Sheng Fitness Studio Management System

3. Methodology

This chapter detailed the chosen methodology for constructing the Kang Sheng Fitness Studio Management System (KSFSMS).

3.1 Agile Model

The KSFSMS construction employed the Software Prototyping Model bolstered by Agile methodology. Commencing with Planning, establishing objectives, and spanning Requirements, Analysis and Design, Implementation, Testing, and Evaluation as shown in Fig. 1. Integrating Agile principles with the Software Prototyping Model ensures an iterative development process that emphasizes continuous refinement based on user feedback. This approach enhances flexibility, adaptability, and collaboration throughout the project lifecycle, ultimately leading to a product that closely aligns with user needs and expectations.

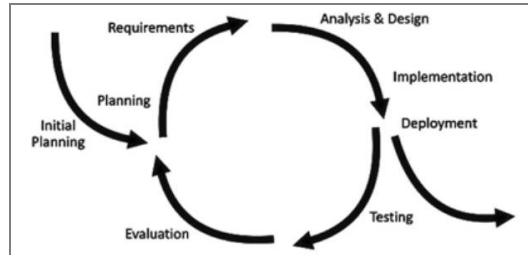


Fig. 1 Iterative and Incremental Method [4].

The process began with the Planning Phase, which entailed setting project objectives, defining scope, and identifying stakeholders. Stakeholder meetings were conducted to establish goals, and a project charter was created to outline timelines. Requirement Phase, the system's foundation was laid through thorough research and analysis of similar systems like Fitness First, KOA Fitness, and Anytime Fitness. This phase aimed to gather insights and align system development with accumulated knowledge from credible resources. The subsequent Analysis and Design Phase involved assessing requirements to define system architecture, functionalities, and interactions. Various techniques such as wireframing and flowcharting were employed to craft a user-friendly system design, including DFDs and ERDs to visualize data flow and relationships.

Transitioning to the Implementation Phase was on translating the system design into functional software. Coding, database creation, interface development, and system integration were key activities undertaken using tools like PHP, CSS, JavaScript, and MySQL. The Testing Phase ensuring the KSFSMS met defined requirements and user expectations. Functional testing was conducted via test cases and plans, while acceptance testing involved gathering user feedback through questionnaires to refine the system. Finally, the Evaluation Phase involved engaging gym users for feedback through questionnaires, with their inputs aiding in refining and improving the system to align with their needs and preferences. Agile principles were integrated, emphasizing an iterative development process focused on continuous refinement based on user feedback, ultimately leading to a product closely aligned with user needs and expectations. Table 2 shows software development activities and their task.

Table 2 Software development activities and their task

Phase	Task	Output
Planning	<ul style="list-style-type: none"> Proposed the project Determine the project schedule, activities and output 	<ul style="list-style-type: none"> Project proposal Develop Gantt chart
Requirement	<ul style="list-style-type: none"> Analyze system requirements and constraints Review similar systems as a guideline to build the KSFSMS 	<ul style="list-style-type: none"> Determine system requirement
Analysis and Design	<ul style="list-style-type: none"> Analyze the content, interaction and functionality of the KSFSMS 	<ul style="list-style-type: none"> Produce flow charts, context diagram, DFD and ERD.
Implementation	<ul style="list-style-type: none"> Use PHP, Javascript, CSS and MySQL to develop KSFSMS 	<ul style="list-style-type: none"> Functional System
Testing	<ul style="list-style-type: none"> Perform functional and acceptance testing 	<ul style="list-style-type: none"> Bug-free system
Evaluation	<ul style="list-style-type: none"> Engage users for feedback and suggestions 	<ul style="list-style-type: none"> Suggestion and feedback from the tester

KSFSMS = Kang Sheng Fitness Studio Management System

3.2 Functional Requirements and Non-functional Requirements

Functional requirements denote the observable behaviors exhibited by the system in specific conditions and encompass the permissible actions available to users while utilizing the system [5]. **Table 3** shows the functional requirements of the Kang Sheng Fitness Studio Management System.

Table 3 Functional Requirements

Modules	Descriptions
Member Control	<ul style="list-style-type: none"> Admin and staff can handle member registration, renewal and communication.
Class Scheduling and Booking	<ul style="list-style-type: none"> Admin can create classes and schedule classes. Instructor can see the scheduled classes. Members can check and book the classes.
Instructor and Staff Management	<ul style="list-style-type: none"> Admin can manage instructors' assignments. Admin can schedule instructors and staff working time.
Inventory Management	<ul style="list-style-type: none"> Admin and staff can track fitness equipment, accessories and merchandise inventory.
Payment and Billing	<ul style="list-style-type: none"> The system shall allow billing processes. The system shall facilitate online payments.

Non-functional requirements refer to system attributes that influence the system's performance and usability for end users, distinct from aspects directly impacting the system's business functionalities [6]. **Table 4** shows the non-functional requirements of the KSFSMS.

Table 4 Non-Functional Requirements

Modules	Descriptions
Operational	<ul style="list-style-type: none"> The system is accessible via any web browser.
Performance	<ul style="list-style-type: none"> The system's response time is brief and quick.
Security	<ul style="list-style-type: none"> The information of the user of the system is secured
Usability	<ul style="list-style-type: none"> The system's design prioritizes simplicity and user-friendliness, ensuring ease of use for its users.

4. Result and Discussion

The visual representations like the Data Flow Diagram Context Diagram (DFD CD), Data Flow Diagram (DFD), Entity Relationship Diagram (ERD) are presented to illustrate the system's data flow and interactions. Besides, the modules interfaces are presented.

4.1 DFD Context Diagram (DFD CD)

A context diagram provides an overarching perspective of an information system, illustrating its limits and extent [7]. **Fig. 2** shows the DFD CD of KSFSMS.

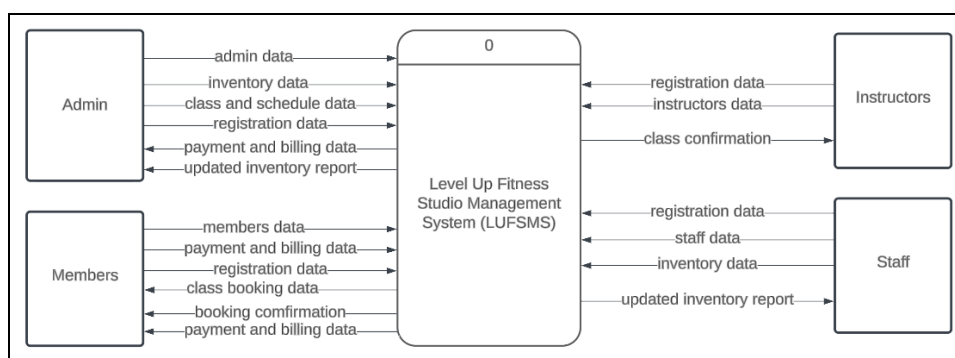


Fig. 2 DFD CD

4.2 DFD Level 0

The DFD Level 0 illustrates the overall process of KSFSMS. At this level, the emphasis is on the system as a whole, depicting major functionalities without delving into the detailed sub-processes within each main function. Appendix A shows the DFD Level 0 that outlines the interactions within KSFSMS.

4.3 DFD Level 1

The DFD Level 1 provides a more detailed breakdown of the main processes depicted in DFD Level 0. Each major function from the Level 0 diagram is expanded to show the specific sub-processes involved, illustrating how data flows between these sub-processes. This level of detail helps in understanding the intricate workings and interactions within the KSFSMS. Some of the important DFD Level 1 will be shown in Appendix B, C, D, E, F and G.

4.4 Entity Relationship Diagram (ERD)

An ERD visually illustrate the relationships and connections between different entities within a system or database. **Fig. 3** shows the ERD of KSFSMS. All entities will have their unique identifier, primary key (PK). These relational paradigms provide a robust framework that allows entities within KSFSMS to interact seamlessly, reflecting the diverse roles and interactions among members, staff, instructors, classes, payments, and inventory items.

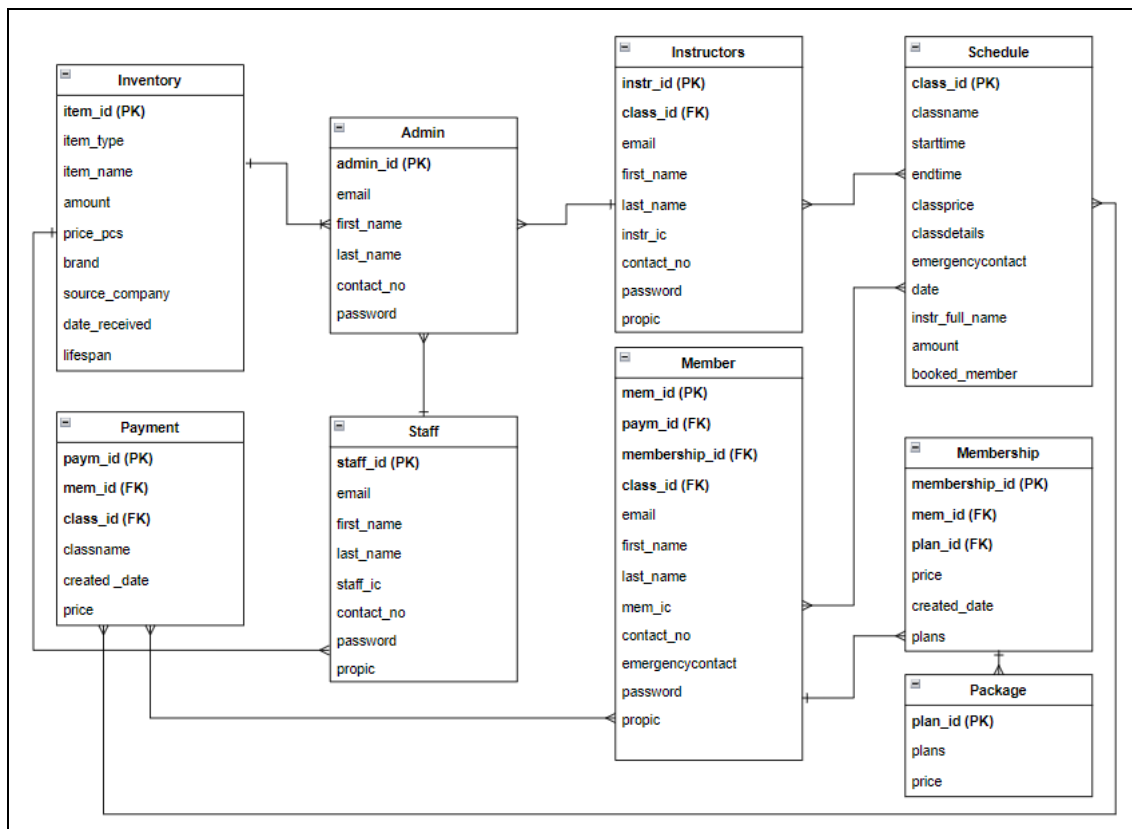


Fig. 3 ERD of KSFSMS

5. Implementation and Testing

The implementation phase focused on translating the system design into a functional software application. This involved coding the front-end and back-end components, establishing database connections, and integrating various system modules. The Kang Sheng Fitness Management System (KSFMS) was developed with a robust architecture to ensure seamless operation and user interaction. The KSFMS was developed using PHP, JavaScript, HTML, and CSS. PhpMyAdmin was utilized for database management.

5.1.1 Sign Up and Sign In Module

The system facilitates the sign-up process for Kang Sheng Fitness by collecting essential information such as first name, last name, IC, email, contact number, emergency contact, and password. Users must also acknowledge

Terms and Conditions and complete a reCAPTCHA challenge. Once verified, the system adds the individual as a new member. Regarding the sign-in functionality, the system supports four distinct user roles. Users select their role from a dropdown menu and input their email and password, followed by completing a reCAPTCHA verification. Error messages are displayed for invalid submissions, with specific server-side error messages, such as invalid credentials. **Fig. 4** shows the Sign Up Module while **Fig. 5** shows the Sign In Module.

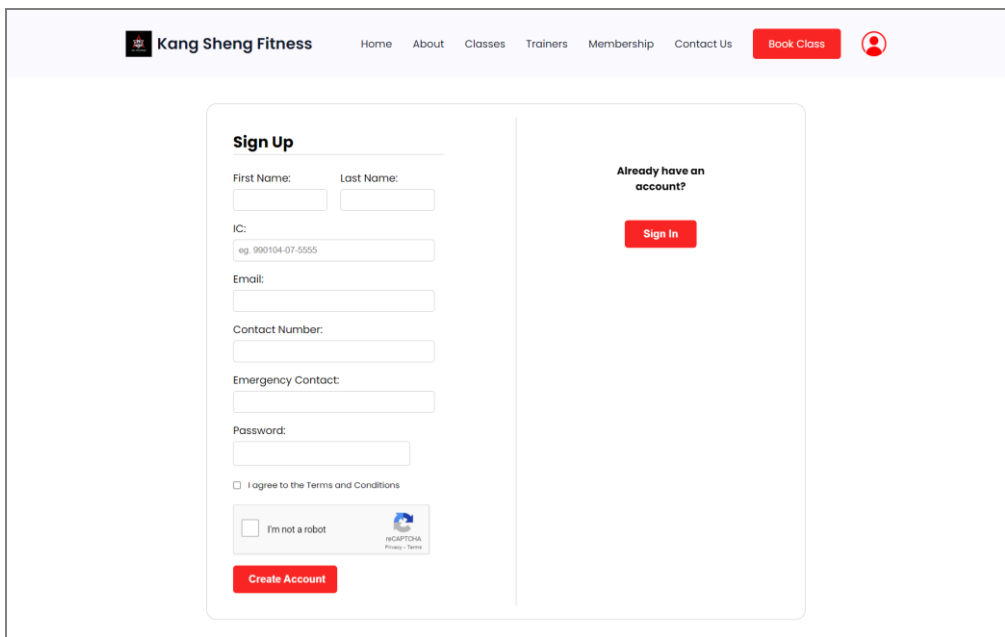


Fig. 4 Sign Up Module

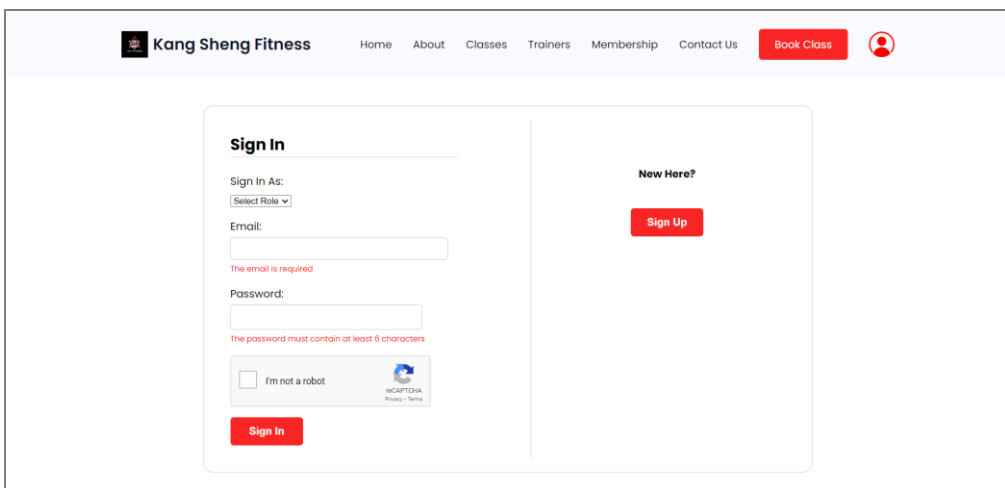


Fig. 5 Sign In Module

5.1.2 Profile Edit Module

The system allows members to edit their personal information, including their name, IC, email, contact numbers, and password. Furthermore, members have the capability to upload a profile picture from their device. Additionally, on this page, members can view their class schedule and the membership packages they have purchased. **Fig. 6** shows the Profile Edit Module.

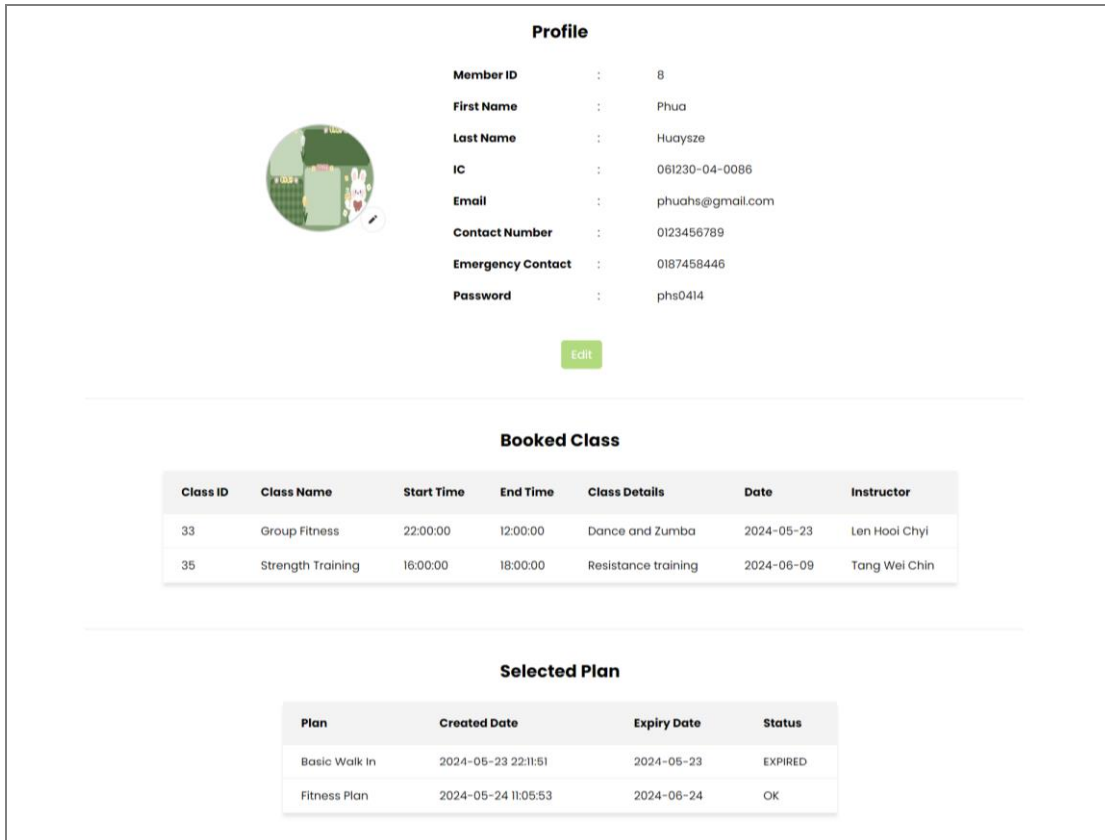


Fig. 6 Profile Edit Module

5.1.2 Member Control Module

The system enables admin and staff to efficiently manage member information by providing functions to add, view and search member profiles. It serves as a centralized platform for managing member data. Likewise, the Staff and Instructors Management interface maintains consistency in design, allowing admin exclusive access to search, edit, and delete staff and instructors' profiles. **Fig. 7** shows the Member Control Module.

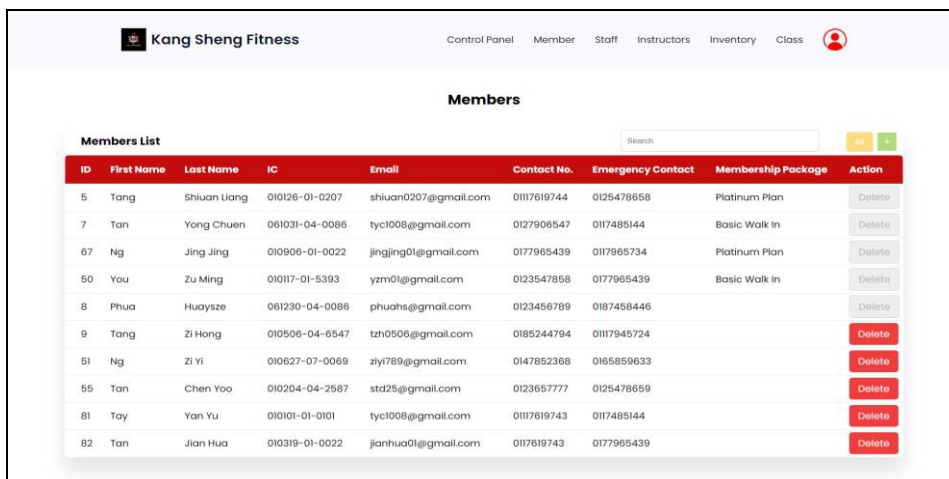


Fig. 7 Member Control Module

5.1.3 Inventory Management Module

The system enables both admin and staff to access comprehensive details of the inventory, including item ID, name, quantity, price, brand, source company, date received, and the inventory lifespan. Furthermore, authorized personnel can perform actions such as adding, viewing, and updating inventory details within the Kang Sheng Fitness Studio Management System. **Fig. 8** shows the Inventory Management Module.

ID	Item Name	Item Type	Amount	Price/pcs	Brand	Source Company	Date Received	Lifespan	Action
1	Treadmill	Fitness Equipment	5	3999.00	ProForm	Fitness Supply Co.	2021-10-06	8 years	View Edit Delete
2	Resistance Bands	Accessories	50	46.50	TheraBand	Sporting Goods Inc.	2023-01-11	2 years	View Edit Delete
3	Water Bottles	Merchandise	150	22.00	HydroFlask	Beverage Corp.	2023-11-20	Indefinite	View Edit Delete
4	Yoga Mats	Accessories	40	0.00	Gaiam	FitnessGear Inc.	2023-09-01	4 years	View Edit Delete

Fig. 8 Inventory Management Module

5.1.4 Class Schedule and Booking Module

Within the system, admin can utilize the Class Schedule feature, enabling admin to observe all available classes along with comprehensive details for each. Additionally, admin have the ability to add, update, or delete classes as necessary, providing them with efficient control over the class schedule. Members within the system are enabled to choose their preferred class. **Fig. 9** shows the Class Schedule Module while **Fig. 10** shows the Class Booking Module.

Date	Class Name	Time	Instructor	Details	Max Members	Booked Member IDs	Action
Thursday, May 23	Group Fitness	10:00 PM - 12:00 PM +08	Len Hooi Chyi	Dance and Zumba	15	8	Delete Edit
Saturday, May 25	Group Fitness	08:50 PM - 08:51 PM +08	Len Hooi Chyi	Dance and Zumba	10		Delete Edit

Fig. 9 Class Schedule Module

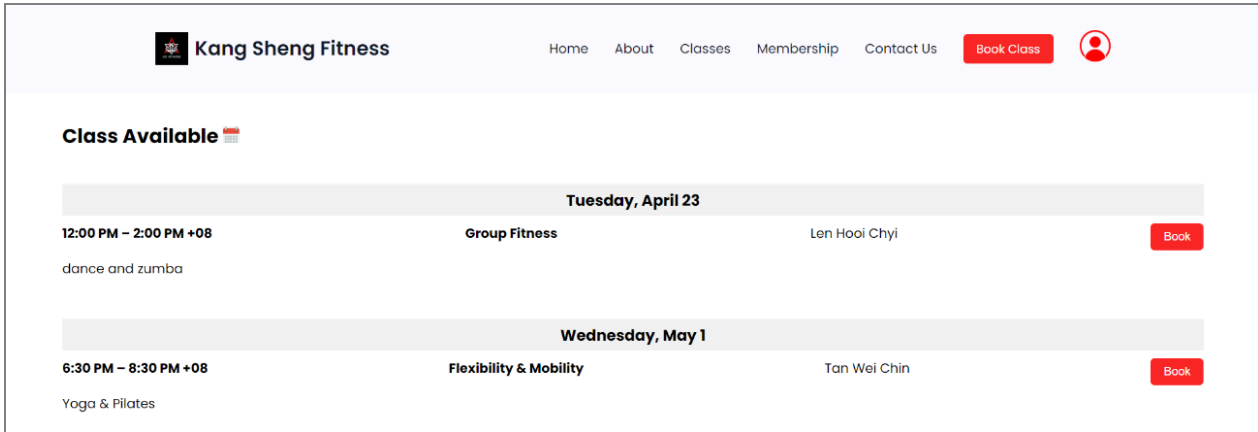


Fig. 10 Class Booking Module

5.1.5 Payment and Billing Module

The system offers various membership packages for members to choose their preferred plan and type of fitness classes. These packages comprise three plans: Basic Walk-In, Fitness Plan, and Platinum Plan, each with distinct benefits as shown in Fig. 11.

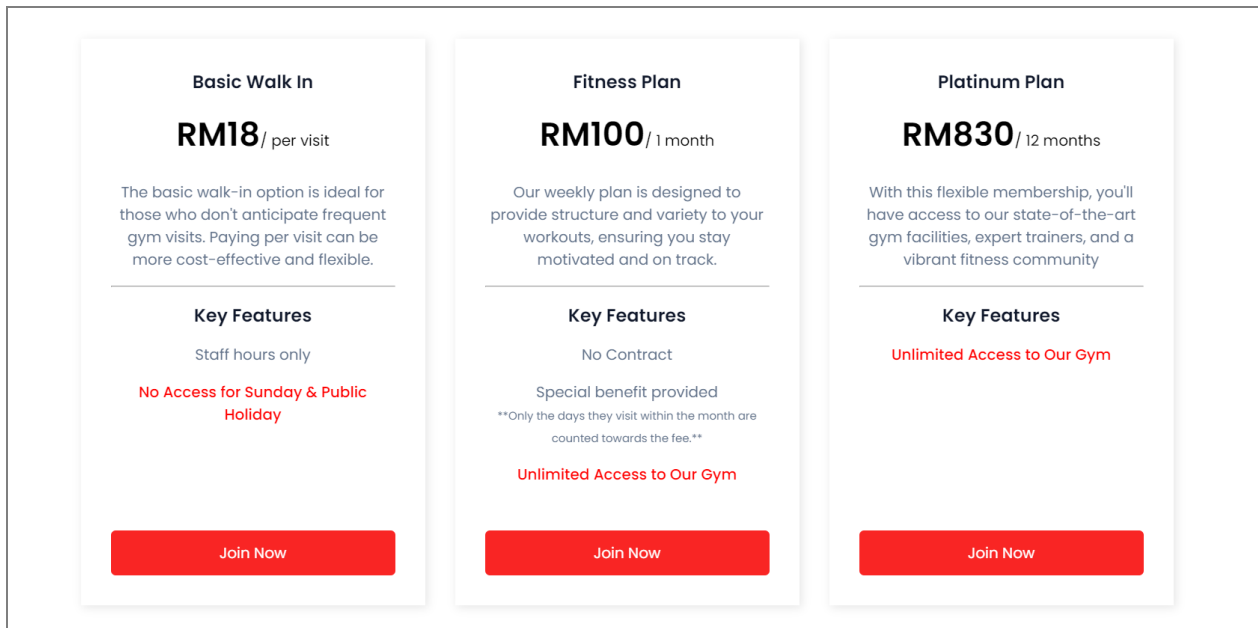


Fig. 11 Class Booking Module

Additionally, the classes are categorized into Strength Training, Flexibility & Mobility, HIIT, and Group Fitness. Members have the flexibility to buy the plan and classes that best suit their fitness objectives and preferences via online payment gateway. The online payment gateway needed to be filled in with member's name, email and phone number. Upon purchasing a plan, members receive access to the gym facilities corresponding to their chosen package. Fig. 12 shows the Payment and Billing Module for Class Booking while Fig. 13 shows the Payment and Billing Module for Membership Package.

Tee Lee Shi
Irenelee609@gmail.com
01117619743

Scroll down and complete all necessary information

Strength Training

Class

RM 18.00

Email *

Enter email here

You will receive the transaction receipt here.

More information ▾

Name *

Enter name here

Telephone Number *

Enter phone number here

Select payment method

Online Banking

Select account type

Personal Banking ▾

*Minimum Transaction is RM1 and Maximum Transaction is RM30,000 (depends on your internet banking transaction limit).

Select bank

Select Bank ▾

Final amount to pay	
Bill Amount	RM 18.00
Admin Fee	RM 1.00
Total Amount	RM 19.00

I agree to the Terms and Conditions

Select Bank >

FPX

Online Banking Payment Channel via DuitNow and FPX provided by TOYIBPAY SDN BHD.

Bill code : btp49%4
Reference : TP2406101653517029

Secured by **toyibPay**

Fig. 12 Payment and Billing Module for Class Booking

Tee Lee Shi
Irenelee609@gmail.com
01117619743

Scroll down and complete all necessary information

Platinum Plan
Access to all facilities and exclusive services

RM 830.00

Email *
Enter email here
You will receive the transaction receipt here.
[More information](#)

Name *
Enter name here

Telephone Number *
Enter phone number here

Select payment method


Select account type
Personal Banking

*Minimum Transaction is RM1 and Maximum Transaction is RM30,000 (depends on your Internet banking transaction limit).

Select bank
Select Bank

Final amount to pay	
Bill Amount	RM 830.00
Admin Fee	RM 1.00
Total Amount	RM 831.00

I agree to the [Terms and Conditions](#)



Online Banking Payment Channel via DuitNow and FPX
provided by TOYYIBPAY SDN BHD.

Bill code : na34ukgh
Reference : TP2406101153796341


Secured by 

Fig. 13 Payment and Billing Module for Membership Package

After a successful transaction, the system generates and sends a confirmation email to the admin and member following a successful transaction. For the email sent to the admin, it contains crucial customer details, including their name and contact information, alongside transaction specifics such as the amount paid, chosen payment method, and transaction date. For the email sent to member, it contains payment details and merchant details. By promptly delivering this notification, the system ensures that the admin stays informed about completed payments and can maintain accurate records of all transactions. **Fig. 14** shows the email received by the admin while **Fig. 15** shows the email received by the member.

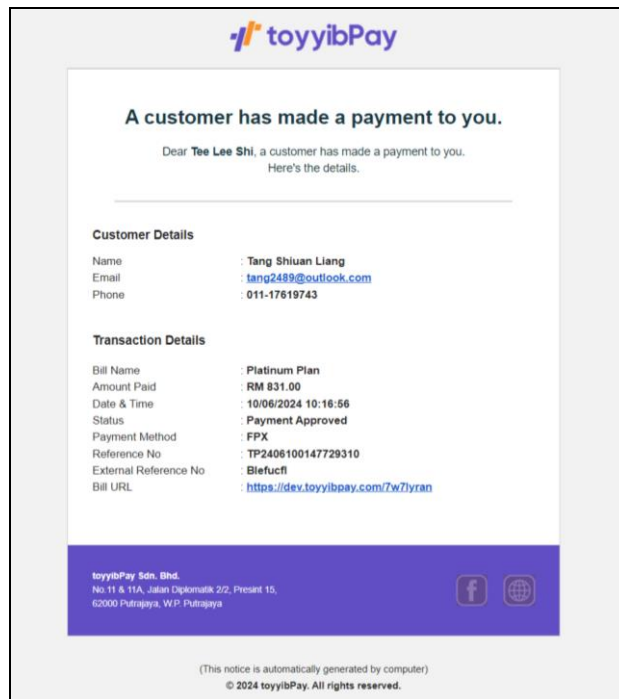


Fig. 14 The email received by the admin

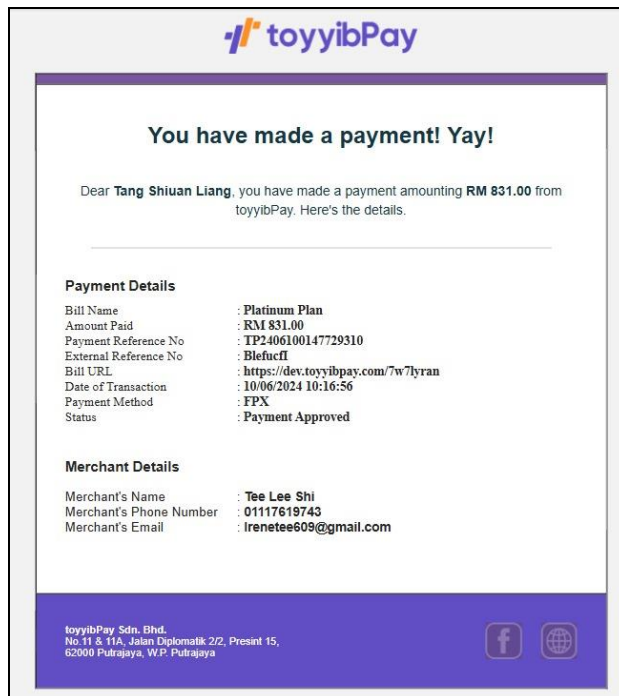


Fig. 15 The email received by the member

5.1.6 BMI Calculator Module

The system provides a BMI Calculator for users to understand whether their weight falls into categories such as underweight, normal weight, overweight, or obese [8]. The interface of the BMI Calculator is user-friendly, allowing individuals to input their weight and height easily. Users can select different units for weight (pounds, kilograms) and height (meters, centimeters, inches, feet), making the tool flexible and accommodating to various preferences and regional standards.

Once the user enters their details and selects the appropriate units, the calculator processes the information to compute the Body Mass Index (BMI) based on a standard formula: weight in kilograms divided by height in meters squared. After the calculation, the BMI value is displayed prominently on the screen, accompanied by a classification of the user's weight status. This classification helps users quickly determine if their weight is within a healthy range or if they fall into the underweight, normal weight, overweight, or obese categories. The clear and straightforward presentation of the results aids users in understanding their health status, prompting them to take any necessary actions, such as consulting a healthcare provider or adjusting their fitness and diet plans accordingly. **Fig. 16** shows the BMI Calculator Module.

BMI Calculator

Height
160
Meter

Weight
40
Kilogram

Calculate BMI

Your BMI is 0 and you are underweight.
Aim for a gradual weight gain of about 1 to 2 kilograms per month.

You should aim for a BMI between 18.5 and 24.9 kg/m². Manage your weight healthily:

- Practice healthy eating habits. Choose and eat a variety of foods daily as guided by the Malaysian Food Pyramid.
- Avoid skipping meals.
- Plan ahead for extra meals. To gain weight, you may need to eat more nutritious foods.
- Snack smartly by choosing nutrient-dense snacks that add calories, vitamins, and minerals.
- Check your energy requirement. Don't forget that you need to indicate what your physical activity level is in order to calculate your daily energy requirement.

Fig. 16 BMI Calculator Module

5.2 Testing

Testing is a crucial phase in system development, as it verifies that the system's functionality operates correctly. Prior to releasing the system to users, thorough testing is necessary to ensure it is free of bugs. In this project, both functional testing and user acceptance testing are performed to confirm that the system meets the specified requirements

5.2.1 Test Cases

A test case consists of a series of actions designed to verify a specific feature or function of the Kang Sheng Fitness Studio Management System. It includes test inputs, execution conditions, and expected results to ensure the program path is correctly exercised and meets specific requirements [9]. Test cases for the Kang Sheng Fitness Studio Management System (KSFSMS) cover various critical modules, ensuring comprehensive functionality and performance. These cases verify specific features and functions, detailing the necessary steps, data, and conditions for each test scenario. They confirm that member control, staff and instructor management, inventory management, class scheduling, class booking, payment processing and the function of BMI Calculator all work as intended. This thorough testing framework ensures the system meets its requirements and operates seamlessly across all components. **Table 5** shows the list of test cases according to the modules in KSFSMS.

Table 5 List of test cases

No.	Test Cases	Description	Outcome
Member Control			
1.	Search Specific Member	Admin and staff can search member by searching the specific character or number.	PASS
2.	Manage Member Profile	Admin and staff can add new member and view the member information.	PASS

Table 5 List of test cases (cont.)

Staff and Instructors Management			
1.	Search Specific Staff or Instructors	Admin can search staff or instructors by searching the specific character or number.	PASS
2.	View Staff or Instructor Profile	Admin can view the staff or instructor information.	PASS
3.	Manage Staff or Instructor	Admin can add new staff or instructor, update and delete staff or instructor information.	PASS
Inventory Management			
1.	Search Specific Inventory	Admin and staff can search inventory by searching the specific character or number.	PASS
2.	View Inventory	Admin and staff can view the inventory information.	PASS
3.	Manage Inventory	Admin and staff can add new inventory, update and delete inventory information.	PASS
Class Schedule			
1.	Add New Class	Admin can add new classes to the schedule.	PASS
2.	Update Class	Admin can update the details of existing classes.	PASS
3.	Delete Class	Admin can delete classes from the schedule.	PASS
Class Booking			
1.	View Class Details	Members can view details of the available classes.	PASS
2.	Book Class	Members can book a class they wish to join.	PASS
3.	Cancel Class Booking	Members can cancel their class bookings.	PASS
4.	View Booking History	Members can view their booking history and plan status in their profile.	PASS
Payment and Billing			
1.	Initiate Payment	Members can initiate the payment process for their membership fee and class fee.	PASS
2.	Process Payment	The system processes the payment through the online payment gateway.	PASS
3.	Confirm Payment	The system confirms successful payment and updates the membership status.	PASS
4.	Send Confirmation Email	A successful payment email is sent to the admin and member with transaction details.	PASS
BMI Calculator			
1.	Input Validation	Verify that the system handles empty input fields for weight and height.	PASS
2.	Display Correct BMI value and category	Ensure the system can display correct BMI value and the category based on user input	PASS
3.	Unit Conversion	Ensure weight and height units can be selected and converted correctly.	PASS

6. Conclusion

This chapter concluded the findings of the Kang Sheng Fitness Studio Management System project. It includes a review of how the system met its objectives, an analysis of its advantages and disadvantages, and recommendations for future improvements.

6.1 Achievement of the Overall Objectives

The Kang Sheng Fitness Studio Management System successfully met its primary objective of streamlining and optimizing the operations of fitness studios. By integrating various modules into a cohesive platform, the system

enhanced the overall efficiency of administrative tasks, improved communication between members and staff, and ensured secure financial transactions. The system also provided real-time tracking and centralized management capabilities, which significantly reduced manual workloads and operational errors. Overall, the system effectively addressed the key operational needs of fitness studios, leading to a more organized, efficient, and user-friendly management environment.

6.2 System Advantages

The system offered several significant advantages. It enhanced efficiency by streamlining various administrative tasks, thereby reducing the manual workload for staff. Improved communication was facilitated through an integrated messaging feature, including email, which promoted better interaction between members and staff. The centralized management aspect allowed a single platform to manage all aspects of studio operations, improving coherence and coordination. Additionally, the system allowed for the scheduling and booking of classes, reducing errors and ensuring optimal use of resources. Real-time inventory tracking was another advantage, keeping track of inventory levels to prevent shortages and overstocking. Finally, the system facilitated secure and efficient online payments, enhancing the overall member experience.

6.3 System Disadvantages

Despite its many advantages, the system had some drawbacks. The initial cost of implementation and customization could be expensive. There was a learning curve associated with the system, requiring staff to undergo training to effectively use all features, which could temporarily impact productivity. The dependency on technology meant that any technical issues or system failures could significantly disrupt operations. Additionally, handling sensitive member information raised data privacy concerns, necessitating stringent data protection measures that could be challenging to maintain. Finally, the system might require significant adjustments to scale up effectively as the business grew, presenting scalability issues.

6.4 Recommendations

To further enhance the Kang Sheng Fitness Studio Management System, several key recommendations were proposed. Implementing continuous training programs is essential to ensure staff remain proficient in using the system, adapting to new features, and maintaining efficiency. Regular system updates should be scheduled to incorporate the latest features and improve security, keeping the system current and robust against potential threats. Scalability planning is also crucial; a well-thought-out scalability plan will ensure the system can seamlessly grow with the business, accommodating an increasing number of users and expanding operations without significant disruptions. Additionally, providing robust technical support is vital for promptly addressing any issues that may arise, minimizing downtime, and maintaining smooth operations. This support could include a dedicated helpdesk, rapid response times, and comprehensive troubleshooting resources. Lastly, investing in advanced security measures to safeguard member data is imperative. Ensuring compliance with data protection regulations and implementing stringent data protection protocols will build trust with members and protect sensitive information from potential breaches. By addressing these areas, the Kang Sheng Fitness Studio Management System can achieve greater efficiency, reliability, and security, ultimately enhancing the overall experience for both staff and members.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

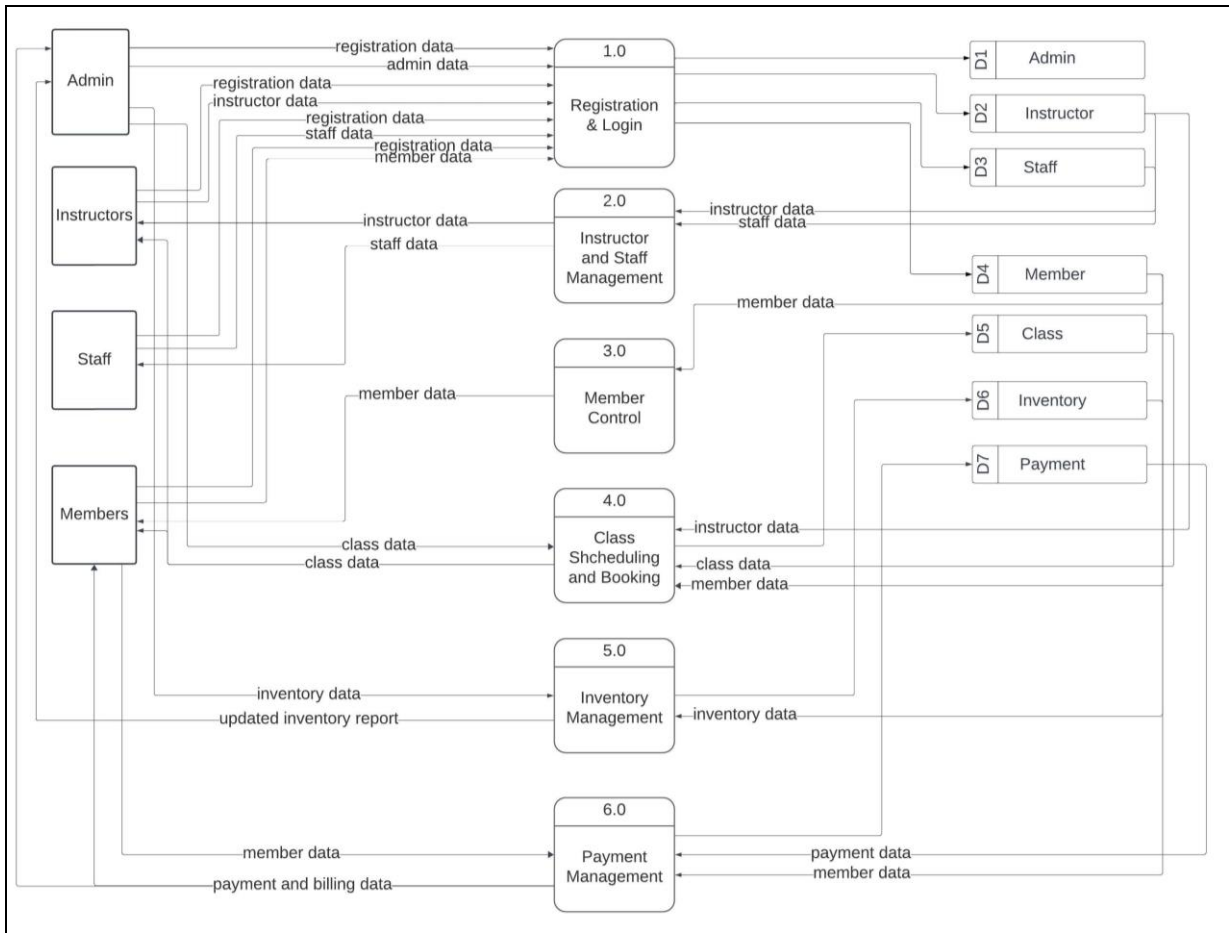
Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Tee Lee Shi, Noryusliza Binti Abdullah; **data collection:** Tee Lee Shi, Noryusliza Binti Abdullah; **analysis and interpretation of results:** Tee Lee Shi, Noryusliza Binti Abdullah; **draft manuscript preparation:** Tee Lee Shi, Noryusliza Binti Abdullah. All authors reviewed the results and approved the final version of the manuscript.*

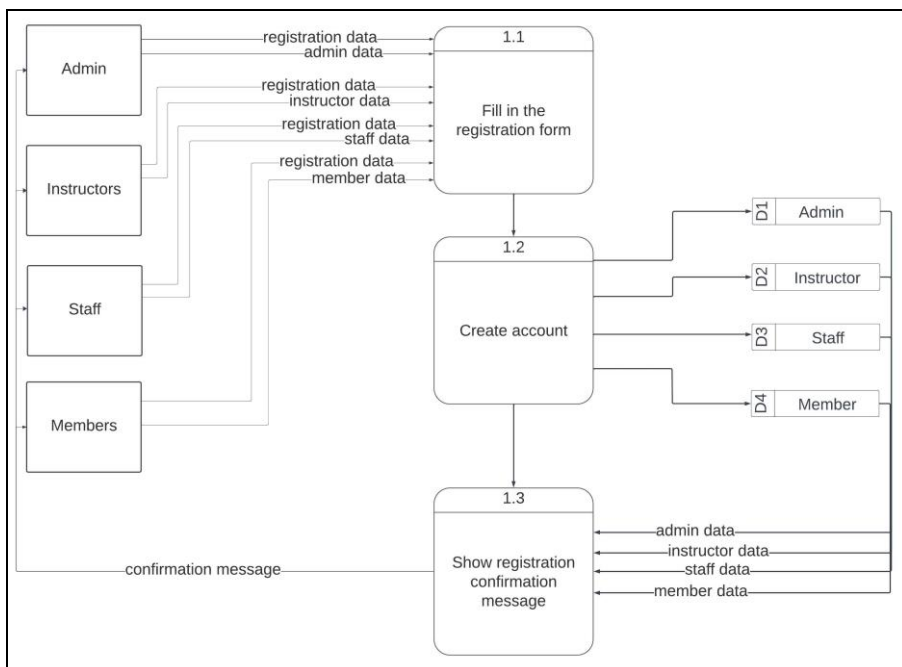
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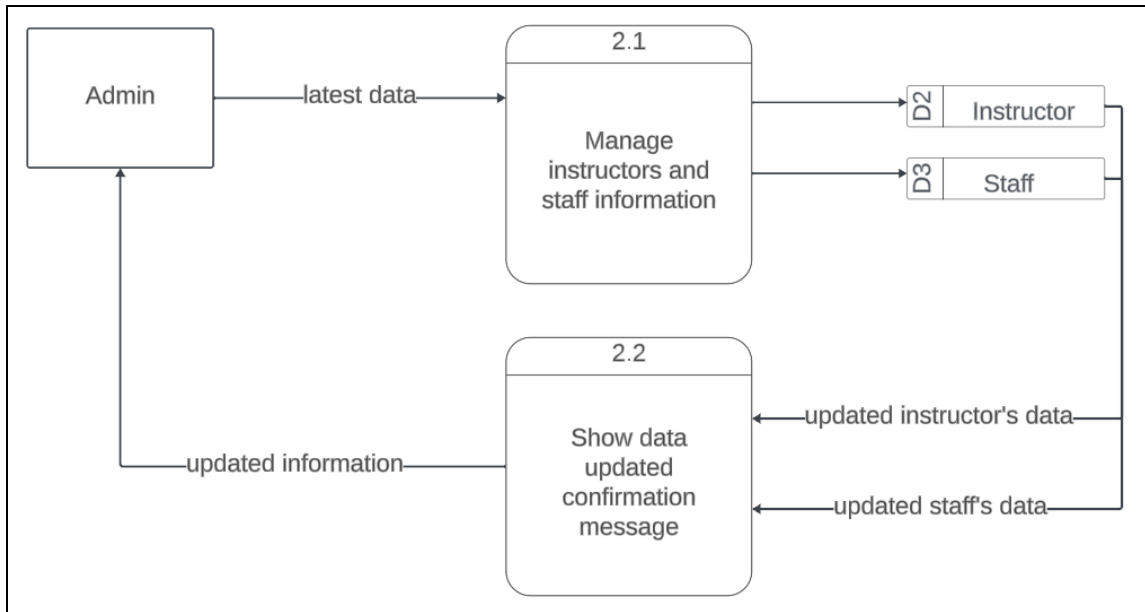
Appendix A: DFD Level 0



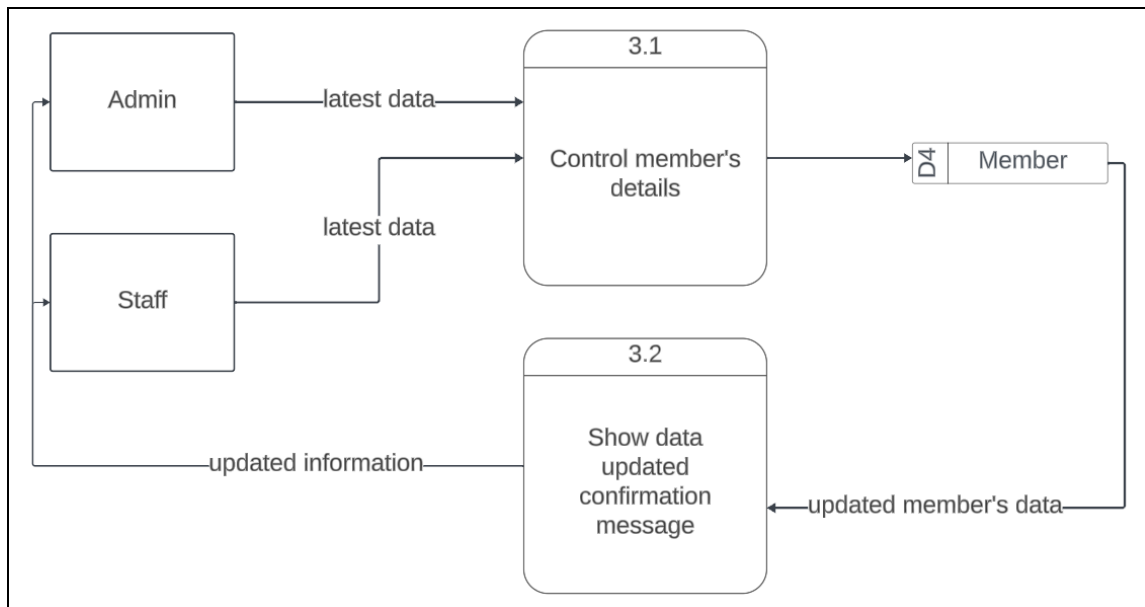
Appendix B: DFD Level 1 Process 1.0 Sign Up



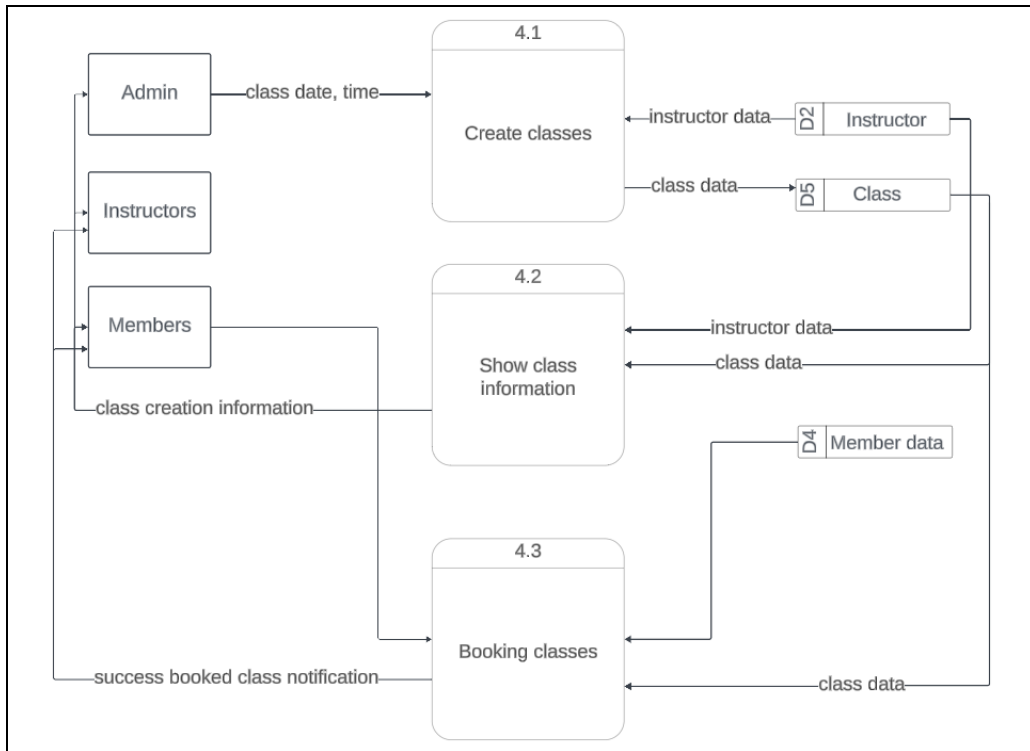
Appendix C: DFD Level 1 Process 2.0 Staff and Instructors Management



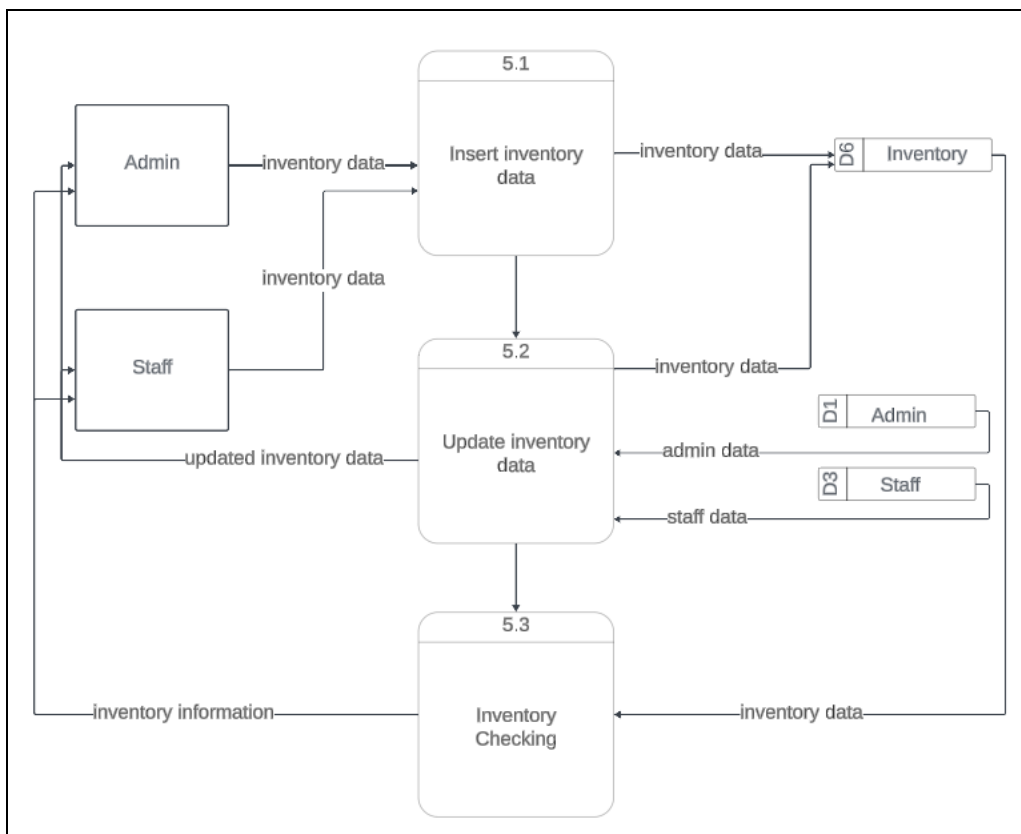
Appendix D: DFD Level 1 Process 3.0 Member Control



Appendix E: DFD Level 1 Process 4.0 Class Scheduling and Booking



Appendix F: DFD Level 1 Process 5.0 Inventory Management



Appendix G: DFD Level 1 Process 6.0 Payment and Billing

