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iKNOW: Used School Supply Web-based System

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Abstract: SMK Taman Molek is a public secondary school located in Johor Bahru. This paper is about technology used by student in SMK Taman Molek to obtain school supply which is very expensive. The students are experiencing gap in obtaining school material for school purposes due to the absence of a system. The objectives of the study were to provide a solution for the student to get a cheaper used school supply from former student by using 9 function modules in the proposed web-based system. The system will be developed using web-based technology and this project will be carry out following the prototyping model development. Apart from official school supplier, the student also shops at Shopee and Facebook trying to find a cheaper version of the school supply. Hence, this research will give student new hope to afford their study and improve their performance as there will be no longer long waiting time and unaffordable price of school supplies.

Keyword: ecommerce, used-school supply, web-based system.

1. Introduction

1.1 Project Background

Web-based system used to have low accessible capability due to the design and interaction. However, the potential reach of web-based system has significantly expanded to improvements in technology, security, and internet speeds. Thus, making it one of the common choices in technology approach. Iknow used school supply web-based system is the name of the web-based system to be developed. This project provides a platform and helps students to advertise their used school supply at reasonable price. SMK Taman Molek student and staff will be the stakeholder of this project and all of the system and user requirement will be based on the school. PHP and JavaScript are the technology used in the development of the system.

Currently, student often struggle to pay for their fees and even their life expenses during studies. Sometime, give their course that cost a lot in fee and even the study materials they cannot afford to get a new set of materials. The first problem they encountered is it is hard to find cheap study material for classes. Next, in certain courses, some materials or tools have a very limited supplies that require pre

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booking to be obtained. It is very inconvenient for the student who need it as soon as possible due to their class demand and their marks can depend on it. The second problem they will faced is the long waiting time for study material to be restock in the shop because some materials are high demand. This causes them being left out in the class and missed certain class because they do not have the tools to do their practical. Last, former student encounter problem to advertised their used material because there is no specific platform for them to sell it for cheap. This makes the students find it difficult to obtain used school supply among the former students. Hence this web-based system proposed to helps gathers these school supplies and deliver it to the student in need. Former student can advertise their old school supplies and the student who want them can browse the web-based system and open a chatroom with each other to get them. This web-based system will guide form the beginning of finding demanded school supply until delivering it to the customer's end and this web-based system is called 'Inherits the knowledge' or in short 'iKnow'.

2. Related Work

2.1 Facebook Marketplace

Marketplace is a convenient place to find, buy, and sell items with people in your community. Marketplace makes it simple to discover new things people enjoy and to find new homes for items people are willing to part with. Facebook is a web-based platform with a React frontend and web APIs written in Scala, Hack, Java, and PHP [4]. The marketplace, a feature of the Facebook platform, allows users to list items for sale in a specific area. This will assist users in identifying sellers and purchasing with confidence. The main disadvantage of marketplace is that Facebook only helps sellers find buyers and vice versa. After the initial contact, Facebook has no authority over the transactions. Both the seller and the buyer must handle this on their own. As a result, the authentication of the user who does the selling and buying must be present in the platform, which has not yet been introduced. It will also be difficult to do so because Facebook does not participate in the transaction process. The Facebook marketplace inspired the development of the iKnow web-based system, which now includes user authentication and authorization to increase security and privacy.

2.2 Shopee

Shopee sells products in a variety of categories, including consumer electronics, home & living, health & beauty, baby & toys, fashion, and fitness equipment. It was founded in 2015, with Chris Feng appointed as CEO in July 2015, and is owned by the Sea Group, Garena, and SeaMoney organizations. In order to compete with other e-commerce websites, the app-based platform launched a website. According to G2 Stack, Shopee employs 17 technology products and services, including HTML5, Google Analytics, and jQuery. A glance at the Shopee homepage reveals that the market is attracting brands and promotions to make normal business to consumer transactions easier. Furthermore, one of the main advantages of Shopee over other e-commerce websites or apps is its approach to secure payment solutions. When a transaction is confirmed, the startup deposits funds into an escrow account and does not release them to the seller until delivery is confirmed. It also has a social component, with users being able to follow one another, use hashtags, and even have a sort of news feed, and this strategy appears to be working [5].

2.3 Amazon

The main areas of interest for Amazon, a multinational technology company based in the United States, are digital streaming, cloud computing, e-commerce, and artificial intelligence. It is the biggest online retailer in the world as well as a well-known cloud service provider. Artificial intelligence (AI) is used and Amazon Web Services (AWS) digital commerce solutions might hasten innovation, boost financial

savings and operational efficiency across all channels. It is the most comprehensive and popular cloud platform in the world, offers more than 200 fully functional services from data centers all over the globe. The Amazon online store is a sizable space with many different categories to browse. On Amazon, individuals can essentially sell anything. The biggest drawback is that school students are not the target audience. Items that a school student could need might or might not be in the system. Due to this problem, school students give less emphasis to amazon. To tailor its offerings to its customers, Amazon use React and Angular for the front-end. Amazon also use redux as well to strengthen the aforementioned frontend frameworks. The backend functionalities on Amazon are then powered by Java, and MySQL manages the database functionalities.

2.4 Comparison Table of the Existing Related System.

The two existing applications are studied and compared to the features of the proposed system. The e-commerce websites were Shopee and Facebook marketplace. The comparison results are shown in Table 1.

Table 1: Table of comparison between Shopee, Facebook,Amazon and IKnow.

Function	Facebook	Shopee	Amazon	iKnow
Platform	Web-based. All support mobile Apps			Web-based only
Technologies used	Scala, Java, Hack, PHP	HTML5, Google Analytics, and jQuery	React, Angular, Java, MySQL	PHP, HTML, MySQL, JavaScript
Registration	√	√	√	√
Sign In	√	√	√	√
Search	Advance search by keyword, category and price	Advance search by keyword, category and priced	Advance search by keyword, category and priced	Simple search by keyword
Web page design	Attractive, user friendly	Attractive, user friendly	Attractive, user friendly	Attractive, user friendly
Shopping cart	√	√	√	√
Payment	Online Payment, cards	Online Payment, cards	Online Payment, cards	Cash on delivery, online Transfer
Order process	4 steps (receiver, sender, payment and confirm order)	4 steps (receiver, sender, payment and confirm order)	4 steps (receiver, sender, payment and confirm order)	4 steps (receiver, sender, payment and confirm order)

3. Methodology

3.1 Prototyping model

The prototyping model is an approach to software development where a prototype is created, tested, and then revised as necessary until a satisfying outcome is attained from which the entire system or product may be released. The project's methodology was chosen because it promotes creativity and

adaptable design. It is also a simple model, which makes it simple to comprehend. This strategy works well when not all project needs are fully understood beforehand. There is an iterative, trial-and-error process that takes place between developers and users. 2019 (Margaret Rouse). The process for prototyping models is shown in Figure 4.1.

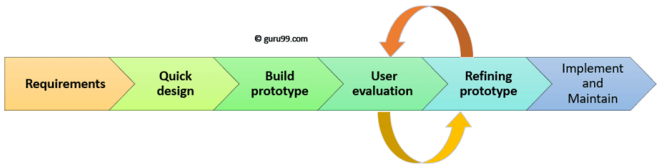

Figure 1: Prototyping Model

3.2 Requirement Phase

Finding out which system components, like hardware, software, networks, and human resources, are now in use is the goal of the analysis. Interview is conducted with the teachers and questionnaire being share among the student through google forms to collect their opinions to understand their reaction about this project. At this step, the system requirements were thoroughly described. During this phase, Data accumulation through teachers and students of SMK Taman Molek will be conducted from existing buying systems, primarily in Malaysia, for background information, what technology is currently being used, and gathering the information in order to develop the proposed web-based system. This is to ensure the flow of system development is well managed. All supporting information and sources also will be gathered during this phase through research on articles, journals, and project studies on the concept of online web-based system of e-commerce development.

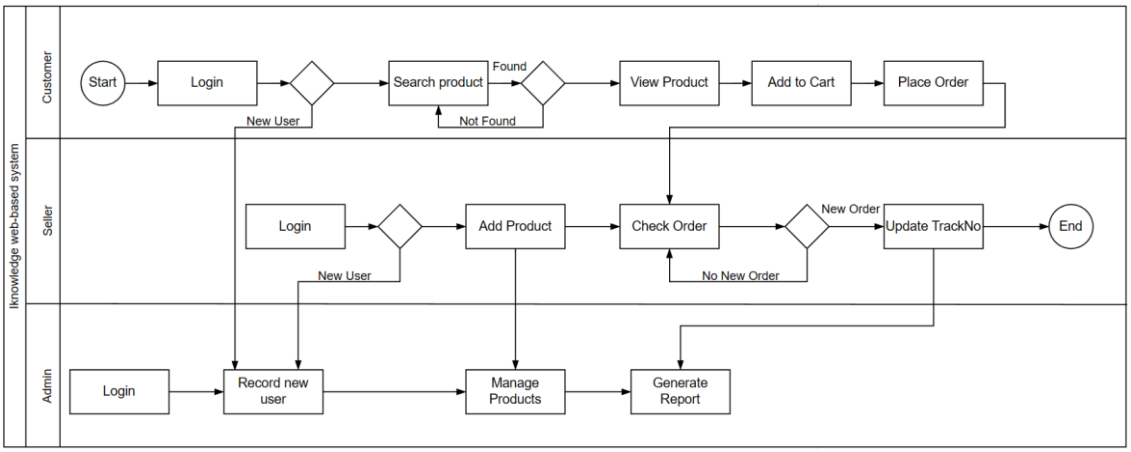

Figure 2: The To-Be model of Iknow Web-based system

3.1.1 Use Case Diagram

There are three actors that are involved in the Iknow Web-based system. They are the customer (buyer), seller and administrator. The main use cases are shown in Figure 3

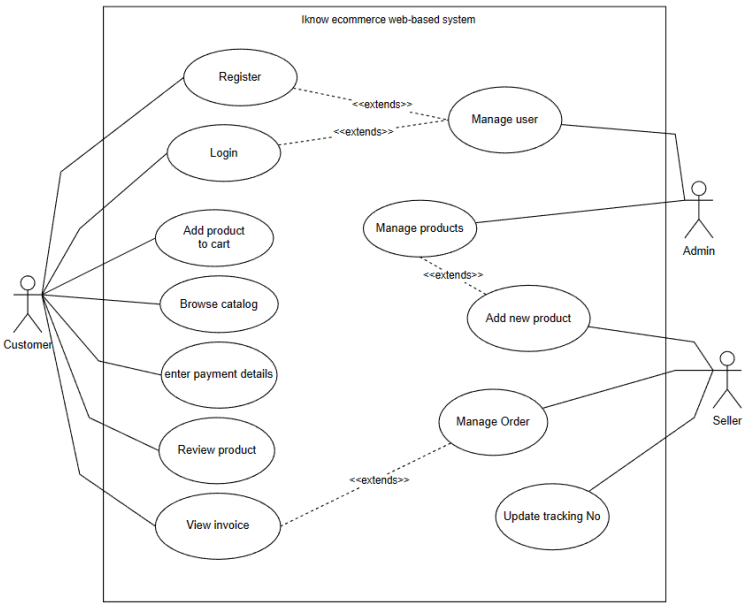

Figure 3: The Use Case Diagram of Iknow Web-based system

3.1.2 Class diagram

There are 7 main class in the proposed system which are customer, Admin, Seller, products, Invoice, Payment and category. One interface is stated as CrudFunction were used all around the system. They are depicted in this class diagram shown in Figure 4.

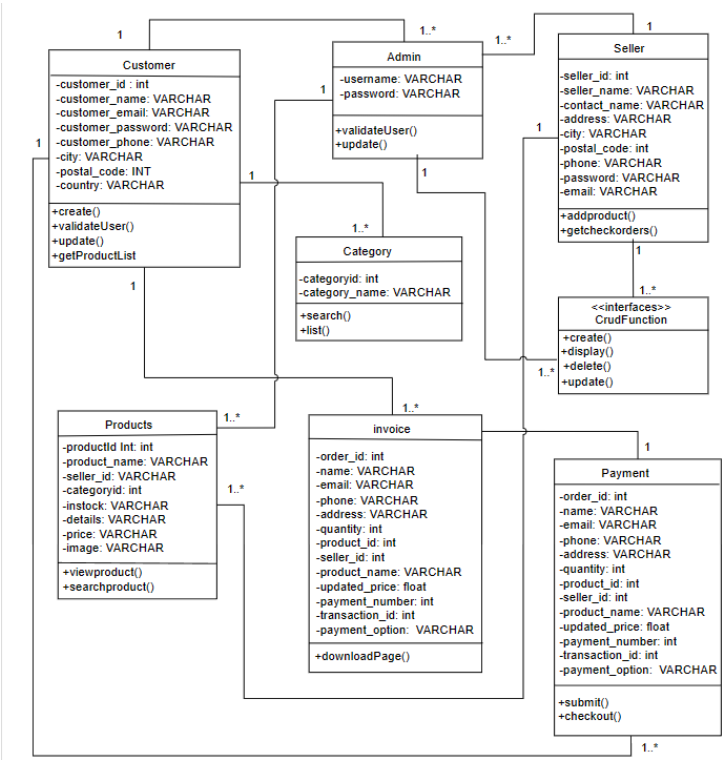

Figure 4: The Class Diagram of Iknow Web-based system

3.2. Design phase

The design phase is depicted in two sub-sections. They are the result of system database design and interface design.

3.2.1 Database Design

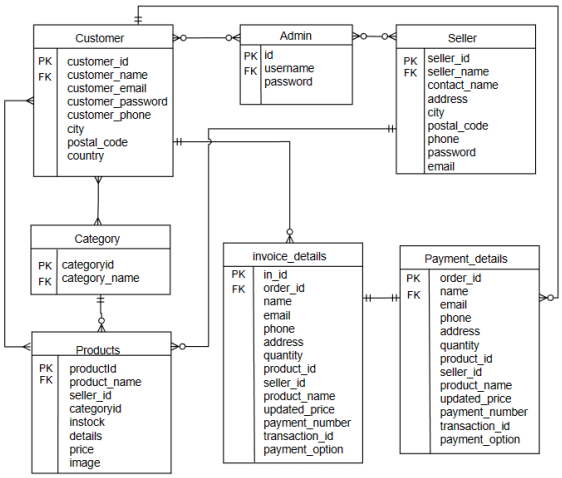

Figure 5: The Database Scheme of Iknow Web-based system

3.2.2 Interface Design

The ultimate goal of a good user interface is to make the user interaction as clear, direct, and efficient as possible. User-friendly interfaces and appealing design are key components of the user experience in eCommerce, and they can have a substantial impact on a website's success and sales.

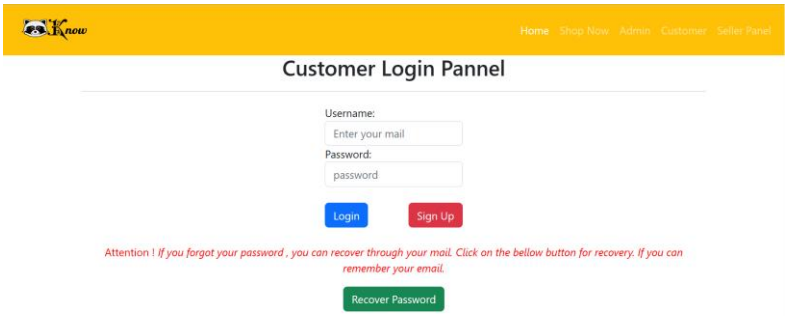

Figure 6: The Login Interface of Iknow Web-based system

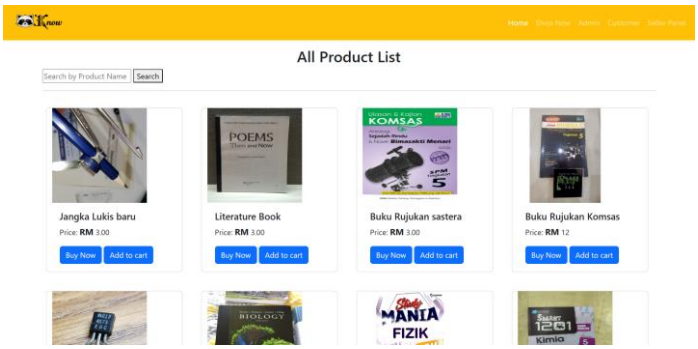

Figure 7: The Product List interface of Iknow Web-based system

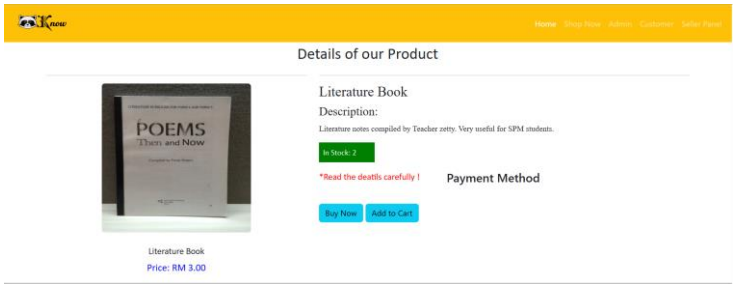

Figure 8: The Product Details interface of Iknow Web-based system

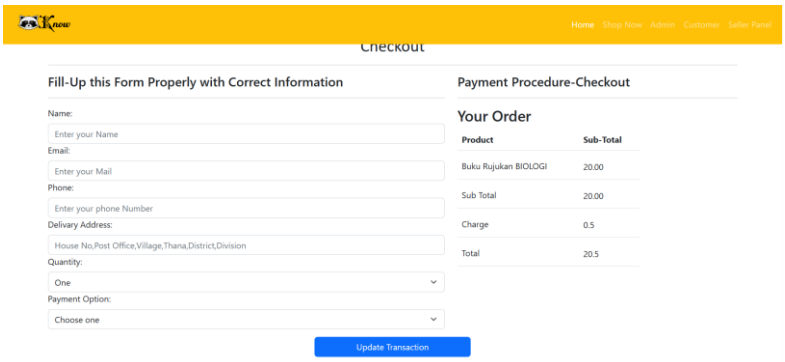

Figure 9: The Checkout interface of Iknow Web-based system

3.2.3 Code Segment

The code segment section contains example of code segment used in the development of Iknow website which are jQuery cdn export and search form validation code. jQuery is a JavaScript framework created to make event handling, CSS animation, Ajax, and DOM tree navigation and manipulation easier. It is open-source software that is available for free under the MIT License. The search form validation used *document.getElementById()* function to compare keywords inserted with the product name.

```
(function(factory) {
    'use strict';
    if (typeof define === 'function' && define.amd) {
        define(['jquery'], factory);
    } else if (typeof exports !== 'undefined') {
        module.exports = factory(require('jquery'));
    } else {
        factory(jQuery);
    }
}(function($) {
    'use strict';
    var Slick = window.Slick || {};
        Slick = (function() {
        var instanceUid = 0;
        function Slick(element, settings) {
            var _ = this, dataSettings;
            _.defaults = {
```

Figure 10: The Code Segment of the imports of jQuery cdn.

```
<!-- Script for form validation of Product search box -->
<script>
    function validateForm() {
        let x =
document.forms["myForm"]["search_name"].value;
        if (x == "") {
            document.getElementById("search_name").innerHTML
= "Product Name must be filled out!!"
            return false;
       }
    }
</script>
```

Figure 11: The Code Segment of the search form.

3.2.4 Functional and Non-Functional Requirements.

A functional requirement is a function that the system should perform in order to determine the system's behavior. In this proposed system, 8 modules will be details out their functional requirements as stated in table 2. Unclear requirements result in a poorly defined scope.

Table 2: Table of functional requirement iKnow Web-based System.

No	Module	Functions
1.	Login	The system should verify users' credential. The system should display error for invalid input. The system should redirect the user to the homepage after successful login.
2.	Registration	The system should allow the new user to register before login. The system should display an error when a duplicate username is entered.
3.	Products	The system should allow the user to insert the details of the product ads. The system should display the product in the product catalog. The system should store the data of the product into the database table.
4.	Payment	The system should display total of cart in the accurate amount. The system should allow the user to view the total for their cart. The system should store the purchase history in the history module.
5.	Tracking	The system should update the user about the product delivery process. The system should allow the user to view product location.
6.	History	The system should allow the user to display purchases history in orderly manner.
7.	Add to cart	The system should allow the user to add product in the cart. The system should allow the user to view product in their cart. The system should notify the user if the product is unavailable.
8.	Rating	The system should allow the user to rate the product to review seller performance.

Non-Functional Requirement

In the literature, non-functional requirements are referred to as quality attributes, constraints, goals, additional functional requirements, and non-behavioral requirements. A non-functional requirement is one that specifies criteria for evaluating a system's operation as shown in table 3.

Table 3: Table of Non-functional requirement iKnow Web-based System.

No	Requirements	Description
1.	Performance	The reasonable operation and response time of the operating system should be expected.
2.	Operational	The web-based system should be able to operates on computer with internet connection.
3.	Usability	The general appearance and flow of the web-based system are easily understood by all type of users.
4.	Security	The physical installation and from a cyber perspective are protected from an unauthorized party. The login module will verify the correct user account and if not verified the login information will be denied access to the web-based system.
5.	Integrity	The database of the web-based system will be kept properly and secured by the system from any corruption and non-readable
6.	Availability	The web-based system is sure readily can be operated and available to use at all times.
7.	Maintainability	The web-based system will be needing low maintenance due to low content reader. This will ensure the prolong use of the system.

3.2.5 User Requirements

User requirements, such as what the user is capable of doing and what the user expects the system to do, can be referenced. Understanding user needs is a critical component of information system design and is required for the success of interactive systems. Table 4 shows the user requirement of the system.

Table 4: Table of user requirement iKnow Web-based System.

No	User requirements
1.	All users should be able to input the username and password for the sign up and login purpose.
2.	All users should be able to login into the system.
3.	All users should be able to logout from the system.
4.	All users should be able to browse the homepage.
5.	All users should be able to view product following the categories.
6.	All users should be able to add product advertisement.

No	User requirements
7.	All users should be able to enter product details for selling purposes.
8.	All users should be able to add product to the cart.
9.	All users should be able to view their account cart.
10.	All users should be able to view total cart during payment session.
11.	All users should be able to view product tracking and be notified.
12.	All users should be able to send messages to the seller.
13.	All users should be able to view history purchase in history page.
14.	The administrator should be able to login into the system.
15.	The administrator should be able to logout from the system.
16.	The administrator should be able to view users' cart.
17.	The administrator should be able to update tracking number to the user.
18.	The administrator should be able to notify the user if product unavailable.

3.3 Quick Design Phase

The second phase is a preliminary design, also known as a quick design. During this phase, a simple system design is created. This provides a preview of how the system will appear. However, it is not a complete design. To get a visualisation of the prototype, the quick design of the system is created using Draw.io. The design was completed quickly, and it represented all of the known components of the software and served as the foundation for prototyping. Susanto and Meiryani (2019) define "system design" as a collection of design efforts that result in functional requirements.

3.4 Build Prototype Phase

Based on the specifications gathered during the Quick design phase, the developer will create an actual prototype. This is a simplified explanation of how the basic system operates. The task of this phase is to convert the designed data into a programming language, a prototype. This is usually a toned-down version of the system that looks like the finished product. The prototype should be able to connect to the database that was also created during this phase.

3.5 User Evaluation and Refining Prototype Phase

Based on earlier stages, the prototype developed focuses on all of the interfaces. The prototype will then be reviewed by the stakeholders, and certain changes will be made. After being review, the prototype must be built accordingly. Also at this point, the proposed system is delivered to the user for preliminary testing. This assists the team in determining the working model's strengths and weaknesses.

3.6 Implementation Phase

The implementation will include a coding section in which the developer must refer to the data gathered in previous phases. This phase employs all of the chosen technology, hardware, and software. The testing phase and maintenance phase are also included in final implementation phase. The test cases are created in the testing section, and each test case will determine whether or not all of the requirements stated were successfully developed. The test result will be generated at the conclusion of the testing phase.

4. Analysis and Result

This part of the proceeding will display collected data based on the findings during the testing phase and some change management steps. The displayed data will be analyzed and concluded to show the project had or had not meet the requirements. Analysis and discussion of this project will consist of user acceptance test findings and normal requirement test. Based on that, a test plan from user acceptance testing.

4.1 Test Plan

This test plan contained the list of test cases based on module which will be attached in **Appendix A.** the test involving 8 module and the total count of 34 test cases. All result of the test cases will be tabulated in table 7.

Table 7: Overall testing result for user acceptance testing.

Test Case Module	No. Test Cases	Passed Test Cases	Failed Test Cases
Login	4	4(100%)	0(0%)
Registration	6	6(100%)	0(0%)
Products	5	5(100%)	0(0%)
Payment	4	4(100%)	0(0%)
Tracking	2	2(100%)	0(0%)
History	3	3(100%)	0(0%)
Add to cart	4	4(100%)	0(0%)
Review	6	6(100%)	0(0%)

5. Conclusion

For this project, students are expected to improve their performance because this web-based system can help the student to obtain their study materials faster. The student can easily find used school supply at cheaper price in the system. The system allows them to browse by categories of their streams. The system will advertise the used school supply systematically and open order for the students. This web-based system will help former student of SMK Taman Molek share their knowledge to others while interacting with another student who is still studying the course. This will spread efficient communication between each other and help in gaining new knowledge. This web-based system also helps the student of SMK Taman Molek who are in need to cut cost or saving more money rather than buying a new set of study materials. The student that obtains the used materials can really save a lot of money. For example, a new Graphics sketching set cost more than RM100 in the store and online. And it is very hard to find a cheaper one but with this web-based system alumni can put it in the web-based system and sell it for cheap to the new students. These students will not have trouble completing their school works and being left out in their studies. This will improve their performance and allows them to focus just on their study with ease.

Acknowledgement

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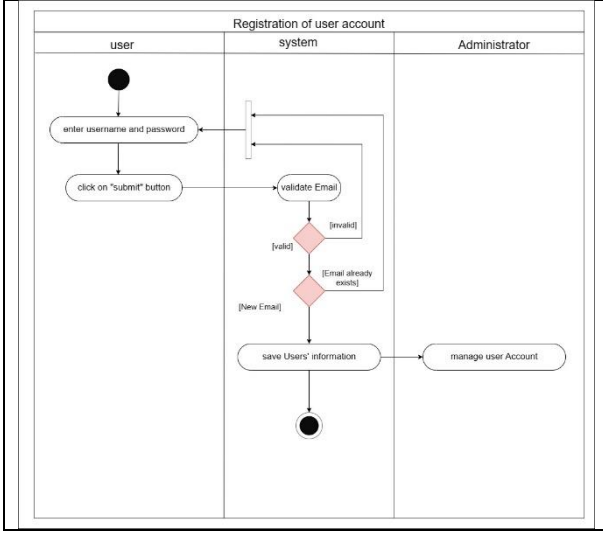
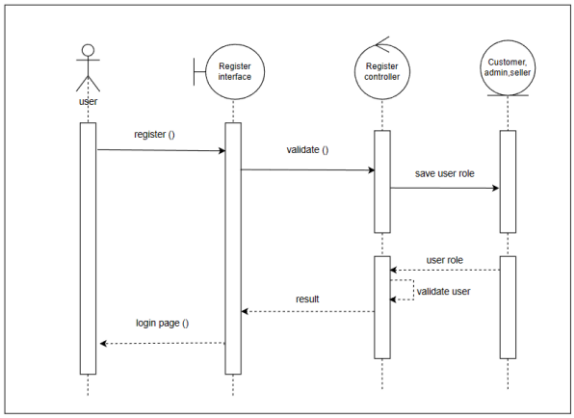
Appendix

Appendix A

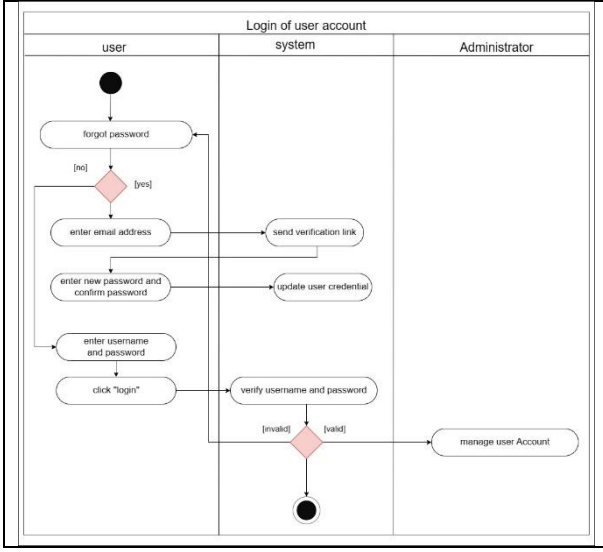
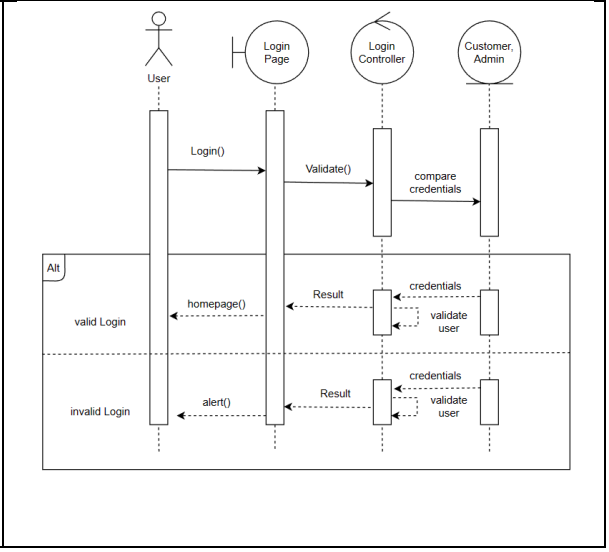
Requirements	Software Requirements Specification	Description
Registration SRS_REQ_100	SRS_REQ_101	User Enter name and email and password.
	SRS_REQ_102	The system validates the email.
	SRS_REQ_103	Sign up process is successful.
	SRS_REQ_104	The system saves details of the new information or account.
	SRS_REQ_105	If the registration is cancelled, system will return back to homepage.
	SRS_REQ_106	If a message displayed on screen due to existed account. The student has to log in instead of signing up.
Login SRS_REQ_200	SRS_REQ_201	Student enters his/her email and password in the provided section.
	SRS_REQ_202	The iKnow web-based System validate the existence and the inserted information of the student.
	SRS_REQ_203	Student successfully login into the iKnow web-based System.
	SRS_REQ_204	If wrong credential, the iKnow web-based System will display error message on top of the page.
Cart SRS_REQ_300	SRS_REQ_301	Student add product to the cart.
	SRS_REQ_302	Student can check availability of the product.
	SRS_REQ_303	The system successfully booked the product.
	SRS_REQ_304	The iKnow web-based System will display error message on top of the page.
Payment SRS_REQ_400	SRS_REQ_401	Student successfully add product to the cart and click “checkout”.
	SRS_REQ_402	Student enter payment details and click “submit”
	SRS_REQ_403	The system successfully produces order summary.
	SRS_REQ_404	Order summary will be saved in the invoice.
Tracking SRS_REQ_500	SRS_REQ_501	Seller can add parcel tracking no.
	SRS_REQ_502	Student can view parcel movement
Invoice SRS_REQ_600	SRS_REQ_601	Student choose invoice by date.
	SRS_REQ_602	Student view order summary.
	SRS_REQ_603	Student can print invoice to pdf.
Products SRS_REQ_700	SRS_REQ_701	Seller can add new product.
	SRS_REQ_702	System will notify that the product is successfully added
	SRS_REQ_703	Admin can delete and edit products’ information.
	SRS_REQ_704	Students can view products by category and view product details.
	SRS_REQ_705	Students can successfully ad product to the cart.
Review SRS_REQ_800	SRS_REQ_801	Student click on “review product” and enter product review.
	SRS_REQ_802	Student click on “Submit” button.
	SRS_REQ_803	The system Shall notify the student that their review was submitted to be validate.
	SRS_REQ_804	Admin can validate safe review and unsafe review.

SRS_REQ_805	Admin disapprove unsafe review based on guideline and the system will remove the review.
SRS_REQ_806	Upon safe review, the system shall post the review

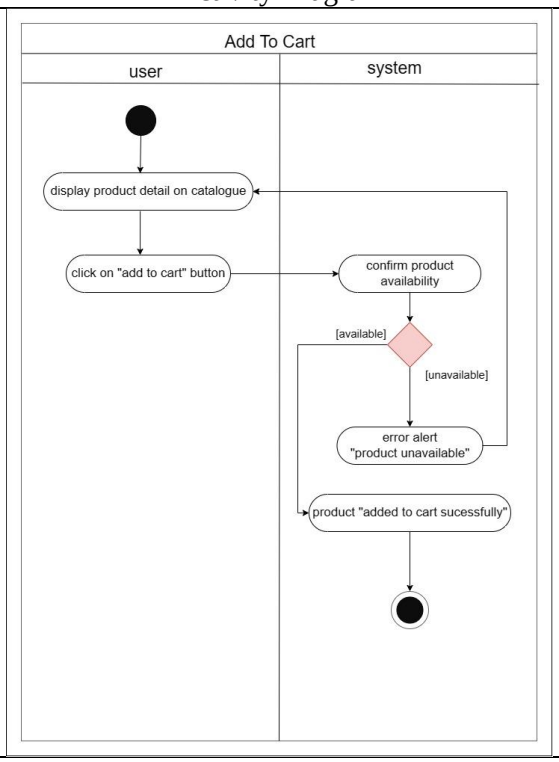
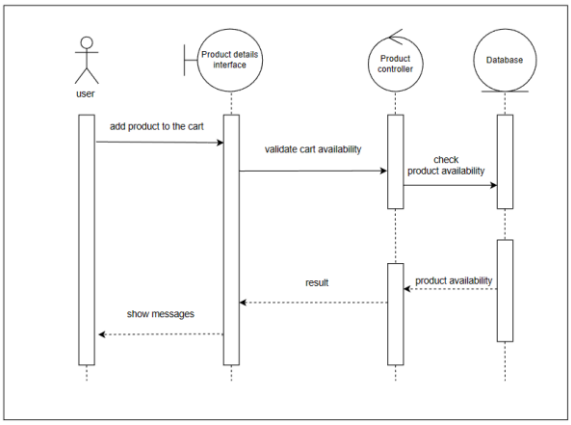
1. Module Register

Activity Diagram	Sequence Diagram
	

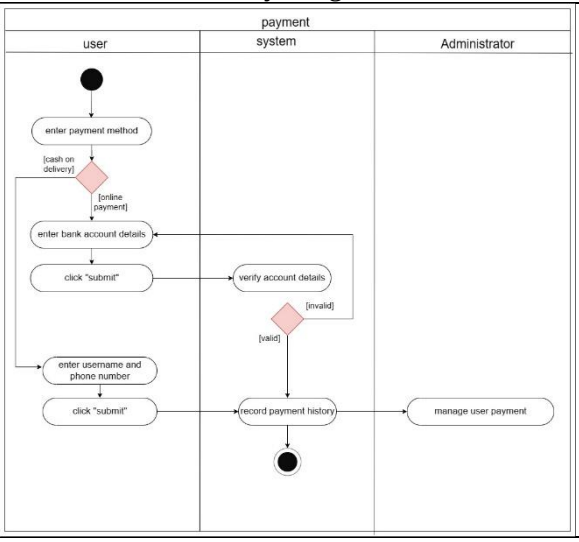
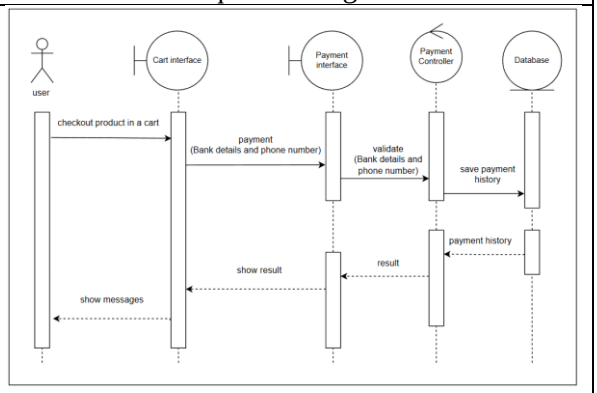
2. Module Login

Activity Diagram	Sequence Diagram
	

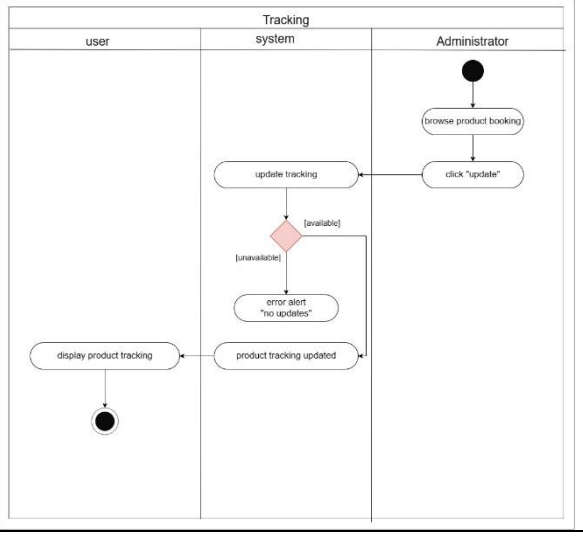
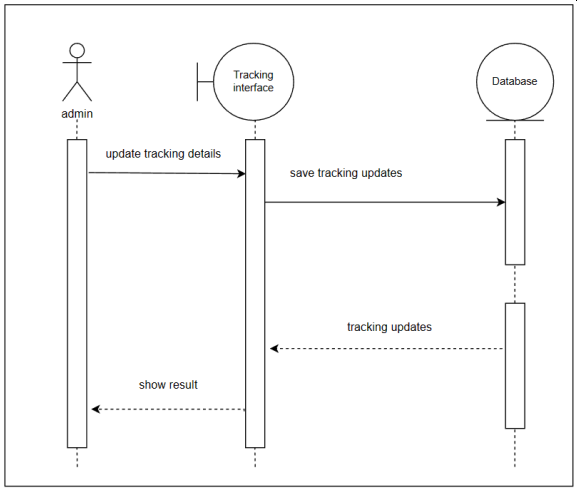
3. Module Cart

Activity Diagram	Sequence Diagram
	

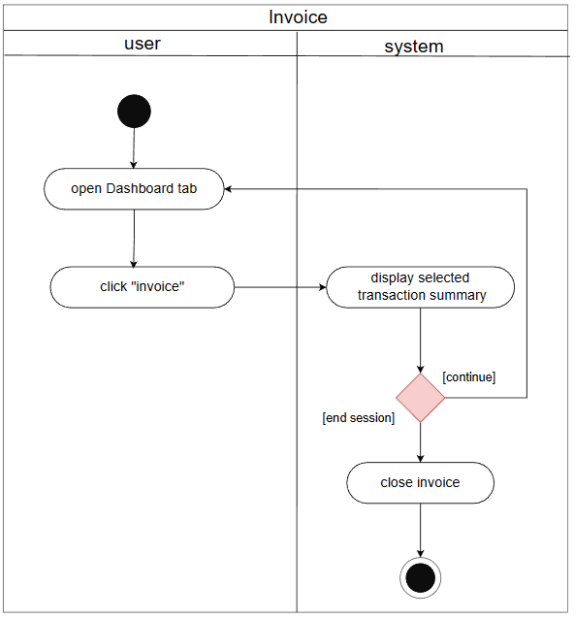
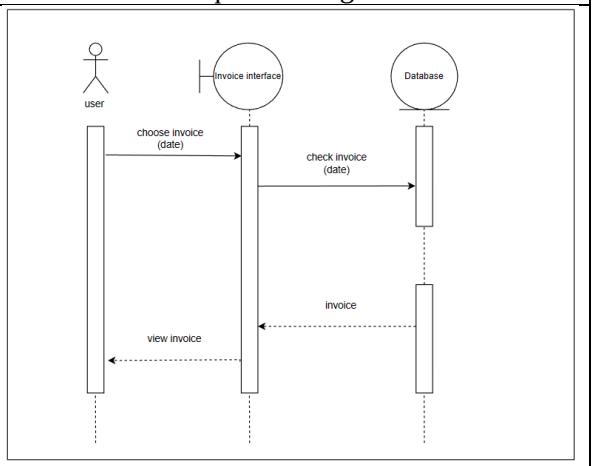
4. Module Payment

Activity Diagram	Sequence Diagram
	

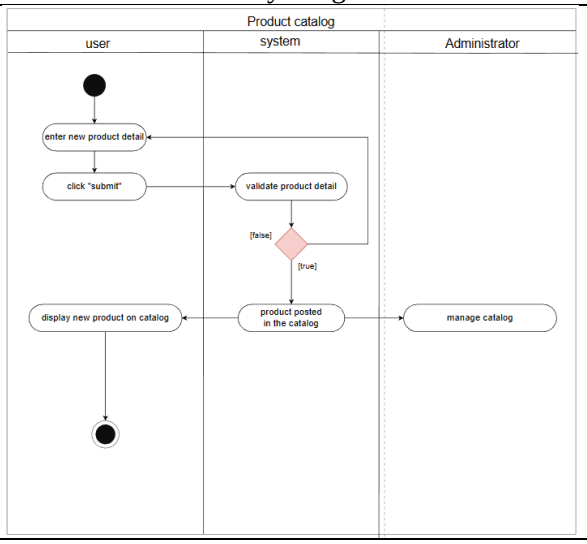
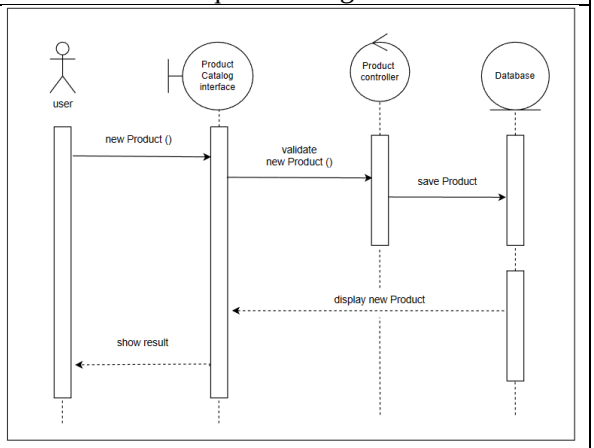
5. Module Tracking

Activity Diagram	Sequence Diagram
	

6. Module Invoice

Activity Diagram	Sequence Diagram
	

7. Module Product Catalog

Activity Diagram	Sequence Diagram
	

8. Module rating

Activity Diagram	Sequence Diagram