

The Development of Kelab Golf Batu Pahat Online Shopping

Muhammad Amir Daniel Suhaimi¹, Ruhaya Ab. Aziz^{1*}

¹ *Fakulti Sains Komputer dan Teknologi Maklumat,*

Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

*Corresponding Author: ruhaya@uthm.edu.my

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Abstract

Kelab Golf Batu Pahat Online Shopping is a web-based system that acts as an online shopping platform for customers to purchase their golf equipment. The purpose of developing this system is to solve the problem of managing stocks as stocks are recorded manually and providing a more convenient online shopping platform for the customers. The prototyping model is chosen in this project because user involvement is critical and effective for this project with a user-centric focus where visual representation of the system plays a crucial role in its overall success. Through the system, customers can make a golf equipment purchase online while the staff can manage their stocks and orders efficiently. Visual Studio Code, MySQL AND XAMPP are the software used in this project. The development of this system will provide the customers a more convenient system to purchase golf equipment and staff to have a better stock management system.

1. Introduction

The game of golf is incredibly historic and enjoyed by many people from numerous different age groups across many parts of the world [1]. Golf has always been considered an elitist sport [2]. Kelab Golf Batu Pahat is a 9-hole golf course located in the Batu Pahat district in Johor. The pro shop currently lacks a computerized stock management system to manage their stocks. New stocks will be updated manually in a logbook daily by the staff. This results in discrepancies between the actual stock available in the shop and the logbook. Therefore, a web-based sales and stock management system were proposed. Online shopping is the act of making purchases of products and services via a web browser [3]. The project aims to facilitate the trading process for the shop and its customers. The system also intends to assist the shop's staff in managing their stocks.

As the club continues to attract golf enthusiasts of all skill levels, the absence of a computerized stock management system has become a notable bottleneck in the daily operations. The process of manually updating stocks for the golf shop has proven to be a notably time-consuming and labor-intensive endeavor.

Additionally, the multi-tasking approach often results in miscounts and errors, causing discrepancies between actual stock levels and the manual records. The complexity of this task is further exacerbated during busy hours, when the staff must balance the demands of assisting customers and managing inventory simultaneously. This dual role often leads to errors in the recorded stock levels between what is available in the shop and what is documented.

On the other hand, the shop has been receiving demands from the customers and their growing preference for an online shopping platform. Customers yearn for the ability to browse and purchase a wide range of golf equipment and accessories from the comfort of their homes or while on the go. Customers also expect a user-

friendly interface that allows them to effortlessly search for products, access detailed information, and make secure transactions.

The objectives of the project are to analyze and design Kelab Golf Batu Pahat Online Shopping using an object-oriented approach. Additionally, the project develops Kelab Golf Batu Pahat Online Shopping on a web-based platform. Finally, the project includes testing and evaluating the online shopping system using user acceptance testing.

The project includes staff and customers of Kelab Golf Batu Pahat Online Shopping as the stakeholders and users of the system. This project is based on an object-oriented approach. Several modules are developed in the system. The system includes eight modules. The modules are detailed in Table 1.

Table 1 : Modules

Modules	Description	Targeted User
Register User Account	Able to register an account by entering name, email, password and password confirmation	Customer
Login	Able to log into the system with user's registered email and password	Staff, customer
Edit Profile	Able to edit personal profile	Staff, customer
Manage Product	Able to view products available in the shops	Customer
	Able to add new product, edit and delete sold out products	Staff
Manage Cart	Able to add products to cart, edit quantity of products in cart and remove product from cart	Customer
Make Payment	Able to make payment of products in cart	Customer
Manage Order	Able to update order status	Staff
Generate Report	Able to view total pending, total completed payment, number of orders placed, number of products added, number of users and number of feedback	Staff

For this project, all the objectives would be achieved. As a result, a fully functional web-based online shopping platform for Kelab Golf Batu Pahat will be deployed. This web-based application will efficiently manage stock availability both in-store and online, enabling customers to make purchases over the internet.

Through the development of the project, the project will solve the issue of managing in-store stocks by removing the need to update logbook regularly and counting stocks manually. It will also ensure products in store are tally to the online application. For the staff members, the development of the system will eliminate the confusion between staff.

For the customers, the project will solve the issue of confusion of customers of products purchased is not available in store. At the same time, the system will also provide an online application for customers to review and purchase products. Aside from this, the project can be applied to other golf equipment stores that experienced the same issue.

2. Literature Review

This section will discuss literature review that had been done for the system and the current system that is being used by Kelab Golf Batu Pahat.

2.1 Stock Management System in Kelab Golf Batu Pahat

Stock is a supply of something that is available for sale or use in a store [4]. Within the inventory of Kelab Golf Batu Pahat, a rich assortment of golf-related products is at disposal, encompassing an extensive range that includes golf clubs, bags, gloves, tees and a diverse selection of golf apparel to complement various golfing equipment.

The pro shop is currently managing its inventory without the aid of a computerized system for stock management. Instead of a more advanced technological solution, the staff manually records the details of new stock arrivals in a logbook daily. This traditional approach requires a substantial investment of time and effort. As the day concludes, the staff is faced with yet another manual counting and cross verifying the remaining stock before closing the shop. This manual stock management process, although familiar, is not only time-consuming but also leaves room for potential errors and inefficiencies.

2.2 Perpetual Inventory Management

Perpetual inventory management is a sophisticated approach that allows businesses to maintain accurate and up-to-date records of the inventory levels in real-time. Unlike periodic inventory systems, which require manual stock counts at regular intervals, perpetual inventory systems automatically track inventory changes as transactions occur. This continuous monitoring ensures that businesses have precise information about the 9 stock levels at any given moment, enabling informed decisions regarding purchasing, production and sales.

One of the primary benefits of perpetual inventory systems is the ability to enhance inventory accuracy and control. By continuously monitoring inventory levels, businesses can quickly detect discrepancies and take corrective actions. Additionally, these systems facilitate efficient order fulfilment and customer service by enabling businesses to fulfil orders promptly and provide accurate delivery estimates. Overall, perpetual inventory management is a vital tool for modern businesses seeking to optimize the inventory operations and improve customer satisfaction.

2.3 Web-Based Application

Web application is defined as an inventory application, through displays which include items to be stored in the warehouse and incoming and outgoing product transactions [7]. It is a software application that is accessed and utilized through a web browser over a network, typically the Internet. Unlike traditional desktop applications that are installed on a user's computer, web apps are hosted on remote servers and can be accessed through a web browser on various devices such as computers, tablets, and smartphones.

There are several advantages of web application [8]. One of the advantages of web-based applications is the ease of deployment and updates. Since the application is centrally hosted, updates and new features can be implemented on the server side without requiring users to download or install anything on their devices. Additionally, web-based applications often leverage cloud computing, enabling efficient storage, processing, and collaboration capabilities.

In this project, the online shopping platform is developed as a web-based application rather than a standalone application. Accessibility has been the key benefit as web-based applications can be accessed from any device with an Internet connection, providing flexibility and convenience for users.

2.4 Comparison with the Existing System

To benchmark the features of the new system against existing ones, the system utilizes the systems of Shopee Malaysia, TaylorMade and Royal Sporting House. The comparisons between four systems are shown in Table 2.

Table 2 : Comparison Analysis with Existing Systems

Features / System	Shopee Malaysia	TaylorMade	Royal Sporting House	Kelab Golf Batu Pahat Online Shopping
Platform	Web-based system/Mobile Application	Web-based system	Web-based system	Web-based system
Register User Account	Yes	Yes	No	Yes
Login	Yes	Yes	No	Yes
Edit Profile	Yes	Yes	No	Yes
Manage Product	Yes	Yes	No	Yes
Manage Cart	Yes	Yes	No	Yes
Make Payment	Yes	Yes	No	Yes
Manage Order	Yes	Yes	No	Yes
Generate Report	Yes	No	No	Yes

Based on the findings in Table 2.1, variations in system functionalities across different modules are apparent. Shopee Malaysia, TaylorMade and Kelab Golf Batu Pahat Online Shopping share common features in register user account, login, edit profile, manage product, manage cart, make payment, manage order and generate report. In contrast, Royal Sporting House appears to lack all the described functions, suggesting a potential gap in its online shopping experience that may need further exploration and enhancement.

3. Methodology

Software Development Life Cycle (SDLC) is a methodology that has clear guidelines for software development [9]. A software development life cycle is a simplified representation of process activities to be carried out during the software development process. In this project, the prototyping model has been chosen as the software development life cycle.

The prototyping model is a software development approach that involves the creation of a preliminary, simplified version of the intended system or product. It is a simplified version or a 'quick and dirty' version that provides minimal features of the proposed system [10]. The primary purpose of the prototyping model is to gather feedback early in the development process, facilitating iterative refinements based on user input and requirements.

One of the key advantages of the prototyping model lies in its ability to provide a tangible and visual representation of the software early in the development life cycle. This allows stakeholders, including end-users and project managers, to better understand the system's functionalities and design. The prototype can be classified on its functionality either it is low fidelity or high fidelity. The fidelity could vary in the visual, content and interactivity of the prototype [11].

As shown in Table 3, each phase has its own assignment and output that need to produce during the entire project development.

Table 3: Software Development Activities and Their Task

Phase	Task	Output
Planning	<ul style="list-style-type: none"> ○ Identify background, problem and project scope ○ Outlining project schedule ○ Identify possible risks 	<ul style="list-style-type: none"> ○ System development proposal ○ Gantt chart
Analysis	<ul style="list-style-type: none"> ○ Interview stakeholders ○ Define requirements ○ Create use case and user stories 	<ul style="list-style-type: none"> ○ Functional and non-functional requirements ○ Use case diagram ○ Sequence diagram ○ Class Diagram
Design	<ul style="list-style-type: none"> ○ Design user interface ○ Design algorithm ○ Design database 	<ul style="list-style-type: none"> ○ UML diagram ○ Wireframe ○ User interface design
Implementation	<ul style="list-style-type: none"> ○ Programming ○ Implement database ○ Unit testing 	<ul style="list-style-type: none"> ○ System prototype
Prototype Iteration 1	<ul style="list-style-type: none"> ○ Collect feedback from stakeholder ○ Repeat analysis, design and implementation 	<ul style="list-style-type: none"> ○ Improved system prototype
Prototype Iteration 2	<ul style="list-style-type: none"> ○ Collect feedback from stakeholder ○ Repeat analysis, design and implementation 	<ul style="list-style-type: none"> ○ Finalised system prototype
Testing	<ul style="list-style-type: none"> ○ Functional testing ○ Usability testing ○ User acceptance testing 	<ul style="list-style-type: none"> ○ Test plan ○ Test case and results ○ Final system

4. Analysis and Design

System requirement analysis is the process of gathering, documenting and analyzing the requirements and constraints of the proposed system. It involves a thorough examination of both functional and non-functional requirements, ensuring a comprehensive understanding of what the system is expected to accomplish. Following the successful analysis of user requirements, the project progresses into the design phase. The design phase marks a transition from conceptualization to visual representations of the proposed system.

4.1 Functional and Non-Functional Requirements

Functional requirements outline the specific functionalities that a system or software must deliver. These requirements describe what the system should do in terms of input, processing, output and interactions with the users. Table 4 shows the functional requirements of the proposed system.

Table 4 : Functional Requirements of the Proposed System

Module	Requirements
Register User Account	<ul style="list-style-type: none"> ○ The system shall allow the customer to register an account by entering name, email, password and password confirmation. ○ The system shall redirect the customer to the login page after registration is successful.
Login	<ul style="list-style-type: none"> ○ The system shall allow the user to log in by providing a registered email and password. ○ The system shall redirect the user to the specified home page based on the roles of the user after successful login. ○ The system shall display an error message if email or password entered is incorrect. ○ The system shall allow the user to log out of the system after the session.
Edit Profile	<ul style="list-style-type: none"> ○ The system shall allow the customer to edit personal information such as name, phone number and address on the profile page. ○ The system shall update the personal information in the database after the profile editing is submitted. ○ The system shall allow the user to view the profile at any time.
Manage Product	<ul style="list-style-type: none"> ○ The system shall display the list of products for all users. ○ The system shall allow the customer to add the product to the cart. ○ The system shall allow the staff to add new product by providing product name, price, category, stocks and image. ○ The system shall allow the staff to edit the product information. ○ The system shall allow the staff to delete the product from database
Manage Cart	<ul style="list-style-type: none"> ○ The system shall allow the customer to add selected product to the cart. ○ The system shall allow the customer to edit the quantity of product in cart. ○ The system shall allow the customer to remove products from the cart. ○ The system shall calculate the subtotal of each product, subtotal of all products and the grand total including shipping fee. ○ The system shall redirect the customer to payment page for checkout
Make Payment	<ul style="list-style-type: none"> ○ The system shall allow the customer to fill in order details such as name, phone number, email, and address. ○ The system shall allow the customer to select the payment method and enter the payment details. ○ The system shall redirect the customer to payment gateway. ○ The system shall add the order to the database for shipping. ○ The system shall update the stock based on customers' purchase quantity. ○ The system shall provide the invoice of order after payment successful.
Manage Order	<ul style="list-style-type: none"> ○ The system shall allow the user to view the order invoice. ○ The system shall allow the staff to update the order status. ○ The system shall allow the staff to delete the order.
Generate Report	<ul style="list-style-type: none"> ○ The system shall allow the staff to view the total pending, total completed payment, number of orders placed, number of products added, number of users and amount of feedback. ○ The system shall allow the staff to view feedback details. ○ The system shall allow the staff to delete old feedback.

On the other hand, non-functional requirements pertain to the characteristics and constraints that govern the overall performance, usability and design of the system. Table 5 shows the non-functional requirements of the proposed system.

Table 5 : Non-Functional Requirements of the Proposed System

Non-Functional Requirement	Description
Operational	The system shall be able to run on any web browser.
Performance	The system shall be able to operate on reasonable response time.
Availability	The system shall be available 24 hours a day.
Portability	The system shall be able to operate across different platform and devices.
Cultural and Political	The system shall follow and not violate the cultural and political rules.

Security

The system shall only allow authenticated users to access the system.

4.2 User Requirement Analysis

User requirements precisely define the expectations of users regarding the system. The user requirements for the proposed system are detailed in Table 6.

Table 6 : User Requirements of the Proposed System

No.	User Requirements
1.	The customer shall be able to register an account by entering name, email, password and password confirmation.
2.	The user shall be able to log in by providing a registered email and password.
3.	The user shall be able to log out of the system after the session
4.	The user shall be able to edit personal information such as name, phone number and address on the profile page.
5.	The user shall be able to view the profile at any time.
6.	The customer shall be able to view ordered product details.
7.	The customer shall be able to add the product to cart.
8.	The customer shall be able to edit the quantity of product in cart.
9.	The customer shall be able to remove products from the cart.
10.	The staff shall be able to add, delete and update product details.
11.	The customer shall be able to fill in the order details such as name, phone number, email, and address.
12.	The customer shall be able to select the payment method and enter the payment details
13.	The user shall be able to view the order invoice.
14.	The staff shall be able to update the order status.
15.	The staff shall be able to delete the order.
16.	The staff shall be able to view the total pending, total completed payment, number of orders placed, number of products added, number of users and amount of feedback.
17.	The staff shall be able to view feedback details and delete old feedback.

4.3 Use Case Diagram

A use case diagram is a visual representation that illustrates the user interaction with a system and the functionalities the system provides. Use-case diagrams aid in capturing the requirements for a system by modelling its behavior [12]. The use case diagram of Kelab Golf Batu Pahat Online Shopping is detailed in Figure 1. The sequence and activity diagrams for each module are provided in the appendix A.

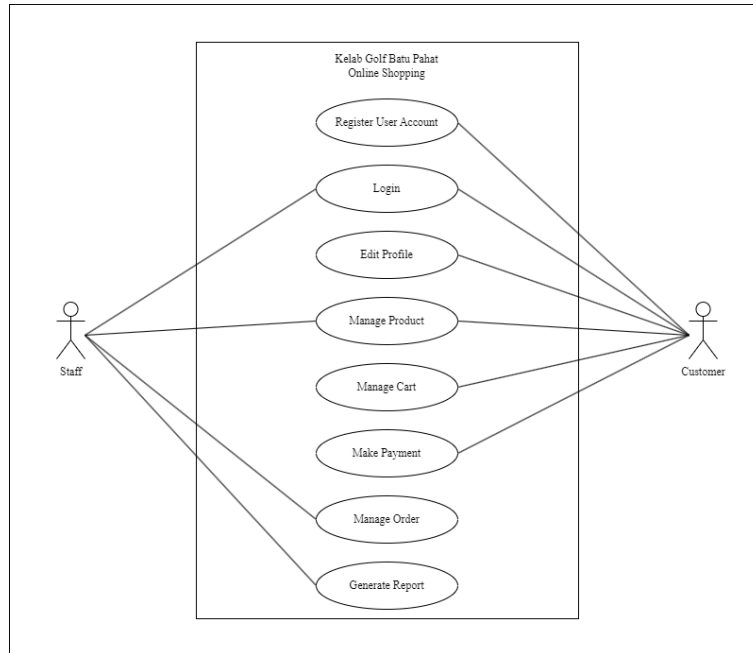


Fig. 1 : Use Case Diagram of Kelab Golf Batu Pahat Online Shopping

4.4 Domain Class Diagram

A domain class diagram is a type of structural diagram in the Unified Modelling Language (UML) that illustrates the structure and relationships within a system or software application. It provides a visual representation of the classes, attributes and methods. The domain class diagram of the proposed system is detailed in Figure 2.

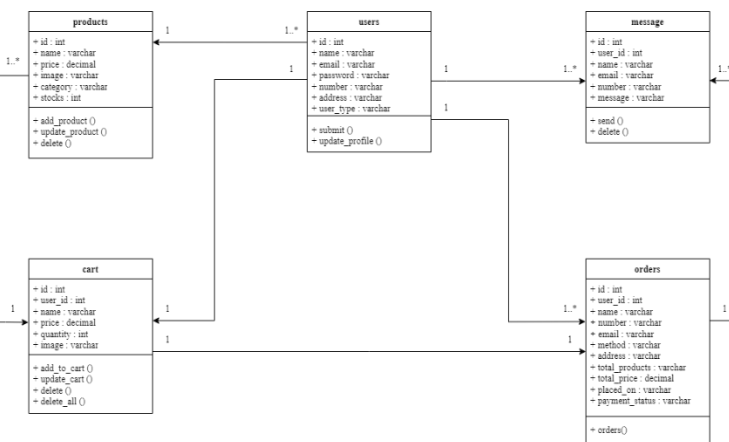


Fig. 2 : Domain Class Diagram of Proposed System

4.5 System Architecture

The system architecture for Kelab Golf Batu Pahat Online Shopping aims to provide a robust and scalable framework that seamlessly integrates with the club's existing infrastructure. The architecture encompasses a user-friendly web-based platform. Overall, the system architecture is tailored to meet the unique needs of Kelab Golf Batu Pahat, optimizing efficiency in stock management, sales processing and overall customer satisfaction. Figure 3 defines the system architecture of the proposed system.

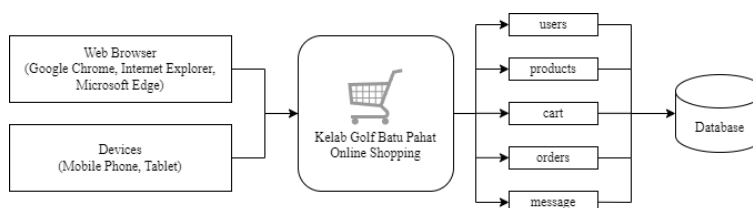


Fig. 3 : System Architecture of the Proposed System

4.6 Hardware and Software Requirements

Within this segment, the system's development outlines the essential hardware and software requirements. Hardware requirements are detailed in Table 7, while Table 8 delineates the necessary software requirements for the developed system.

Table 7 : System Hardware Requirements

Device	Acer Nitro 5 AN515-45-R9RJ
Processor	AMD Ryzen™ 5 5600H
Random Access Memory (RAM)	8GB 3200Mhz DDR4
Solid State Drive (SSD)	512GB PCIe NVMe
Peripherals	Monitor, keyboard, mouse

Table 8 : System Software Requirements

Operating System	Windows 11
Web Browser	Google Chrome
Web Server	XAMPP
Programming Software	Visual Studio Code
Database	MySQL

4.7 Interface Design

Interface design plays a vital role in shaping the user experience within a software application. The design focuses on presenting information in a clear and organized manner, ensuring that users can easily navigate through the application. Interface designs of the proposed system are shown in Figure 4 to Figure 5.



Fig. 4 : Edit Profile Interface

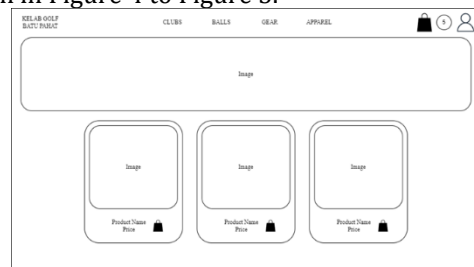


Fig. 5 : Display Product Interface

5. Implementation and Testing

Implementation in software development refers to the process of translating a system's design into an operational software application. This phase involves coding, integrating and testing the software to ensure it functions as intended. Testing in software development is a critical phase that involves the systematic evaluation of the application to ensure it meets the specified requirements and functions correctly. This process includes identifying defects, verifying that the software operates as intended and validating that it provides a seamless user experience. The interface is depicted in Figure 6 to Figure 21 with the accompanying code segment.

In the registration module, customers are required to provide name, email, password and password confirmation. If a customer already has an account, the customer can be redirected to the login page.

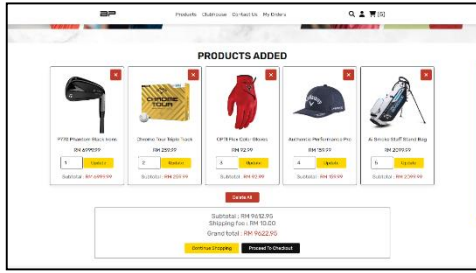


Fig. 14 : Manage Cart Interface



Fig. 15 : Manage Cart Code Segment

In the make payment module, customers are required to fill in the information such as name, phone number, email, address and payment type. Upon submission, the payment is redirected to a secure payment gateway website. If the payment is successful, the order is submitted and processed.

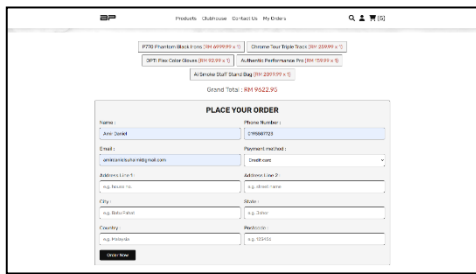


Fig. 16 : Make Payment Interface

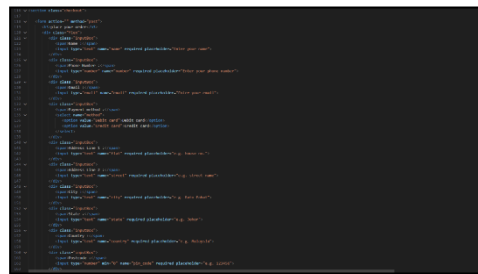


Fig. 17 : Make Payment Code Segment

In the manage order module, staff can view all orders made by customers and filter the orders by order status. Staff can update the status to either "pending" or "shipped." Additionally, staff can view the invoice to print it and prepare the order for shipping.

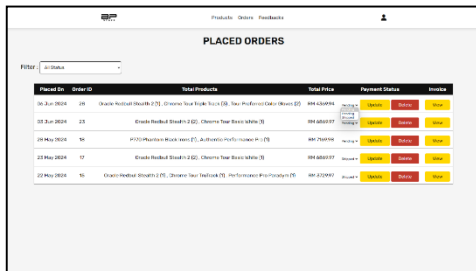


Fig. 18 : Manage Order Interface

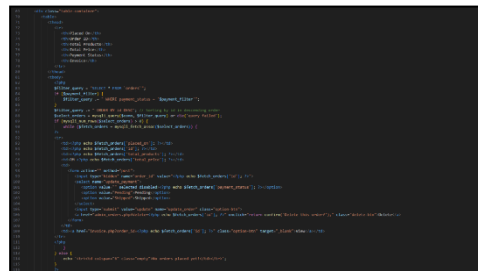


Fig. 19 : Manage Order Code Segment

In the feedback module for the customer side, customers can share the feedback through a feedback form. Customers need to fill in name, email, phone number and message. Staff can view all details of customers' feedbacks, total pending, revenue, number of users and number of products.

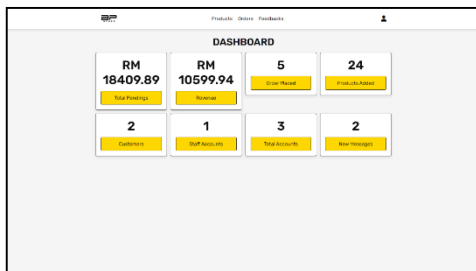


Fig. 20 : Generate Report Interface

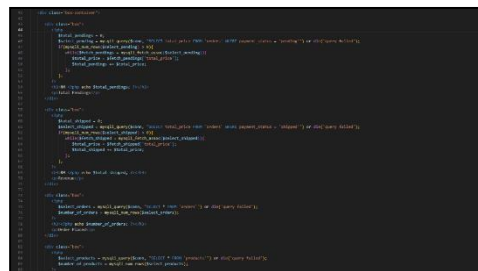


Fig. 21 : Generate Report Code Segment

5.1 Test Case

The test cases are divided into eight categories, corresponding to each module of the system. The functionalities tested are derived from the functional requirements outlined in section 4, ensuring comprehensive coverage and verification of all specified requirements. The detailed test cases and the results are presented in Tables 9 through Table 16.

Table 9 : Test Case for Register User Account

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_100	TEST_100	Register User Account	
SRS_REQ_101	TEST_101	The system shall allow the customer to register an account by entering email, password and password confirmation	Pass
SRS_REQ_101	TEST_102	The system shall display an error when customer registers an account by not entering all information.	Pass
SRS_REQ_101	TEST_103	The system shall display an error when customer registers an account by entering existing account.	Pass
SRS_REQ_101	TEST_104	The system shall display an error when customer registers an account by entering different password confirmation.	Pass
SRS_REQ_102	TEST_105	The system shall redirect the customer to the login page after registration is successful.	Pass

Table 10 : Test Case for Login

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_200	TEST_200	Login	
SRS_REQ_201	TEST_201	The system shall allow the user to log in by providing a registered email and password.	Pass
SRS_REQ_201	TEST_202	The system shall display an error message if email or password entered is incorrect.	Pass
SRS_REQ_202	TEST_203	The system shall redirect the user to the specified home page based on the roles of the user after successful login.	Pass
SRS_REQ_203	TEST_204	The system shall allow the user to log out of the system after the session.	Pass

Table 11 : Test Case for Edit Profile

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_300	TEST_300	Edit Profile	
SRS_REQ_301	TEST_301	The system shall allow the customer to edit the personal information such as name, phone number and address on the profile page.	Pass
SRS_REQ_301	TEST_302	The system shall display an error when customer edit profile by not entering all information.	Pass
SRS_REQ_301	TEST_303	The system shall block the customer to edit the email address	Pass
SRS_REQ_302	TEST_304	The system shall update the personal information in the database after the profile editing is submitted	Pass

SRS_REQ_303	TEST_305	The system shall allow the customer to view the profile at any time.	Pass
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Table 12 : Test Case for Manage Product

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_400	TEST_400	Manage Product	
SRS_REQ_401	TEST_401	The system shall display the list of products for all users.	Pass
SRS_REQ_402	TEST_402	The system shall allow the customer to add the product to cart.	Pass
SRS_REQ_403	TEST_403	The system shall allow the staff to add new product by providing product name, price, category, stocks and image.	Pass
SRS_REQ_404	TEST_404	The system shall allow the staff to edit the product information.	Pass
SRS_REQ_404	TEST_405	The system shall display an error when staff edit product information by not entering all information.	Pass
SRS_REQ_405	TEST_406	The system shall allow the staff to delete the product from database.	Pass

Table 13 : Test Case for Manage Cart

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_500	TEST_500	Manage Cart	
SRS_REQ_501	TEST_501	The system shall allow the customer to add selected product to the cart.	Pass
SRS_REQ_502	TEST_502	The system shall allow the customer to edit the quantity of product.	Pass
SRS_REQ_503	TEST_503	The system shall allow the customer to remove products from the cart.	Pass
SRS_REQ_504	TEST_504	The system shall calculate the subtotal of each product, subtotal of all products and the grand total including shipping fee.	Pass
SRS_REQ_505	TEST_505	The system shall redirect the customer to payment page for checkout.	Pass

Table 14 : Test Case for Make Payment

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_600	TEST_600	Make Payment	
SRS_REQ_601	TEST_601	The system shall allow the customer to fill in the order details such as name, phone number, email, and address.	Pass
SRS_REQ_602	TEST_602	The system shall allow the customer to select the payment method and enter the payment details.	Pass
SRS_REQ_603	TEST_603	The system shall redirect the customer to payment gateway.	Pass
SRS_REQ_604	TEST_604	The system shall add the order to the database for shipping.	Pass
SRS_REQ_605	TEST_605	The system shall update the stock based on customers' purchase quantity.	Pass

SRS_REQ_606	TEST_606	The system shall provide the invoice of order after payment successful.	Pass
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Table 15 : Test Case for Manage Order

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_700	TEST_700	Manage Order	
SRS_REQ_701	TEST_701	The system shall allow the user to view the order invoice.	Pass
SRS_REQ_702	TEST_702	The system shall allow the staff to update the order status.	Pass
SRS_REQ_703	TEST_703	The system shall allow the staff to delete the order.	Pass

Table 16 : Test Case for Generate Report

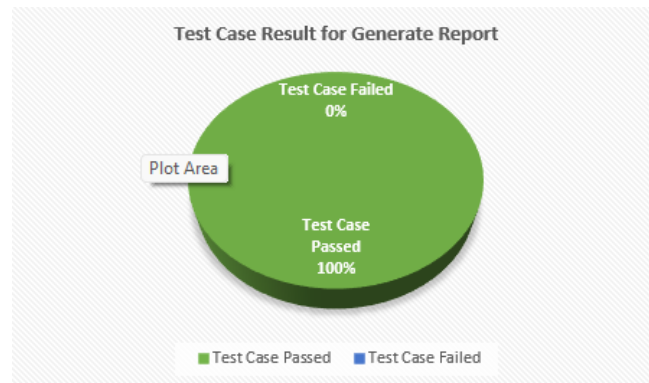
Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_800	TEST_800	Generate Report	
SRS_REQ_801	TEST_801	The system shall allow the staff to view the total pending, total completed payment, number of orders placed, number of products added, number of users and amount of feedback.	Pass
SRS_REQ_802	TEST_802	The system shall allow the staff to view feedback details.	Pass
SRS_REQ_803	TEST_803	The system shall allow the staff to delete old feedback.	Pass

5.2 Overall Test Case Result

After conducting a comprehensive assessment, all test cases have successfully passed, demonstrating 100% accuracy and functionality. The results indicate that each specified requirement and system functionality is operating as intended, ensuring a reliable and effective system. The pie chart illustrating the distribution of passed and failed test cases is presented in Figure 22, where it can be observed that all test cases have passed without any failures. Summary of test case results is presented in Table 17.

Table 17 : Overall Test Case Result

Test Case ID	Total Test Cases	Total Case Passed
TEST_100	5	5
TEST_200	4	4
TEST_300	5	5
TEST_400	6	6
TEST_500	5	5
TEST_600	6	6
TEST_700	3	3
TEST_800	3	3
Overall Test Case Result	37	37



5.3 User Acceptance Testing

User acceptance testing is the final phase of the software testing process where actual users test the software to ensure it can handle required tasks in real-world scenarios, according to specifications. This testing phase verifies that the system meets the business requirements and is ready for deployment, ensuring user satisfaction and identifying any issues that may have been overlooked during previous testing stages.

User acceptance testing was conducted with representative users to evaluate the system's functionality, usability and user interface design. User satisfaction for these aspects was measured on a scale from 1 to 5, where 1 represents very unsatisfied and 5 represents very satisfied. The testing involved one user in the role of staff and one user in the role of customer. The user acceptance testing form is provided in Appendix A. The results, depicted in the bar graph in Figure 23, illustrate the overall user satisfaction with the system.

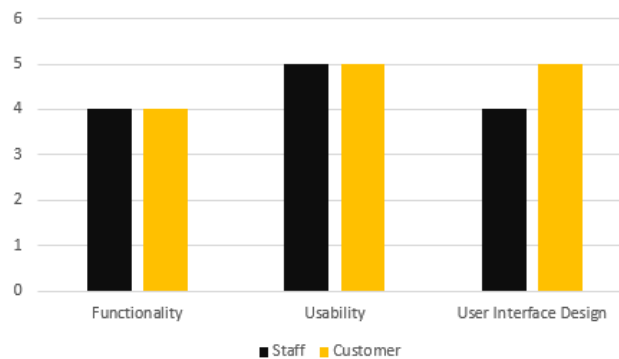


Fig. 23 : User Acceptance Testing Result

For functionality, both staff and customers expressed satisfaction with the developed system. However, both groups suggested enhancing security measures and payment functionalities to ensure the system's robustness. Additionally, customers recommended incorporating an on-site tracking feature to monitor the orders efficiently.

Both staff and customers were satisfied with the usability of the system. Both users found the system straightforward to use and easy to learn.

Customers were satisfied with the user interface design, noting that the interface is aesthetically pleasing and visually engaging. The customer also appreciated the ease of accessing detailed information about each product. While the staff was generally satisfied with the design, the staff suggested further enhancements to make the system more visually appealing and engaging.

6. Conclusion

This section presents a comprehensive summary of the findings, results and achievements derived from the entire project. It offers an in-depth discussion on the strengths and limitations of the proposed system, providing a balanced evaluation of its performance. Additionally, this section includes thoughtful recommendations for future enhancements, aimed at refining the system and ensuring greater success in subsequent iterations of the project. By incorporating these suggestions, future endeavours can build upon the current work, leading to improved outcomes and more effective solutions.

6.1 Achievement of the Overall Objectives

Kelab Golf Batu Pahat Online Shopping system successfully achieved its primary objectives through a thorough object-oriented analysis and design. This approach ensured that the system's architecture is modular, scalable,

and easy to maintain. By clearly defining system components and their interactions, the design resulted in a robust and well-structured framework that can adapt to future needs. The project also accomplished the development of Kelab Golf Batu Pahat Online Shopping platform on a web-based platform. The web-based solution offers users an accessible and user-friendly interface, enabling seamless navigation and interaction with the shopping system. Leveraging modern web technologies, the implementation ensures a responsive and efficient user experience across various devices and browsers. This approach allows for easy updates and scalability, ensuring the platform can grow with the club's needs. User acceptance testing was another critical objective that was successfully met. Comprehensive testing sessions were conducted with real users to gather valuable feedback and ensure the system met expectations and requirements. The feedback received was overwhelmingly positive, confirming that the system is intuitive, functional, and effective in meeting users' needs. Any issues identified during testing were promptly addressed, resulting in a polished and reliable online shopping platform. The system offers several notable advantages, including the ability for users to generate and download invoices for orders, simplifying receipt viewing and order preparation. It efficiently manages stock levels as customers make purchases, and staff can easily add new stock, aiding in effective inventory management. Being web-based, the system allows access from any device with internet connectivity, providing convenience and flexibility for users. Additionally, the system boasts a visually appealing and user-friendly interface design, ensuring simplicity and ease of use for all users. Despite its advantages, the system has some limitations. It cannot be accessed without an internet connection due to its web-based nature. It lacks real-time chat functionality with customer service or an AI bot, relying solely on feedback and email for communication. The system also does not include an order tracking feature, necessitating reliance on external courier tracking websites. Several recommendations for further enhancement include integrating chat functionality or providing product recommendations based on users' previous orders and interests, implementing an order tracking feature, enhancing system security by incorporating measures such as two-factor authentication and reCAPTCHA, adding multiple address autofill options to expedite the checkout process, and refining the user interface on the staff side for a more polished and engaging experience. In conclusion, the Kelab Golf Batu Pahat Online Shopping system represents a significant advancement in digital commerce for the club. It provides a comprehensive, user-friendly platform that revolutionizes customer engagement with the club's offerings. Customers can effortlessly browse and purchase products from the comfort of their homes, eliminating the need for physical visits and thereby enhancing convenience and satisfaction. The system also streamlines operations for the club's staff, allowing for more efficient stock management. Real-time stock tracking ensures accurate maintenance of stock levels, and the process of adding new inventory is simplified, reducing the likelihood of errors and stockouts. The ability to generate and download invoices seamlessly facilitates both order fulfillment and customer record-keeping. Moreover, the intuitive, visually appealing interface ensures that users, regardless of technical proficiency, can navigate and utilize the system effectively. This, combined with the system's accessibility across any device with internet connectivity, broadens the reach of the club's services, catering to a diverse clientele. Overall, the project not only meets its objectives but also sets a new standard for customer service and operational efficiency, underscoring the club's commitment to innovation and excellence. This system paves the way for a future where technology and tradition harmoniously coexist to deliver exceptional value to both customers and staff.

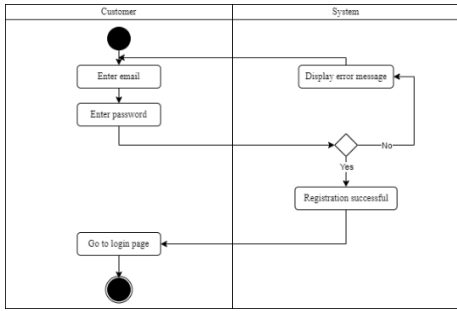
Acknowledgement

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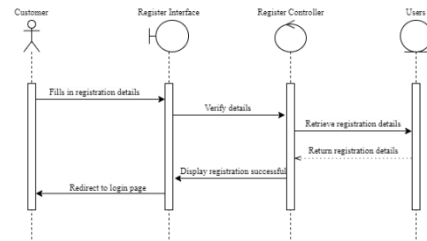
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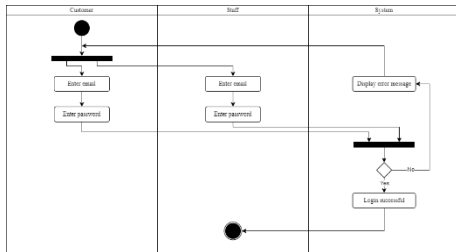
Appendix A



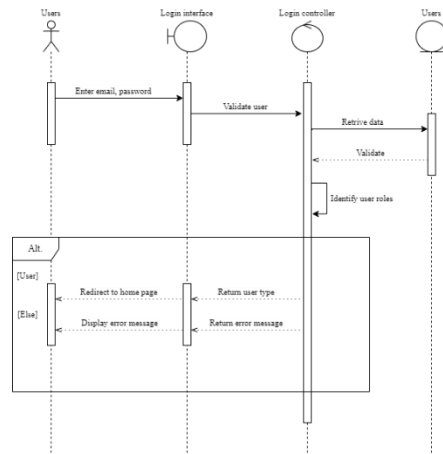
Register User Account Activity Diagram



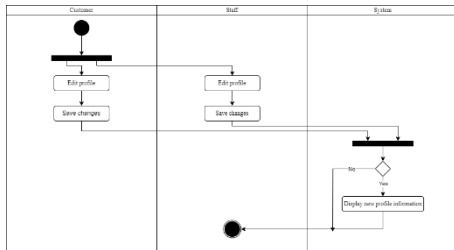
Register User Account Sequence Diagram



Login Activity Diagram



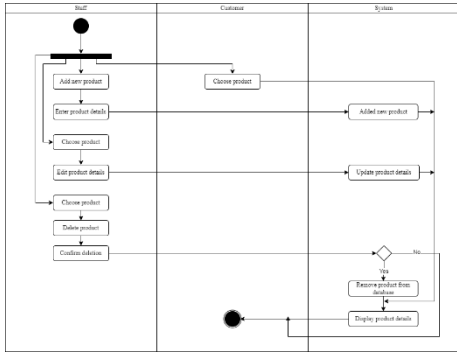
Login Sequence Diagram



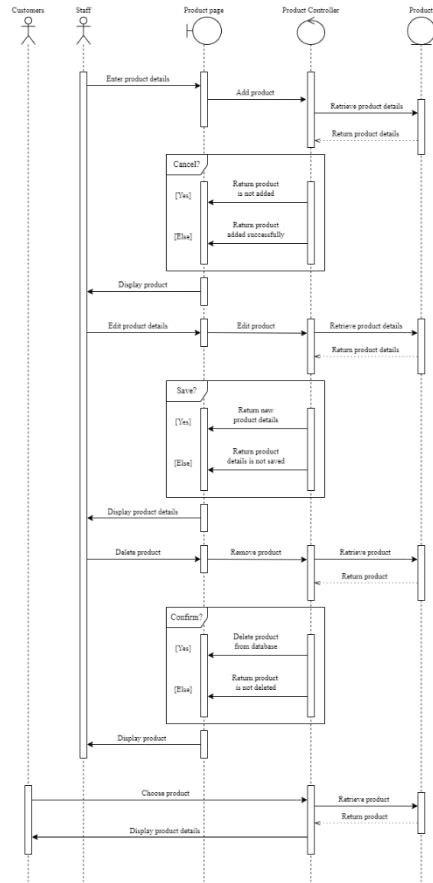
Edit Profile Activity Diagram



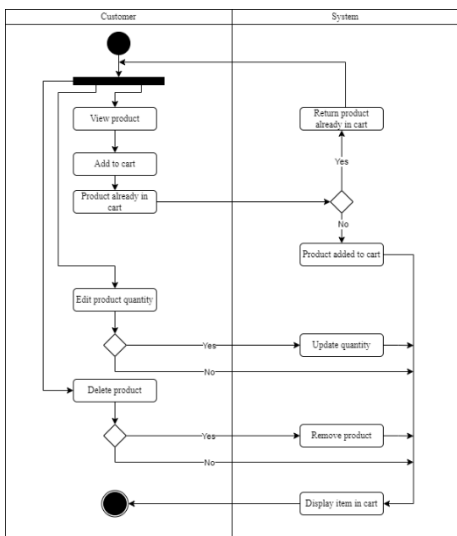
Edit Profile Sequence Diagram



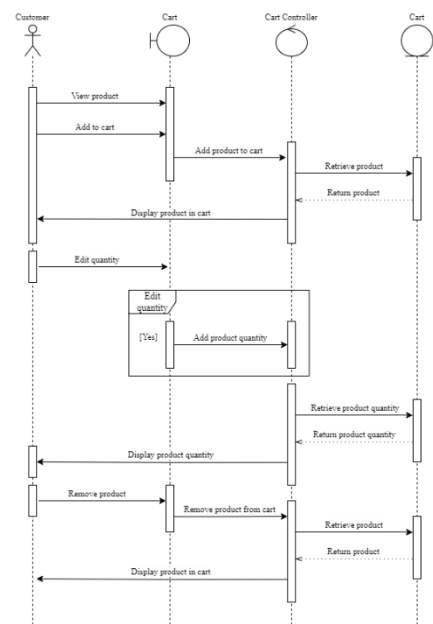
Manage Product Activity Diagram



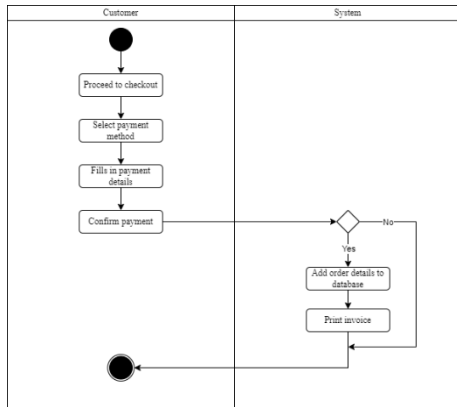
Manage Product Sequence Diagram



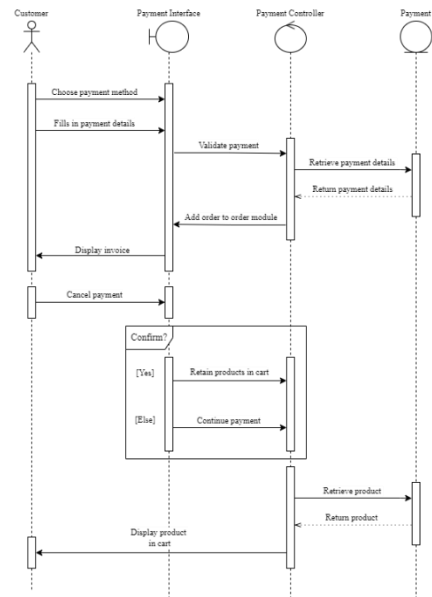
Manage Cart Activity Diagram



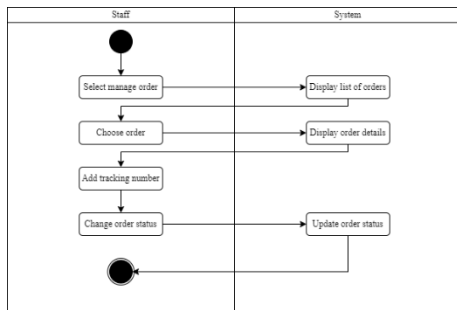
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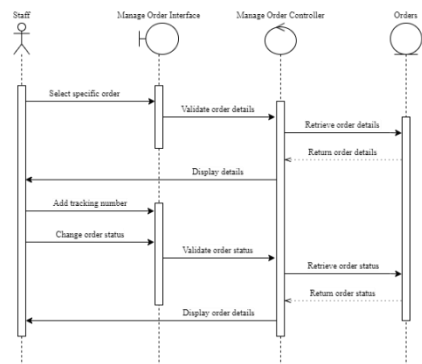
Make Payment Activity Diagram



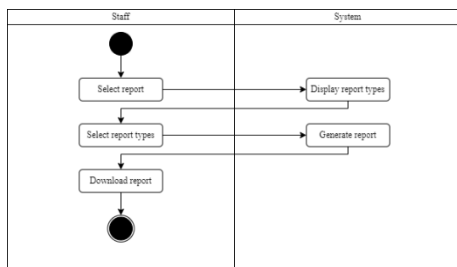
Make Payment Sequence Diagram



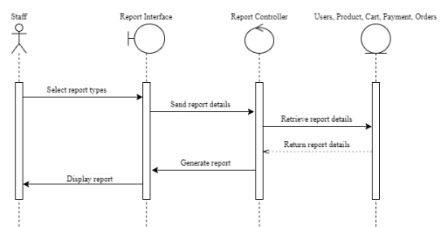
Manage Order Activity Diagram



Manage Order Sequence Diagram



Generate Report Activity Diagram



Generate Report Sequence Diagram