

# Superwomen Fitness Management System

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## Abstract

A The fitness industry faces challenges stemming from outdated manual processes and fragmented data management. To address these issues, the Superwomen Fitness Management System (SFMS) was developed to enhance efficiency and user satisfaction in fitness center operations. This web-based platform integrates functionalities such as user registration, personalized training programs, appointment scheduling, inventory management, and secure payment processing. Utilizing object-oriented principles and Agile methodologies, the system was designed with scalability and maintainability in mind. Key technologies employed include PHP, MySQL, and JavaScript, ensuring robust functionality and user-friendly interfaces. Implemented at Superwomen Fitness Studio, Nilai Impian, Negeri Sembilan, SFMS streamlines operational workflows, reduces administrative overhead, and improves data accuracy. It enables users to access real-time fitness data and personalized plans, while staff benefit from efficient management tools. The project highlights the transformation potential of digital solutions in meeting evolving industry demands, fostering a supportive and empowering fitness environment.

## 1. Introduction

In today's fast-paced digital era, the fitness and health industry is evolving rapidly, embracing technology to enhance accessibility and user engagement. Despite this progress, many fitness centers still rely on outdated, manual systems that lead to inefficiencies and data management challenges. The Superwomen Fitness Management System (SFMS) aims to address these issues by creating a modern online platform specifically designed for women's fitness. Implemented at Superwomen Fitness Studio, Nilai Impian, Negeri Sembilan [1], SFMS streamlines operational workflows, reduces administrative overhead, and improves data accuracy. By streamlining operations and offering user-friendly tools, SFMS will improve efficiency, enhance the overall user experience, and support the long-term growth of fitness centers..

## 2. Related Work

This study explore about the feature and implementation for Superwomen Fitness Management System.

### 2.1 Superwomen Fitness Background

Superwomen Fitness Studio in Nilai Impian, Negeri Sembilan [1], is a dedicated space for women's fitness empowerment. Focused on exclusivity and individualized journeys, the studio offers personalized programs, group classes, and online support. This supportive community fosters camaraderie, making it more than just a gym and it's a space where women can thrive together.

## 2.2 Web-Based Management System

Web-based management systems, as highlighted by authors [2], transform organizational processes by streamlining operations, improving communication, and enabling data-driven decision-making. The Superwomen Fitness Management System (SFMS) exemplifies this by leveraging online technologies to optimize fitness center operations, offering flexibility, accessibility, and efficiency. This digital approach modernizes traditional manual methods by automating tasks like member registration, scheduling, and payment processing, thus increasing operational efficiency and reducing errors. The system also enhances the member experience by providing a user-friendly interface for services like booking appointments and accessing personalized fitness programs, improving member satisfaction and engagement. Furthermore, integrated messaging and notification features promote seamless communication between members, trainers, and staff, fostering stronger relationships and a sense of community within the fitness studio.

## 2.3 Comparison with Existing System

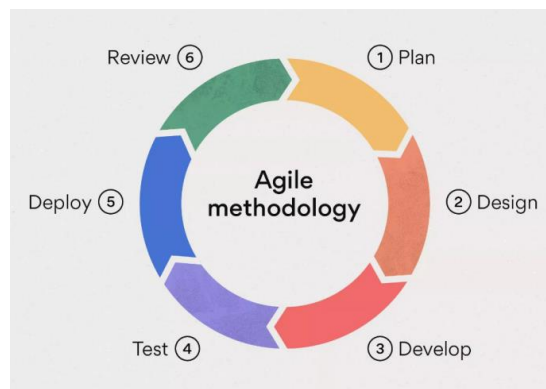
The analysis of the existing system was conducted with three existing systems which are Fitness First Malaysia, Anytime Fitness, and GoFit were identified and compared with the proposed Superwomen Fitness Management System . This comparative analysis served as a foundation for refined and innovating the system. At this section the features of the system are compared with the proposed system.

**Table 1** Comparison of existing system and proposed system

Features	Fitness First Malaysia	Anytime Fitness	GoFit	Superwomen Fitness Management System
User registration	√	√	√	√
Administration	√	X	√	√
Report	X	√	√	√
Appointment scheduling	√	√	X	√
Payment and billing	√	√	√	√
Inventory management	√	X	√	√

## 3. Methodology

The chosen System Development Life Cycle(SDLC) is agile model. The Agile model, chosen for developing the Superwomen Fitness Management System (SF), emphasizes flexibility, customer satisfaction, and collaborative development. It involves iterative cycles of planning, requirement analysis, designing, implementation, testing, and deployment, ensuring continuous feedback and adjustments. This approach suits the dynamic needs of the gym, fostering collaboration and adaptability to create an efficient web-based fitness management system.



**Fig. 1** Agile Model

### 3.1 System Development Workflow

The prototype model has six phases. As shown in Table 3.1, each phase has its assignment and output that must be produced during the entire project development. The output was completed within the allocated days.

**Table 2** *Software development activities and their task*

Phase	Task	Output
Planning	Initiate the project and establish the project timeline, tasks, and expected outcomes	Project proposal and a Gantt chart
Requirement Analysis	Collect and analyze requirements, prioritize the backlog, and establish acceptance criteria	Requirements document and user stories
Designing	Develop comprehensive design documents, create wireframes and prototypes, and conduct design evaluations	Design documents, wireframes, prototypes, and design review reports
Implementation	Code development, unit testing, component integration, and code review practices	Source code, unit test outcomes, system integration, and code review reports
Testing	Develops test plans, designs test cases, executes tests, manages defects, and conducts regression and user acceptance testing	Test plans, test cases, defect reports, and user acceptance test results
Deployment	Sets up the production environment, creates deployable artifacts, plans and executes deployment, and monitors and tests the system after post-deployment	Deployment plan, deployment scripts, and post-deployment test results

## 4. Analysis and Design

Analysis and design are critical steps in the software development life cycle (SDLC) that involve analyzing and identifying the problem, establishing a solution structure, and preparing for software system implementation. Its involved identifying the system requirement analysis, design the database and interfaces for the user.

### 4.1 System Requirement Analysis

Analysis and System Requirement Analysis (SRA) is a structure, or organized, methodology for identifying an appropriate set of resources to satisfy a system need and the requirements for those resources that provide a sound basis for the design or selection of those resources [3]. This multifaceted approach involves identifying various requirements, such as functional, non-functional, user, software, and hardware elements. The objective is to collect all of the specifications that will guide the development process.

#### 4.1.1 Functional Requirement

Functional requirements are specifications that outline the functions and capabilities that a system or software program needs in order to fulfill its intended purpose and meet the needs of the user. Table 3 shows the functional requirement for Superwomen Fitness Management System.

**Table 3** *Functional Requirement*

Module	Description
Registration	The system should allow the new user to register to the system
Administration	The system should allow the new user to register to the system

Report	<ul style="list-style-type: none"> <li>- The system should allow administrator to add, edit, and remove item in the menu</li> <li>- The system should allow administrator to add, edit, and remove category in the menu</li> <li>- The system should allow administrator to categorize the menu</li> </ul>
Payment and billing	<ul style="list-style-type: none"> <li>- The system should allow customer to make online payment</li> <li>- The system should allow customer to upload receipt for transactions</li> </ul>
Inventory management	<ul style="list-style-type: none"> <li>- The system should allow customer to tracks inventory.</li> <li>- The system should allow customer to make payment</li> </ul>
Appointment scheduling	The system should allow customer to schedule appointment.

### 4.1.2 Non-functional Requirement

Non-functional requirements are criteria that show how a system should perform its functions rather than what functions it should accomplish. Table 4 shows the non-functional requirement for Superwomen Fitness Management System.

**Table 4** *Non-functional Requirement*

Requirement	Description
Performance	<ul style="list-style-type: none"> <li>- The system should respond to user interactions within a maximum three seconds</li> <li>- The system should support a high number of simultaneous orders during peak hours</li> </ul>
Operational	<ul style="list-style-type: none"> <li>- The system should be able to function on any web browser</li> <li>- The system should provide a user-friendly interface</li> </ul>
Security	The system should securely store the user authentication

### 4.1.3 Hardware and Software Requirement

Table 5 shows the hardware requirement specification of the laptop used in the proposed system and Table 6 shows the software requirement specifications that are used to develop the proposed system

**Table 5** *Hardware requirements specification*

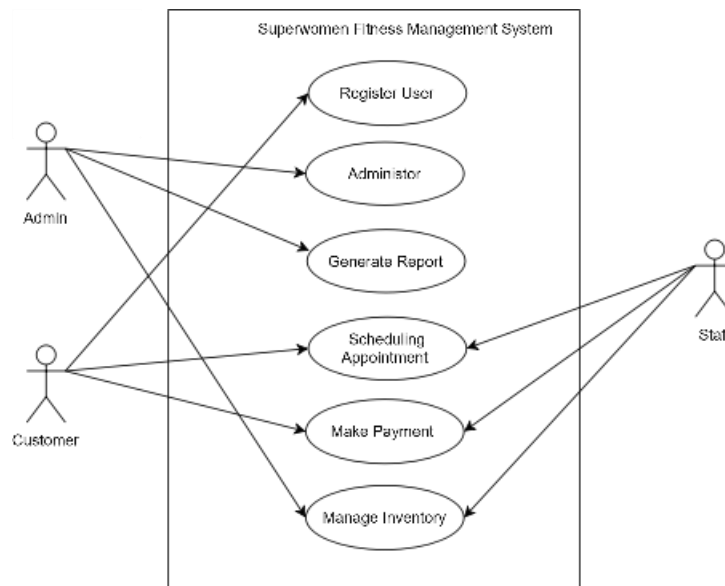
Aspects	Requirement
Central Processing Unit (CPU)	Intel(R) Core(TM) i5-8250U CPU @1.60GHz 1.80 GHz
Memory	8.00 GB
Storage	475 GB
Internet connection	Wifi or hotspot connection
Operating system	Windows 11
Web browser	Google Chrome or Microsoft Edge

**Table 6** Software requirement specifications

No	Software	Description
1.	Visual Studio Code	Text editor used for coding and develop the system
2.	XAMPP	Open-sourced web serve used to connect and access the database
3.	Draw.io	To illustrate and design diagram related to the system
4.	PhpMyAdmin	To create and manage database for the system

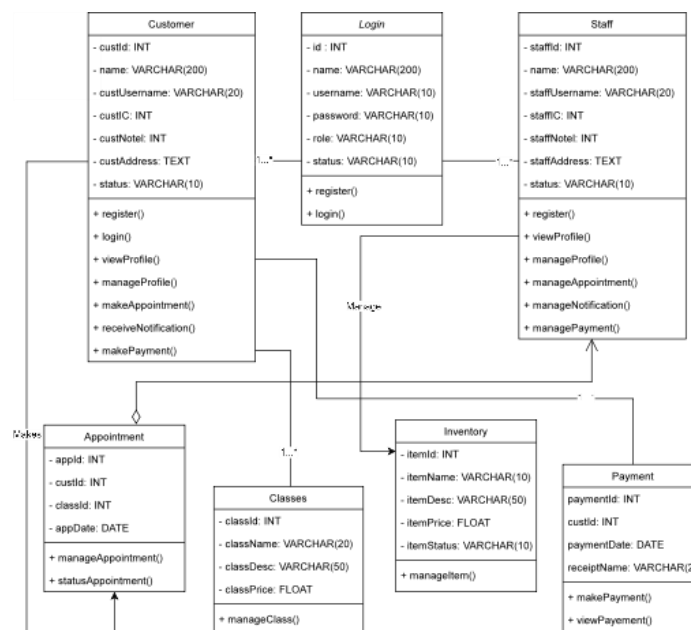
### 4.2 System Analysis

A use case diagram is a model of interaction between external user of a software product and the software product itself [3]. Fig. 2 shows the use case diagram for the Superwomen Fitness Management System.



**Fig. 2** Use case diagram for the Superwomen Fitness Management System

Class diagrams are used when developing an object-oriented system model to show the classes in a system and the associations between these classes [4]. Fig. 3 shows class diagram for the system.



**Fig. 3** Class diagram for the Superwomen Fitness Management System

### 4.3 Database Design

Table schema is a formal definition of the structure and constraints applied to a database. The table schema of the proposed system have been analyzed. The table schema for Superwomen Fitness Management System are listed as follows:

- i. Registration (id, name, username, password, status, role)
- ii. Customer (custId, name, custUsername, custIC, custAddress, custNotel, statusUser)
- iii. Staff (staffID, name, username, staffIC, staffAddress, staffNoTel, status)
- iv. Appointment (appId, custId, classId, appDate)
- v. Classes ( classId, className, classDesc, classPrice)
- vi. Inventory (itemID, itemName, stockDetails)
- vii. Payment (paymentId, custId, paymentDate, receiptName)

### 4.4 Interface Design

Interface design, often known as user interface (UI) design is the process of developing visually appealing and user-friendly interface for websites. The goal is to improve the user experience by making interactions as simple and straightforward as possible [5]. Fig. 4 until Fig. 14 shows user interface for Superwomen Fitness Management System.

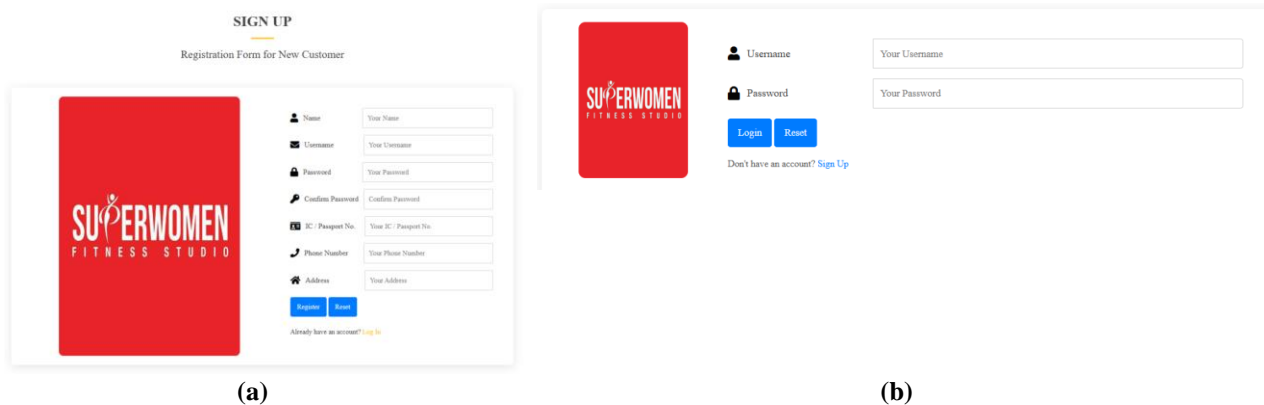


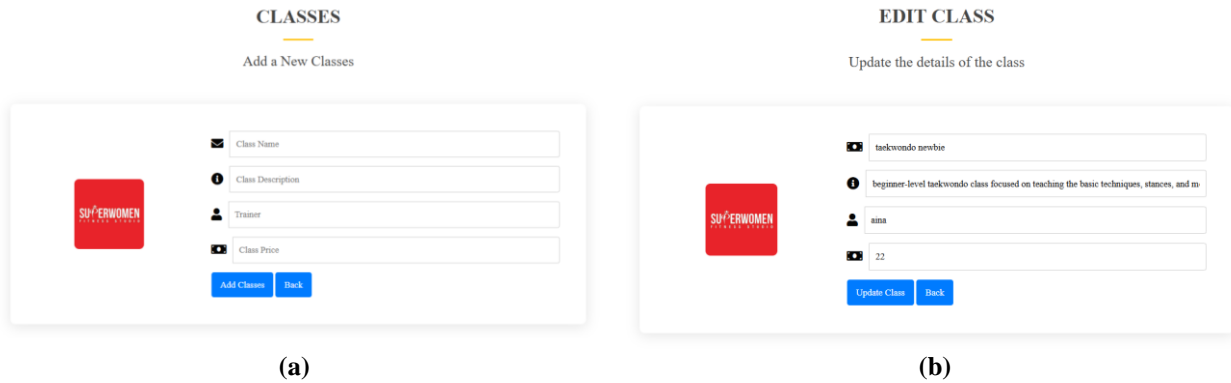
Fig. 4 Interface (a) Sign up; (b) Login

**SERVICES | CLASSES**

[+ Add Classes](#)

Class Name	Description	Price (RM)	Trainer	Actions
tackwondo newbie	beginner-level tackwondo class focused on teaching the basic techniques, stances, and movements	22	aina	
zumba	combines Latin and international music with easy-to-follow dance moves for a fun cardiovascular work	20	ikaasa	
yoga class	focuses on stretching, breathing techniques, and poses to improve flexibility	20	alinec	
body workout	fitness class designed to strengthen and tone the entire body	15	lin wey	
dance workout	provide an engaging and energetic way to improve cardiovascular health and coordination.	15	mimi	
grading test	formal examination where students demonstrate their tackwondo skills	10	que	
sparring seminar	special training session focused their tackwondo skills in a controlled, competitive environment.	10	haidar	
football class	learning the fundamentals of football, including techniques, strategies, and teamwork	20	adam	
pilates	focuses on strengthening the core muscles, improving posture, flexibility, and body alignment.	30	shaza	

Fig. 5 Interface Administrator's manage class



(a) (b)  
**Fig. 6 Interface Administrator's (a) Add new class form; (b) Update class form**

Search by customer name

No.	Name	IC / Passport	Phone Number	Address	More Details
1	Nureen Aina Binti Badrul Kamal	101110448	0139638527	taman sri jaya, klang, 43200 selangor	<input type="button" value="More"/>

**Fig. 7 Interface Administrator's generate report by search function**

CUSTOMER DETAILS: NUREEN AINA BINTI BADRUL KAMAL

Personal Information					
Name	IC / Passport	Phone Number	Address		
Nureen Aina Binti Badrul Kamal	101110448	0139638527	taman sri jaya, klang, 43200 selangor		

Appointment Services Information						
Booking ID	Class Name	Description	Price	Trainer	Date	Time Slot
14	yoga class	focuses on stretching, breathing techniques, and poses to improve flexibility	RM20	alinec	2024-12-07	09:00 AM
16	body workout	fitness class designed to strengthen and tone the entire body	RM15	lim wey	2024-12-28	11:00 AM

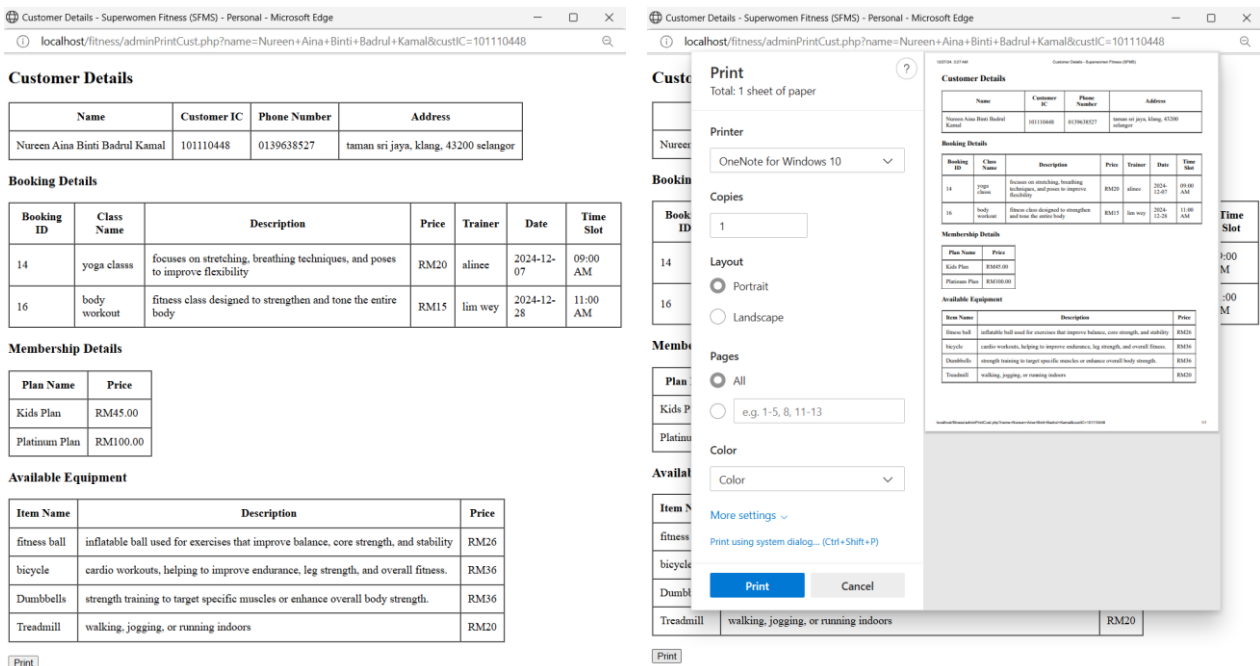
  

Package Membership Information	
Plan Name	Price
Kids Plan	RM45.00
Platinum Plan	RM100.00

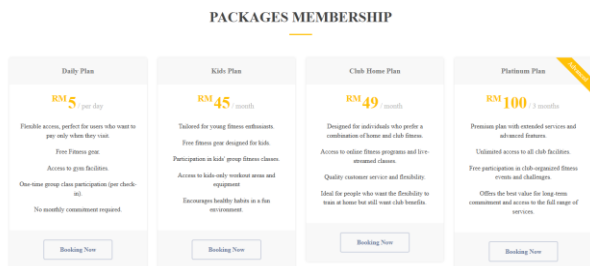
  

Equipment Information		
Equipment Name	Description	Price
fitness ball	inflatable ball used for exercises that improve balance, core strength, and stability	RM26
bicycle	cardio workouts, helping to improve endurance, leg strength, and overall fitness.	RM36
Dumbbells	strength training to target specific muscles or enhance overall body strength.	RM36
Treadmill	walking, jogging, or running indoors	RM20

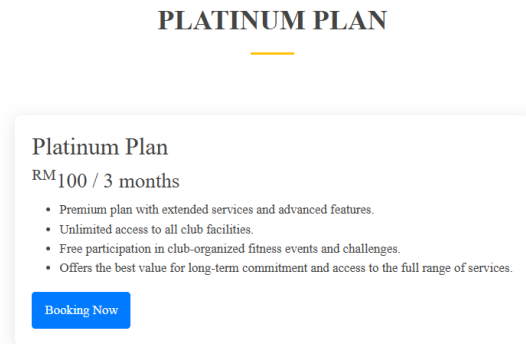
(a)  
**Fig. 8 Interface Administrator's generate report**



(a) (b)  
**Fig. 9 Interface Administrator's (a) Generate report; (b) Print report**

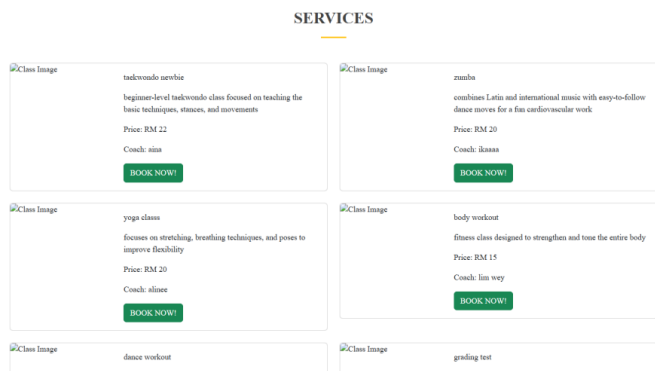


(a)



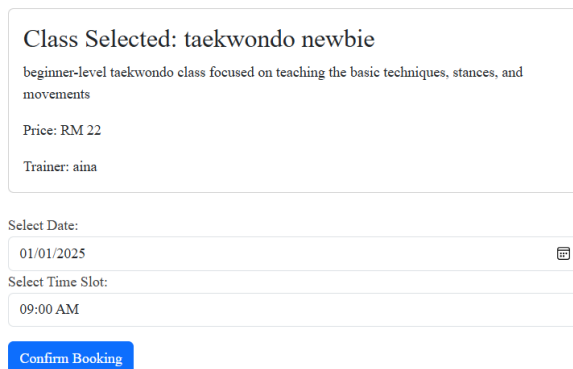
(b)

Fig. 10 Interface Customer's (a) Membership plan; (b) Booking membership form



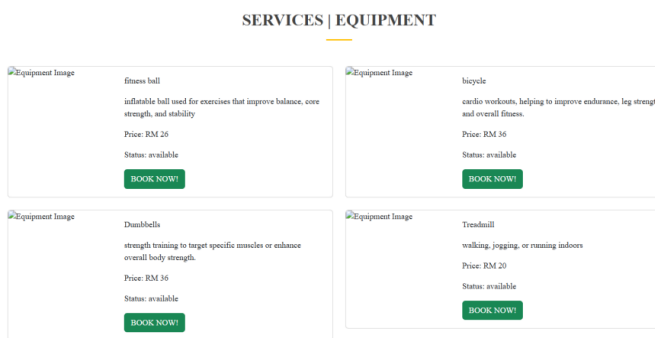
(a)

### BOOK YOUR APPOINTMENT



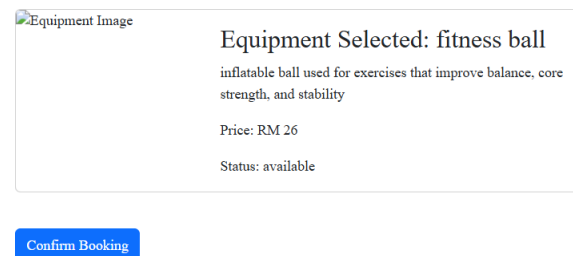
(b)

Fig. 11 Interface Customer's (a) Services; (b) Booking services form



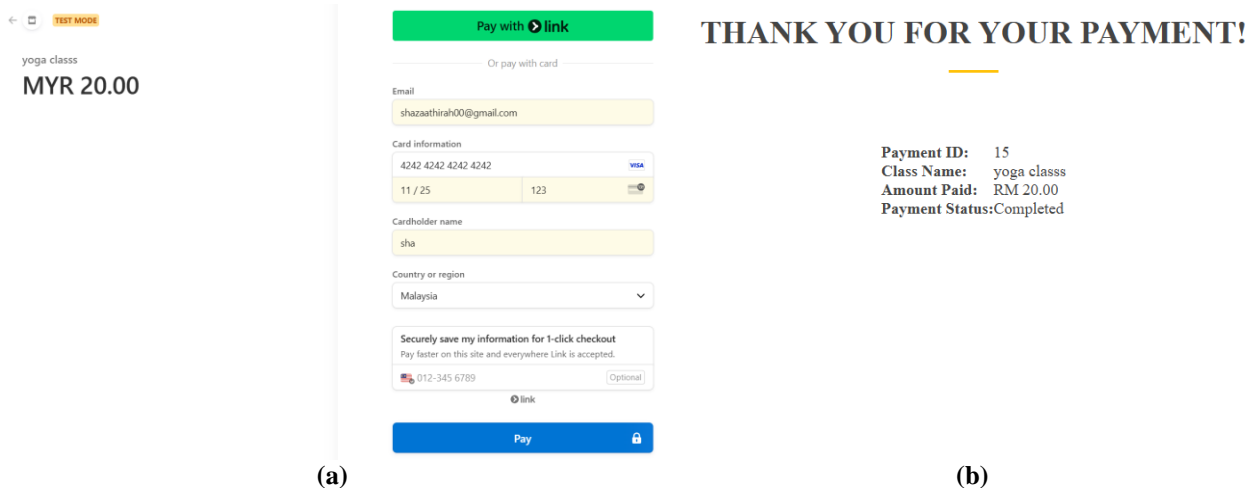
(a)

### BOOK YOUR EQUIPMENT

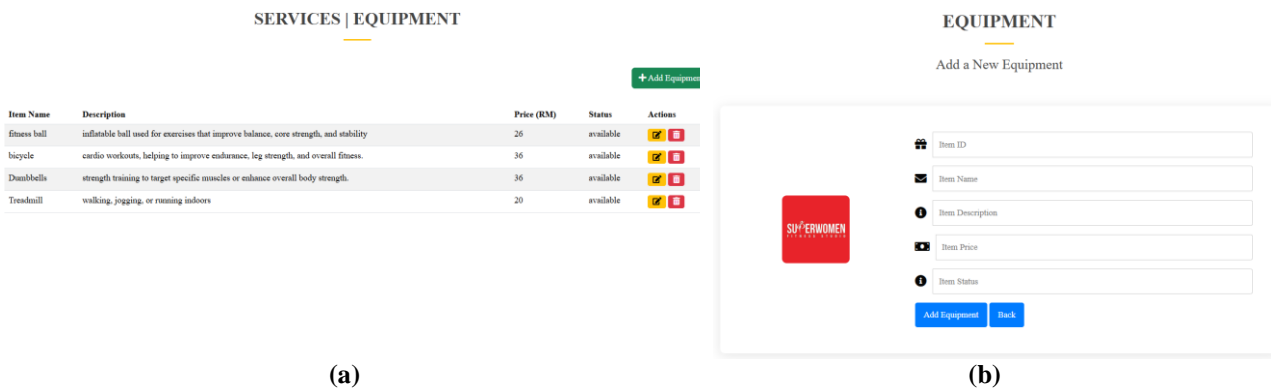


(b)

Fig. 12 Interface Customer's (a) Equipment; (b) Booking equipment



**Fig. 13** Interface Customer's (a) Stripe payment; (b) Success payment form



**Fig. 14** Interface Administrator's (a) Manage Inventory@Equipment; (b) Add new Inventory@Equipment form

## 5. Result and Discussion

The Superwomen Fitness Management System (SFMS) is developed as a website to optimize fitness center management. The system utilizes PHP for server-side scripting, ensuring robustness and scalability, which improves maintainability and structural organization. The front-end of the website is crafted using HTML, CSS, JavaScript, and Bootstrap to create an interactive, visually appealing, and user-friendly interface. PHP handles server-side logic, while MySQL databases are efficiently managed through phpMyAdmin to store and retrieve user and system data. Development and testing are conducted locally using XAMPP, which integrates Apache, MySQL, and PHP, ensuring seamless functionality during the testing phase. Visual Studio Code serves as the primary code editor, chosen for its comprehensive features and extension support. This implementation delivers a well-structured, scalable, and efficient website tailored to the specific needs of fitness center operations.

### 5.1 Test case

The test case based on the functional requirement of the system. Table 6 shows the test cases for all module.

**Table 7** Comparison of existing system and proposed system

Test Cases ID	Requirements ID	Description	Status
<b>TC_100</b>	<b>REQ_100</b>	<b>Register User and Login</b>	
TC_100_01	REQ_101	The system must be able to display registration page	PASS
REQ_101	REQ_101		
The system must be able to display registration	The system must be able to display registration		

page	page		
PASS	PASS		
TC_100_02	REQ_102	The user must be able to enter their username, password, ic/ passport no, phone number, and address into the system	PASS
TC_100_03	REQ_103	The system must be able to validate the username, password, ic/passport no, phone number, and address	PASS
TC_100_04	REQ_104	The system must be able to display error if the user enter invalid details	PASS
TC_100_05	REQ_105	The system must be able to register an account for new user	PASS
TC_100_06	REQ_106	The system must securely store and manage user registration data, ensuring the confidentiality and integrity of user information.	PASS
TC_100_07	REQ_107	The system must be able to display login page	PASS
TC_100_08	REQ_108	The user must be able to enter their username and password	PASS
TC_100_09	REQ_109	The system must be able validate the username and password	PASS
TC_100_10	REQ_110	The system must be able to display error if the user enter invalid details	PASS
TC_100_11	REQ_111	The user must be able to log in to the system	PASS
TC_100_12	REQ_112	The system must securely store and manage user login data, ensuring the confidentiality and integrity of user information.	PASS
<b>TC_200</b>	<b>REQ_200</b>	<b>Administration</b>	
TC_200_01	REQ_201	The system must be able to display the staff's list	PASS
TC_200_02	REQ_202	The administrator must be able to manage staff profile	PASS
TC_200_03	REQ_203	The system must be able to display the customer's list	PASS
TC_200_04	REQ_204	The system must be able to display the package page	PASS
TC_200_05	REQ_205	The administration must be able to add, update, delete package in the system	PASS
TC_200_06	REQ_206	The system must be able to display the service page	PASS
TC_200_07	REQ_207	The administrator must be able to add, update, or delete service in the system	PASS
TC_200_08	REQ_208	The system must be able to display the equipment page	PASS

TC_200_09	REQ_209	The administrator must be able to add, update, or delete equipment in the system	PASS
TC_200_10	REQ_210	The system must be able to display error if the administrator enter invalid information	PASS
<b>TC_300</b>	<b>REQ_300</b>	<b>Generate Report</b>	
TC_300_01	REQ_301	The system must be able to display generate report page	PASS
TC_300_02	REQ_302	The system must be able to generate the report	PASS
TC_300_03	REQ_303	The system must allow user to print the report	PASS
TC_300_04	REQ_304	The system must allow administrator to print the report	PASS
<b>TC_400</b>	<b>REQ_400</b>	<b>Manage Appointment Scheduling</b>	
TC_400_01	REQ_401	The system must be able to display appointment page	PASS
TC_400_02	REQ_402	The system must be able to display only the available time slots to the users when booking an appointment	PASS
TC_400_03	REQ_403	The system shall send a confirmation notification	PASS
<b>TC_500</b>	<b>REQ_500</b>	<b>Make payment</b>	
TC_500_01	REQ_501	The system must be able to display payment page	PASS
TC_500_02	REQ_502	The system must let user choose preferred mode of payment	FAIL
TC_500_03	REQ_503	The system must be able to store the payment data	PASS
TC_500_04	REQ_504	The system must be able to display success message of payment successful	PASS
<b>TC_600</b>	<b>REQ_600</b>	<b>Manage Inventory</b>	
TC_600_01	REQ_601	The system must be able to display equipment page	PASS
TC_600_02	REQ_602	The administrator must be able to add, update, or delete equipment in the system	PASS
TC_600_03	REQ_603	The system must be able to display error if the administrator enter invalid information	PASS

## 6. Conclusion

In conclusion, The Superwomen Fitness Management System (SFMS) has been successfully developed to streamline fitness center operations and enhance the user experience. This web-based system achieved its objectives through careful planning, efficient time management, and thorough testing. It operates seamlessly with features such as member registration, class scheduling, and equipment management, powered by a robust PHP and MySQL backend. Innovative functionalities, including dynamic class booking, personalized fitness program access, and integrated notification systems, further enhance its usability. While the system effectively improves operational efficiency and member satisfaction, opportunities for enhancement include integrating detailed performance analytics and promotional tools to boost member engagement. Future developments could

incorporate advanced analytics for tracking user progress and a rewards program to foster long-term loyalty. The SFMS is well-positioned to revolutionize Superwomen Fitness Studio's management by adapting to modern fitness trends and customer expectations. By adopting this innovative system, the studio can maintain its competitive edge in the fitness industry while providing members with a seamless and enjoyable experience.

### **Acknowledgement**

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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: Shaza Athirah; analysis Dr. Suhaila Binti Yasin; draft manuscript preparation: Shaza Athirah.** All authors reviewed the results and approved the final version of the manuscript.*

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### Appendix B: Sequence Diagram

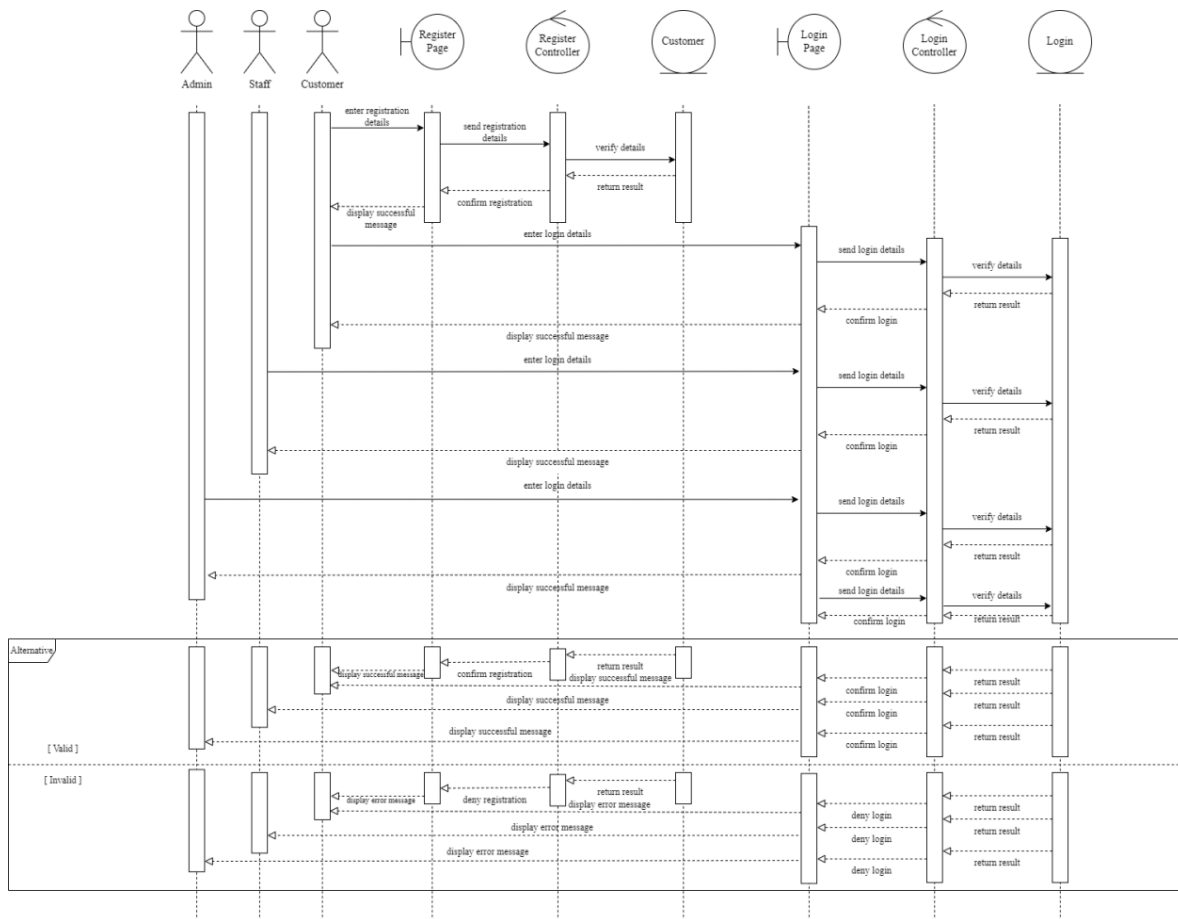


Fig. 16 Sequence diagram of registration module

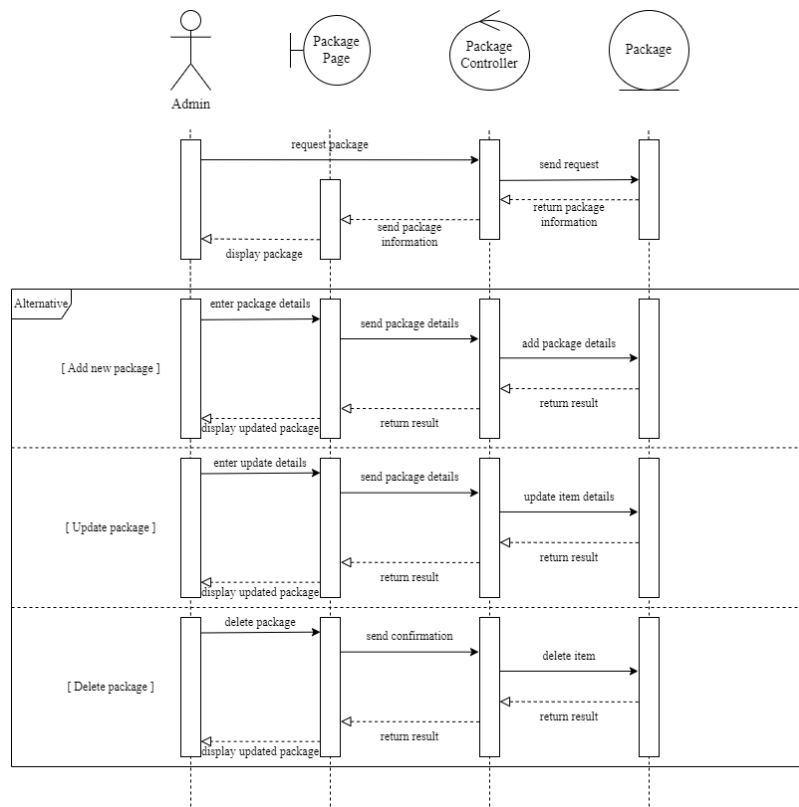


Fig. 17 Sequence diagram of administration module

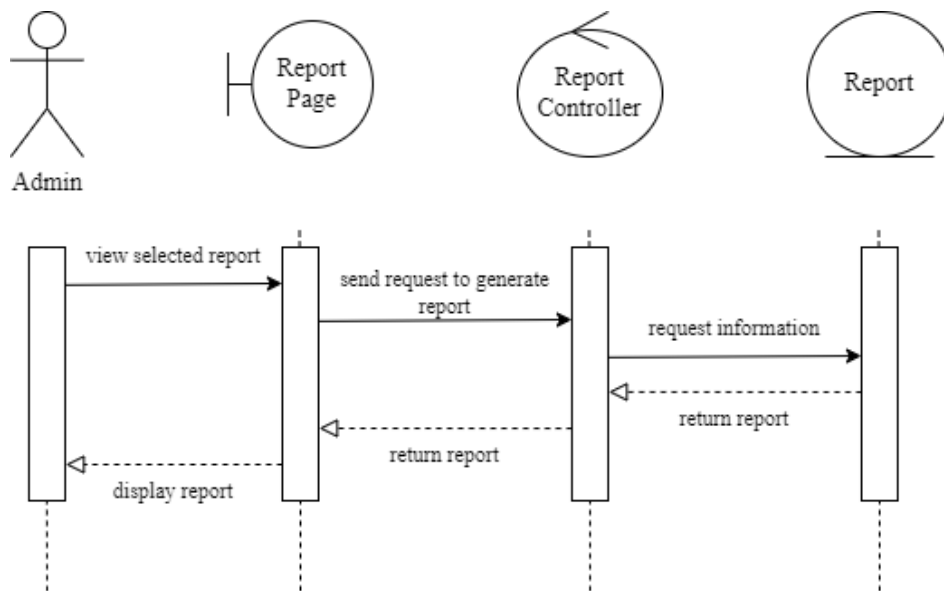


Fig. 18 Sequence diagram of report module

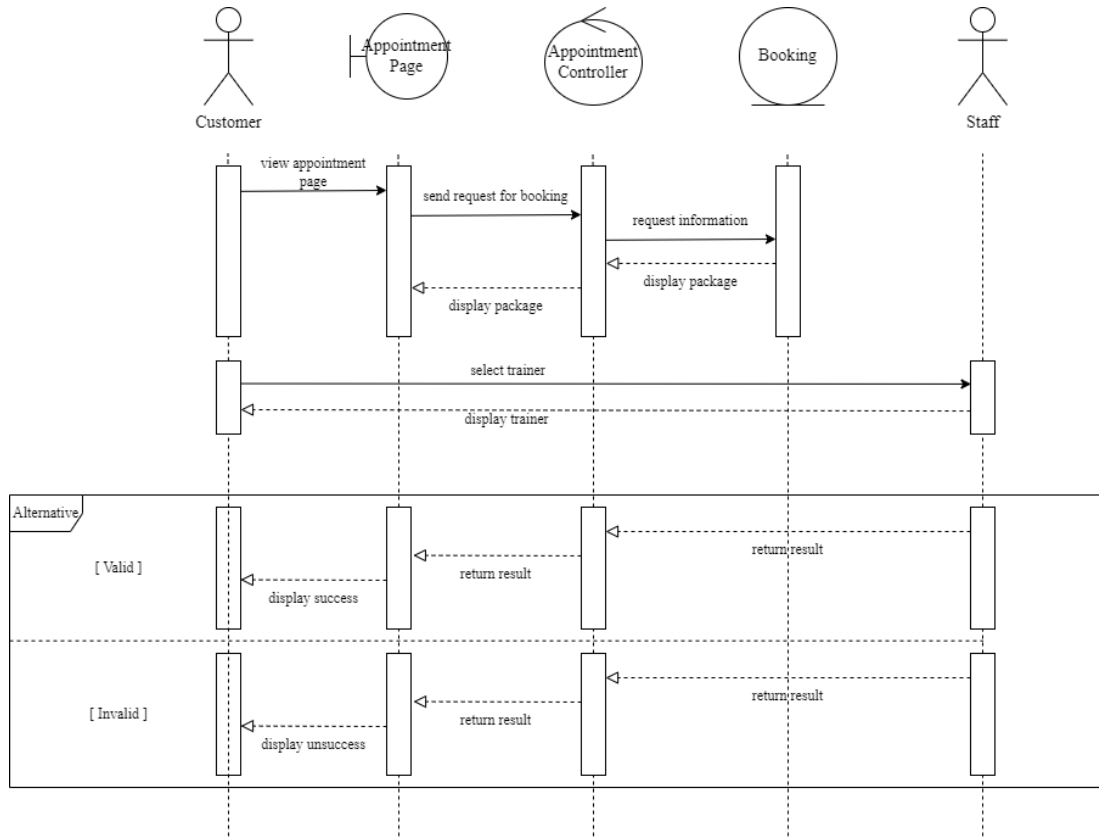


Fig. 19 Sequence diagram of Appointment scheduling module

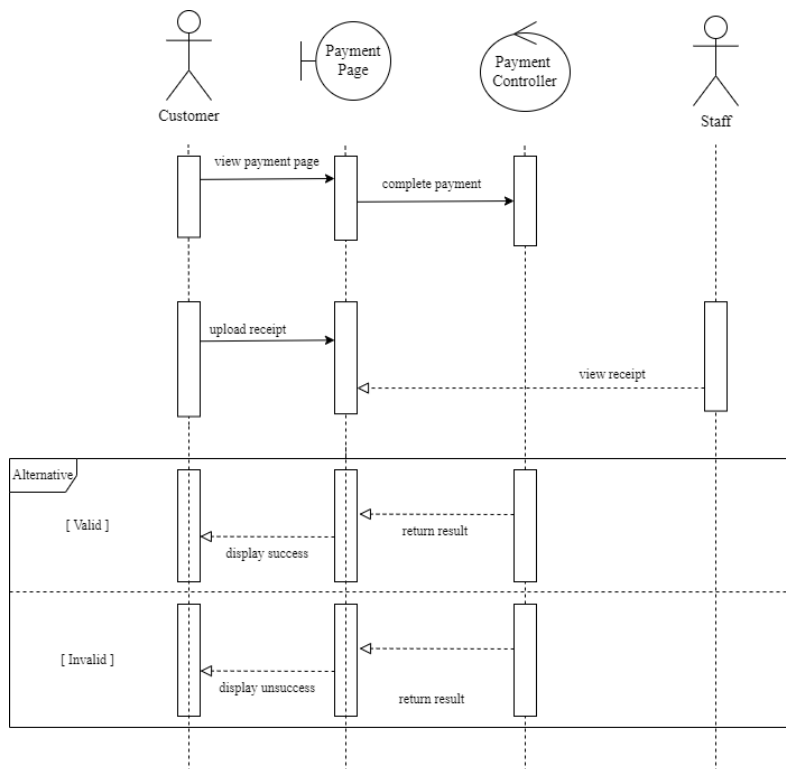
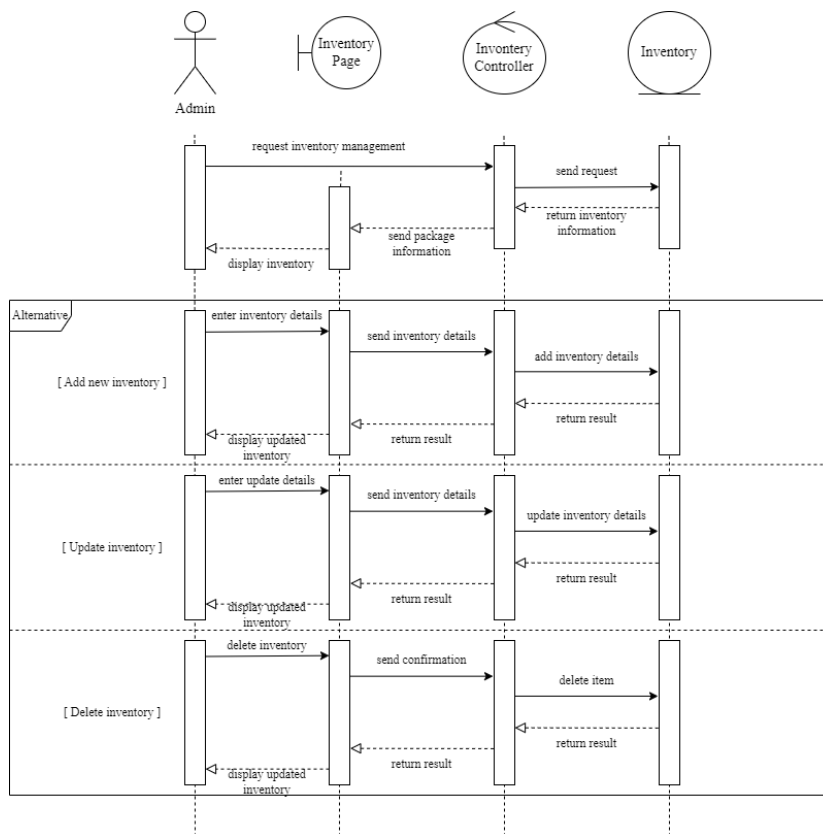


Fig. 20 Sequence diagram of payment module



**Fig. 21** Sequence diagram of Manage Inventory module