

# **COMMUNITY E-CONTENT MANAGEMENT SYSTEM**

**BY**

**ANDREW ONG TAN HUI**

**A REPORT**

**SUBMITTED TO**

**Universiti Tunku Abdul Rahman**

**in partial fulfillment of the requirements**

**for the degree of**

**BACHELOR OF INFORMATION SYSTEM (HONS)**

**INFORMATION SYSTEM ENGINEERING**

**Faculty of Information and Communication Technology**

**(Kampar Campus)**

**SEPTEMBER 2020**

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**Title:** Community e-Content Management System  
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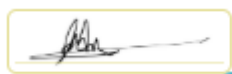
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## DECLARATION OF ORIGINALITY

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Name : ANDREW ONG TAN HUI

Date : 8/9/2020

## **ACKNOWLEDGEMENTS**

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## **ABSTRACT**

Not everyone in this world know how the inside of a website operates. An IT personal may know that `<p>` in coding language means paragraph and that can be used to insert a paragraph of content to display in the website. This in the IT world is called hardcode, whereby content is manually typed into the website and wont dynamically change in the website unless one change it from the website. But what if a user can dynamically change the content without having to know how to code? This is what we are trying to achieve currently, a dynamic community e-content management system where a user can easily manipulate data to design or to add new content into the website. The system will include four different roles of users which includes Admins, Staffs, Moderator and normal user. Each role has different access to pages except admins who has access to all pages. This system will few features such as article posting where an admin or staff can submit and article for approval which moderator can access worklists to approve or decline the article. Approved article will then be displayed on home page for other users to view. Admin is also the only role which can edit the information of all existing user in the system including changing the role of users which may allow them to be included in special roles of moderator, staffs or admin. Admins and staffs can also create news, photo books, events and downloadable content for users to view or download. Certain places such as home will also have banners which moves every few seconds. Admin and staff can also change the banner to what they want through banner maintenance page. E-Commerce will also be integrated in this system to further enhance the system and to form a better community. With this system, a community can be formed to work together and maintain a e-content management system that is easy to learn and use for everyone.

# Table of Contents

<b>DECLARATION OF ORIGINALITY</b> .....	iii
<b>ACKNOWLEDGEMENTS</b> .....	iv
<b>ABSTRACT</b> .....	v
<b>LIST OF FIGURES</b> .....	v
<b>LIST OF TABLES</b> .....	ix
<b>LIST OF ABBREVIATIONS</b> .....	x
<b>Chapter 1: Introduction</b> .....	1
<b>1.1 Problem Statement</b> .....	1
<b>1.2 Project Background</b> .....	2
<b>1.3 Project Objectives</b> .....	4
<b>1.3.1. Implementation of Three-layer Architecture to tackle security issues</b> .....	4
<b>1.3.2. Integrate e-commerce into a community content management system</b> .....	4
<b>1.3.3. Implementation of auto delete data function</b> .....	5
<b>1.4 Proposed Approach/ Study</b> .....	6
<b>1.5 Highlights of What Has Been Achieved</b> .....	8
<b>1.6 Report Organization</b> .....	9
<b>Chapter 2: Literature Review</b> .....	10
<b>2.1 Overview</b> .....	10
<b>2.2 Literature Review</b> .....	10
<b>2.2.1 Drupal</b> .....	10
<b>2.2.2 Joomla!</b> .....	13
<b>2.2.3 WordPress</b> .....	16
<b>2.3 Comparison Table</b> .....	19
<b>2.4 Recommendation</b> .....	20
<b>2.5 Summary</b> .....	20
<b>Chapter 3: System Design</b> .....	21
<b>3.1 Overview</b> .....	21
<b>3.2 System Design Diagrams and Description</b> .....	22
<b>3.2.1 Flow Chart</b> .....	22
<b>3.2.1.1 Flow chart for Admin view</b> .....	22
<b>3.2.1.2 Flow chart for Staff View</b> .....	24
<b>3.2.1.3 Flow chart for Moderator View</b> .....	26
<b>3.2.1.4 Flow chart for User View</b> .....	28
<b>3.2.2 Use Case Diagram</b> .....	30

3.2.3 Activity Diagram.....	31
3.2.3.1 Activity diagram for user signup .....	31
3.2.3.2 Activity diagram for login.....	32
3.2.3.3 Activity diagram for User Maintenance (Admin only).....	33
3.2.3.4 Activity diagram for Post Article (Admin and Staff only).....	34
3.2.3.5 Activity diagram for Worklist (Admin and Moderator only).....	35
3.2.3.6 Activity diagram for Banner Maintenance (Admin and Staff only) .....	36
3.2.3.7 Activity diagram for Download Maintenance (Admin and Staff only).....	37
3.2.3.8 Activity diagram for Circular Maintenance (Admin and Staff only) .....	38
3.2.3.9 Activity diagram for PhotoBook Maintenance (Admin and Staff only).....	39
3.2.3.10 Activity diagram for Forum (All roles allowed) .....	40
3.2.3.11 Activity diagram for Event Maintenance (Admin/Staff).....	41
3.2.3.12 Activity diagram for E-Commerce (All roles allowed) .....	42
3.2.3.13 Activity diagram for Three-Layer Architecture.....	43
3.3 Implementation Issues and Challenges .....	43
3.4 Timeline.....	44
3.4.1 Gantt Chart.....	44
3.5 Explanation of diagrams .....	45
3.6 Mock-up diagrams of system.....	46
<b>Chapter 4: Methodology, Tools/technologies Involved and Requirements .....</b>	<b>52</b>
4.1 Methodology.....	52
4.1.1 Analyzing .....	52
4.1.2 Designing.....	53
4.1.3 Implementation.....	53
4.1.4 Testing.....	53
4.2 Technologies and Tools Involved.....	54
4.2.1 ASP.NET MVC Platform.....	54
4.2.2 C# Programming Language .....	54
4.2.3 Microsoft SQL Management Studio.....	55
4.2.4 Google Chrome .....	55
4.2.5 Javascript and JQuery .....	55
4.3 Requirements .....	56
<b>Chapter 5: Layered Architecture (Objective 1).....</b>	<b>57</b>
5.1 Overview.....	57
5.2 Implementation/Flow and Testing.....	59



<b>Chapter 6: e-Commerce (Objective 2)</b> .....	66
<b>6.1 Overview</b> .....	66
<b>6.2 Implementation/Flow and Testing</b> .....	66
<b>Chapter 7: Auto-delete feature (Objective 3)</b> .....	72
<b>7.1 Overview</b> .....	72
<b>7.1 Implementation/Flow and Testing</b> .....	72
<b>Chapter 8: Conclusion</b> .....	75
<b>8.2 Problems encountered</b> .....	76
<b>8.3 Future Works</b> .....	77
<b>BIBLIOGRAPHY</b> .....	78
<b>APPENDICES</b> .....	81
<b>POSTER</b> .....	87
<b>Plagiarism Check Result</b> .....	88

## LIST OF FIGURES

<b>Figure Number</b>	<b>Title</b>	<b>Page</b>
Figure 1.1	Comparison of most used content management system in 2019	2
Figure 1.2	The figure above shows the upper half of the flowchart for proposed system Admin role.	6
Figure 1.3	The figure above shows the lower half of the flowchart for proposed system Admin role.	7
Figure 2.1	The figure above shows the logo of Drupal	10
Figure 2.2	The figure shows the effort required and satisfaction of customer comparison	12
Figure 2.3	The figure above shows the comparison table of ease of use between content management system	12
Figure 2.4	The figure above is the official logo of Joomla!	13
Figure 2.5	The figure above shows the content editor for Joomla!	15
Figure 2.6	The figure above shows one of the security vulnerabilities that is patched with latest version	15
Figure 2.7	The figure above is the official logo of WordPress	16
Figure 2.8	The figure above shows the content editor for WordPress	18
Figure 3.1	The figure above is to show the upper part of flow chart for admin view.	22
Figure 3.2	The figure above is to show the bottom part of flow chart for admin view.	23
Figure 3.3	The figure above is to show the upper part of flow chart for staff view.	24
Figure 3.4	The figure above is to show the bottom part of flow chart for staff view.	25
Figure 3.5	The figure above is to show the upper part of flow chart for moderator view.	26

Figure 3.6	The figure above is to show the bottom part of flow chart for moderator view.	27
Figure 3.7	The figure above is to show the upper part of flow chart for user view.	28
Figure 3.8	The figure above is to show the bottom part of flow chart for user view.	29
Figure 3.9	The figure above shows the use case diagram for the proposed system.	30
Figure 3.10	The figure above is to show the activity diagram for user signup.	31
Figure 3.11	The figure above is to show the activity diagram for user login.	32
Figure 3.12	The figure above is to show the activity diagram for user maintenance (Admin use only).	33
Figure 3.13	The figure above is to show the activity diagram for post article (Admin and staff use only).	34
Figure 3.14	The figure above is to show the activity diagram for worklist (Admin and moderator use only).	35
Figure 3.15	The figure above is to show the activity diagram for banner maintenance (Admin and staff use only).	36
Figure 3.16	The figure above is to show the activity diagram for download maintenance (Admin and staff use only).	37
Figure 3.17	The figure above is to show the activity diagram for circular maintenance (Admin and staff use only).	38
Figure 3.18	The figure above is to show the activity diagram for photobook maintenance (Admin and staff use only).	39
Figure 3.19	The figure above is to show the activity diagram for forum (Use by all roles).	40
Figure 3.20	The figure above is to show the activity diagram for Event Maintenance (Use by Admin/Staff).	41
Figure 3.21	The figure above is to show the activity diagram for E-Commerce (All Roles Allowed).	42

Figure 3.22	The figure above is to show the activity diagram for Three-Layer Architecture.	43
Figure 3.23	The figure above is the Gantt chart for the proposed system and process along the way.	44
Figure 3.24	The figure above is the detailed task, dates and duration for the Gantt chart (Duration is in days format).	45
Figure 3.25	The figure above shows page 1 on mock-up system.	46
Figure 3.26	The figure above shows page 2 on mock-up system.	47
Figure 3.27	The figure above shows page 3 on mock-up system.	47
Figure 3.28	The figure above shows page 4 on mock-up system.	48
Figure 3.29	The figure above is to portray page 5 on mock-up system.	48
Figure 3.30	The figure above shows page 6 on mock-up system.	49
Figure 3.31	The figure above shows page 7 on mock-up system.	49
Figure 3.32	The figure above shows page 8 on mock-up system.	50
Figure 3.33	The figure above shows page 9 on mock-up system.	50
Figure 3.34	The figure above shows page 10 on mock-up system.	51
Figure 4.1	The figure above shows the development phases for the proposed system.	52
Figure 5.1	The figure above shows how a normal DAL would look like.	57
Figure 5.2	The figure above shows how a normal database is created if using normal BLL and DAL method.	58
Figure 5.3	The figure above shows how a normal stored procedure is done if using normal BLL and DAL method.	58
Figure 5.4	The figure above shows that a user fired and action from the User Interface.	59
Figure 5.5	The figure above shows the information has been successfully passed into Controller.	60
Figure 5.6	The figure above shows the information has been successfully passed to BLL from Controller.	60

Figure 5.7	The figure above shows the information has been successfully passed to BLL from Controller.	61
Figure 5.8	The figure above shows the stored procedure which has received the information and will perform actions.	62
Figure 5.9	The figure above shows the Banner appearing in Home page after the operation.	63
Figure 6.1	The figure above shows the message before a user enter the community e-Commerce page.	66
Figure 6.2	The figure above shows an Admin trying to sell an item.	67
Figure 6.3	The figure above shows the item posted by Admin appearing in the e-Commerce home page.	67
Figure 6.4	The figure above shows User71 trying to purchase the item.	68
Figure 6.5	The figure above shows the message when User71 uploaded the transfer slip.	68
Figure 6.6	The figure above shows the purchase history for User71.	69
Figure 6.7	The figure above shows the conversation between seller and buyer.	69
Figure 6.8	The figure above shows the change of status to complete.	69
Figure 7.1	The figure above shows a non-expired account.	72
Figure 7.2	The figure above shows a successful login.	73
Figure 7.3	The figure above shows an expired account.	73
Figure 7.4	The figure above shows an unsuccessful login.	73

## LIST OF TABLES

<b>Table Number</b>	<b>Title</b>	<b>Page</b>
Table 2.1	The table above is a comparison of 3 reviewed system as well as what will be included in the proposed system	19
Table 5.1	The table above is unit testing for layered architecture.	64,65
Table 6.1	The table above is unit testing for e-Commerce.	70,71
Table 7.1	The table above is unit testing for auto-delete feature.	74

## LIST OF ABBREVIATIONS

<i>CMS</i>	Content Management System
<i>CSS</i>	Cascading Style Sheets
<i>UI</i>	User Interface
<i>MVC</i>	Model View Controller
<i>CRUD</i>	Create Read Update Delete
<i>ASP</i>	Active Server Page
<i>HTML</i>	Hypertext Markup Language
<i>IT</i>	Information Technology
<i>e-CMS</i>	e-Content Management System
<i>BLL</i>	Business Access Layer
<i>DAL</i>	Data Access Layer
<i>SQL</i>	Structured Query Language
<i>e-Commerce</i>	Electronic Commerce

## **Chapter 1: Introduction**

### **1.1 Problem Statement**

Problem statement found below is listed after conducting a research content management system.

The first problem statement is regarding security issues as a common issue among content management system. Some research finds that security issues happened due to content management system being an open-source software that was exposed to people who have the intention of improving it as well as people who are trying to harm it. Common security issues include SQL injection as well as phishing activities. A system was proposed to solve such issues which was inspired by issue tracker of Joomla! (Contu *et al.*, 2016) but after studying about the proposed system, there is certain limitation and doubts regarding the proposed system. The system allows a user to submit issues as well as view a list of issues that have been solved. There are chances that the issues will not be solved as there might be no one with the expertise despite having a community of people backing the software. By constantly submitting issues as well would not be feasible as there might be an overflow of issues but not enough people to solve it, simply putting it is not a permanent solution to the existing problem. In order to solve the problem, three-layer architecture is proposed to be implemented and used during the CRUD process of the content management system as three-layer architecture can improve security as well as improving data integrity (Pal, 2013).

The second problem the choices of content management system. Drupal and Joomla both have a separate workflow and system which is specifically for e-commerce. Unlike their usual content management system, the e-commerce content management system will be separated from the original content management system which means users need to manage 2 websites. This is very troublesome and requires more manpower to handle.

The final problem statement is the storage of database. Yes, one cannot deny that you can just purchase more databases when you are running out of storage. But that will cost the company or user extra money or cost in order to purchase extra storage for new data while the old data just stayed in the database and do nothing. This is a wastage of



space and in a large amount will be a very hefty lost for a company. Hence, if a company manages the data one by one, it will be a waste of time and manpower to do so.

## 1.2 Project Background

Content Management System also abbreviated as CMS is a software that helps and allow users to perform create, read, update and delete on a content of theirs without needing the knowledge of coding or HTML mark-up. Users will be easily accessed for example a blog and simply add a textbox in which they can edit the content inside the textbox to create what we called a content to put in their blog and other users can then view it. Without having the knowledge to code from scratch, users can create their own website easily which resulted in content management system being known to the world for their convenience of services. However, there are studies where certain content management system is harder to learn and harder to use but it still fulfils the purpose of allowing users to create and manage content. There are numerous numbers of content management system now on the internet, for example, WordPress, Joomla!, Drupal, Wix and more.

### Quick statistics and content overview:

1. **WordPress** (27+ Million Live Websites)
2. **Wix** (3.8+ Million Live Websites)
3. **Squarespace** (1.9+ Million Live Websites)
4. **Joomla!** (1.8+ Million Live Websites)
5. **Shopify** (1.1+ Million Live Websites)
6. **Drupal** (630+ Thousand Live Websites)
7. **Blogger** (430+ Thousand Live Websites)
8. **Prestashop** (285+ Thousand Live Websites)
9. **Magento** (265+ Thousand Live Websites)
10. **Bitrix** (223+ Thousand Live Websites)

Figure 1.1: Comparison of most used content management system in 2019  
(SCHÄFERHOFF, 2019).

Figure 1.1 above is a statistic analysis of which is the most used content management system in the world currently which WordPress stands on top with 27+ million live websites. WordPress is one of the older generations of content management system which started in 2003 by Mike Little and Matt Mullenweg and progressed to the top used content management system. Initially started as a content management system for blogs, slowly progressed into much more due to public demands and a community of innovative and skills peoples behind it as it is open-source software, WordPress thrives to the top and is a successful content management system nowadays. Wix is the sort of later started content management system but is placed second in the statistic due to immense marketing on social and other media. Before the researching begun, for the proposed system, Wix was the only content management system I knew existed due to immense advertising on YouTube where I dint even know WordPress or Joomla! which is the highest used and older generation of content management even existed. Joomla! and Drupal as well known for being an open-source content management system was started in the year 2005 by Open Source Matters, Inc and in the year 2000 by Dries Buytaert respectively. WordPress, Joomla! and Drupal, in the end, are still what most people from the past are using but as time goes by, there might be other contenders such as Wix which took over the ranking board even though they are not as historical as Joomla! and Drupal might appear and contend with WordPress in the future. With the world moving towards a technology-based world, more and more business, news and media are now on the internet for the public to use but there will not be enough skilled personal to keep up with each company's website. Hence with the pace that the world is moving, it is not going to be long before content management takes over the world as it will be the quickest and easiest way a person can start their own website even for small and new vendors to enter the new era.

### **1.3 Project Objectives**

To tackle all existing issues stated in the problem statement and in order to create a community e- that can allow users with no knowledge of codings to use and manage the system.

#### **1.3.1. Implementation of Three-layer Architecture to tackle security issues**

Three-layer architecture contains 3 layers which includes the user interface layer which is what the user sees for example, the design of the webpage. The next layer is a business logic layer that establishes a connection between user interface and database. The last layer is the data access layer which allows a simple access to data that is stored inside persistent storage. Three-layer architecture is suitable because it has multiple advantages which includes improving the security of a system as a client does not have direct access to the database. Besides that, there will be an improvement in data integrity as the business logic layer can ensure that only data that is valid will be allowed to perform CRUD process. Finally, database structure will be hidden as the actual structure of the database is hidden from the user.

#### **1.3.2. Integrate e-commerce into a community content management system**

In light of the issue whereby user have to manage 2 separate websites, the proposed system will include e-commerce feature where users can post and sell items on the content management system. The website will allow users to manage the website such as posting photobooks of event, managing the banners or images in the websites and in the meantime as well, post items or buy items on the community content management system.

### **1.3.3. Implementation of auto delete data function**

In light of excess data problem, the proposed solution will be an auto delete data function. This function will focus on user of the website which has been inactive for 5 years and above. Those who has been inactive for 5 years and above will automatically have their account and all associated data deleted which includes articles, news and etc. This will drastically reduce the amount of data inside the database and can routinely make way for new users or data.

In the final stage and product of this project, a community e-content management system will be created that will allow the community to use it. This content management system targets to allow people with no knowledge in coding to be able to manage their own website, for example, creating new articles, updating existing information or designing their own webpage. The system will also allow e-commerce to happen inside the system among users in the community. This community e-content management system will be created in hope to tackle all the problems from the problem statement above which includes security issues, handling issues as well as maintenance issues. The final product will be a complete community e-content management system including innovation that will be able to tackle issues stated and allows users to have a comfortable and easy to use system as well as building a strong community inside in the meantime.

## 1.4 Proposed Approach/ Study

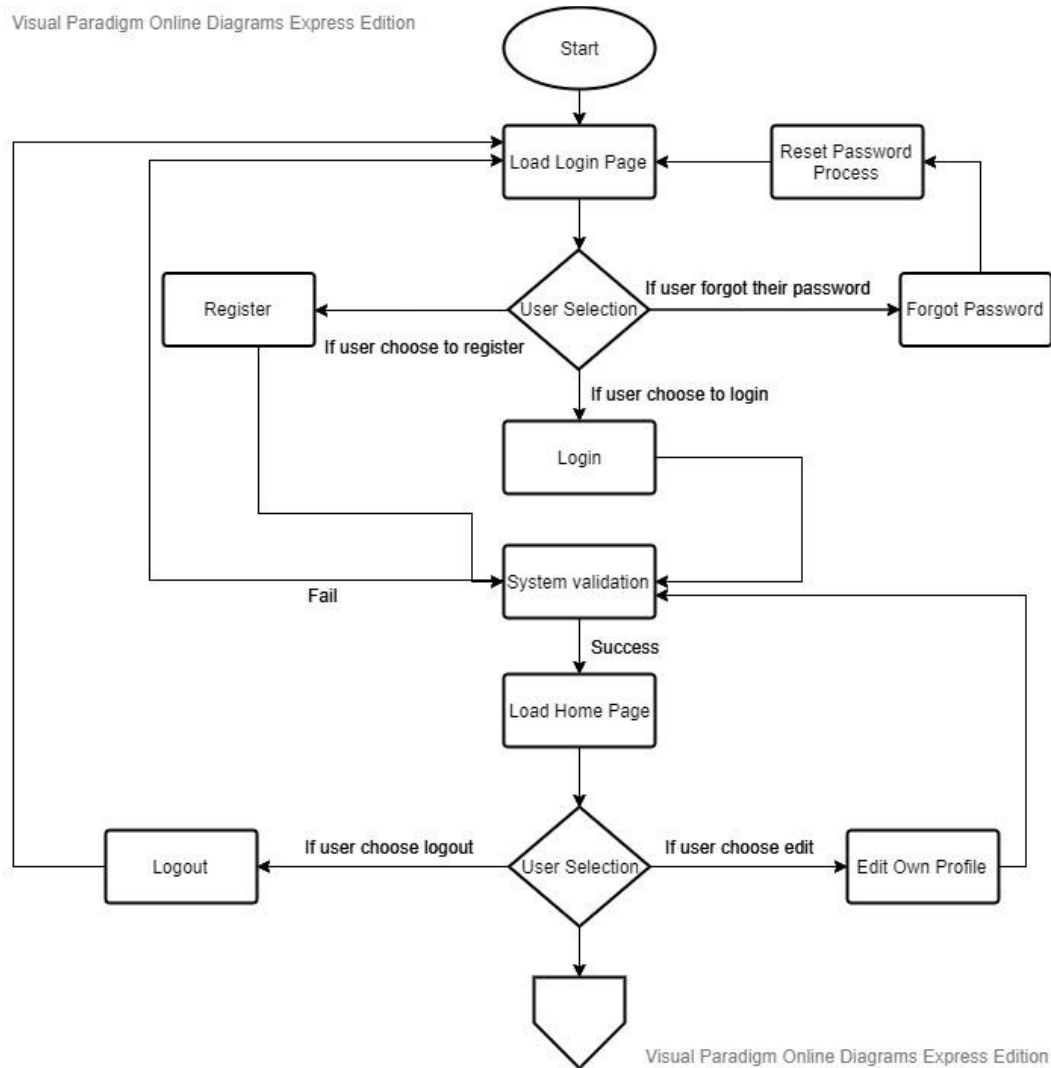


Figure 1.2: The figure above shows the upper half of the flowchart for proposed system Admin role.

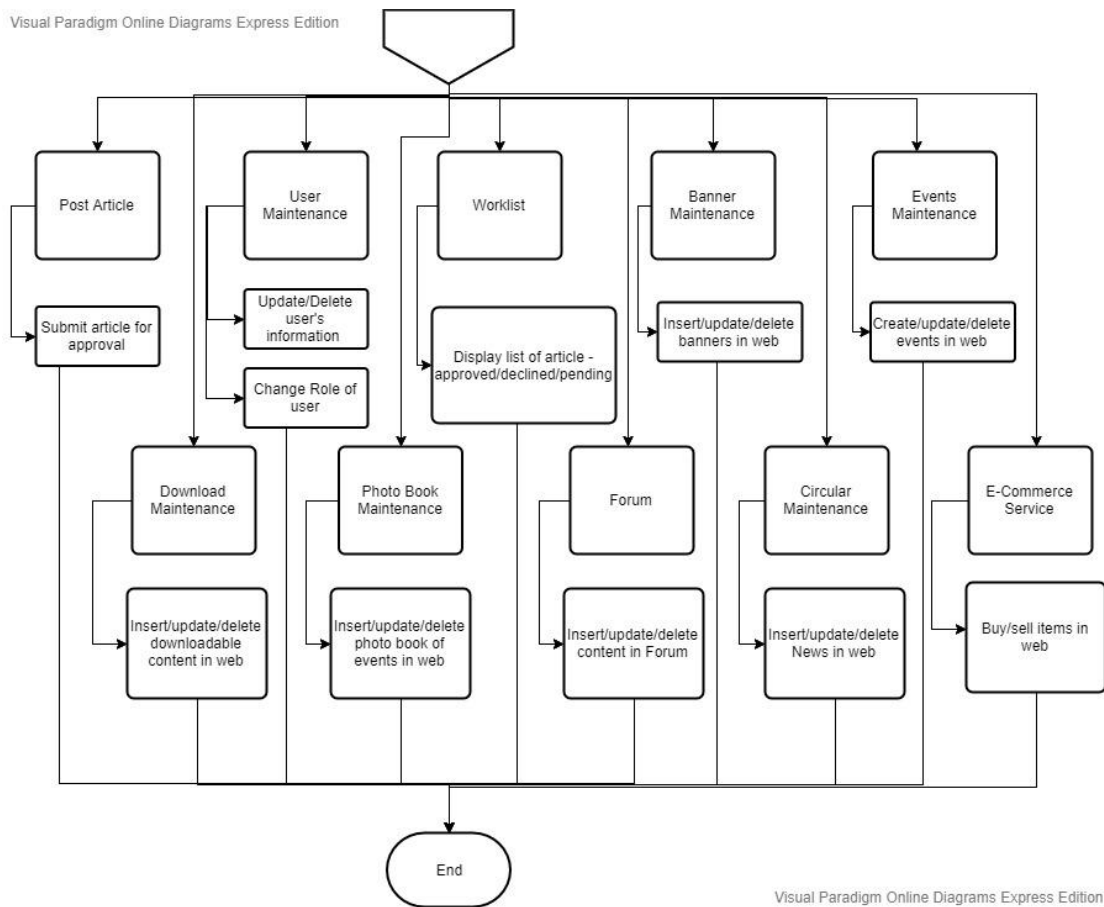


Figure 1.3: The figure above shows the lower half of the flowchart for proposed system Admin role.

The 2 figures above show the system flowchart for an admin in the Community e-Content Management System. There will be 4 different roles (Admin, Staff, Moderator, User) in the system each with different rights and privileges in the system. The figure shows what an admin can potentially do in the system by managing everything inside the system. Admin will be able to perform all the task above which includes posting articles, maintaining all users in the system, approve and declining articles, manage banners in the system, manage upcoming events, manage downloadable contents, maintain photobooks, maintain the forum of the website, maintain the circulars (news) in the system as well as buying or selling in the e-Commerce feature. Staff would be able to do everything expect managing users which allow one to delete or edit any users in the system. Moderator will be able to approve or decline any articles submitted for approval as well as the forum and the e-Commerce feature while user can only view

everything that has been posted and participate in the forum as well as the e-Commerce. This will allow a community to form and bond within the system as well as updates themselves with latest news, articles, events, photobook and also selling and buying things in the system.

### **1.5 Highlights of What Has Been Achieved**

Firstly, a new layer architecture is incorporated inside the system. The usual layered architecture in MVC platform involves the entire table, relationships among tables, as well as the entire structure of the database to be exposed as a hacker can instantly figure out which table to steal and what data to steal from the database. The achieved layered architecture is a business access layer and a data access layer which handles pass in from the user interface or client side triggered by certain action into the stored procedure and the store produce which is on Microsoft SQL server will execute the process and updates it to the table making it harder for hacker to get into the database and the data being exposed as the process is done inside the database not on the controller.

Secondly, a community e-Commerce system is incorporated inside the system which enables users to sell and buy items among themselves which is known as the community. The selling and buying is done by seller and buyer themselves for example, buying and item through Facebook post which one personal message the buyer and transfer the payment themselves. The system will not provide gateway for payment as well as shipment instead, all is done between seller and buyer themselves with a e-Commerce platform provided. This means that the Admin or the owner/co-owner of the website would not have to risk themselves on being the middle man among all transaction where if anything happens, they might need to compensate or refund the money to parties involved which is good for owners as it holds no risks.

Lastly, a auto-delete data function based on account expiry date. Due to heavy load of data in databases as well as the expensive tag on data storage, it is better for data to be cleared automatically but safely as we might not know whether the user still needs the data or not. Hence, the auto-delete function will allow this to happen by renewing a user's last login date everytime they login to the system. If the user does not log in for

5 years consecutively, the account will expired and all datas associated to the account will be deleted automatically. This feature will make space for more data to come and save some cost in constant buying of new servers or databases.

## **1.6 Report Organization**

The details of this research are shown in the following chapters. In Chapter 2, there will be a comparison of existing and related system which is Joomla!, WordPress as well as Drupal. A comparison will also be done with the proposed system to show what are some of the feature that will or will not be included in the proposed system. In Chapter 3, it will be the system design which includes use case, flowcharts and activity diagrams of each features that will be included in the proposed system as well as some descriptions. Timeline for the proposed system will also be included in chapter 3. In chapter 4, methodology, tools and requirements will be described in a more detailed manner. In chapter 5,6,7 it will focus on the 3 objectives which has been suggested that is the layered architecture, e-Commerce feature as well as the auto-delete feature along with the implementation and testing for these features. Chapter 8 will be the conclusion where the project will be reviewed, and contributions will be highlighted.



## Chapter 2: Literature Review

### 2.1 Overview

In this chapter, 3 of the most known and famous content management system will be reviewed which includes Drupal, Joomla!, and WordPress. Each system reviewed will have their strengths and weaknesses included for a clear understanding of current problems and advantages each system possessed.

### 2.2 Literature Review

#### 2.2.1 Drupal



Figure 2.1: The figure above shows the logo of Drupal (*Drupal logos / Drupal.org*, no date).

Drupal is an open source CMS that is administered under General Public License. Drupal is written in PHP provides a back-end framework for users ranging from personal blogs to political and government sites. A few examples of Drupal users includes RedHat and also The Economist (Contu *et al.*, 2016). Being an open-source content management system and with the slogan “Come for the code, stay for the community.” Users can download Drupal software for free and do what they like with it. There is also a community of users coming from around the world to improve the code, write documentation, run events as well as support each other (*Introduction to Drupal / Drupalize.Me*, no date). Drupal started off as a small news site with a web board where the founder, Dries Buytaert and his friends could update each other with their activities. Under drop.org, Drupal was released as software under drop.org which bears the idea to allow other users to use and extends the experimentation platform so that more people can explore a new path in web developments (*Our history /*

*Drupal.org*, no date). Drupal can be powered by Pantheon or Acquia in order to create a CMS online.

Strengths:

Satisfaction among users is high

- According to a survey conducted by Acquia, one of the cloud providers for Drupal conducted a survey and in figure 2.2, it showed that Drupal ranked higher than both WordPress and Joomla in terms of customer's content creation satisfaction. Feedbacks from users includes users achieved what they have envisioned for in the first place.

Suitable for enterprise or business that involves a high number of traffic

- One of the weakness being a lot of effort needed means that users who uses Drupal should have least enough technical knowledge which is suitable for enterprise solution or high traffic complex sites.

Weaknesses:

Not east to use:

- In figure 2.3, according to a survey conducted by Acquia which is one of the cloud provider for Drupal to hold website for online users conducted a survey which shows in the figure below that indicated that in terms of ease of use, WordPress is easier to use to Drupal although Drupal is easier to use compared to Joomla!.

Requires a lot of effort

- In figure 2.2, according to a survey conducted by Acquia as well shown that the average effort needed to create content is highest among WordPress and Joomla. This strongly fortifies that Drupal is not a CMS that is learning friendly nor use.

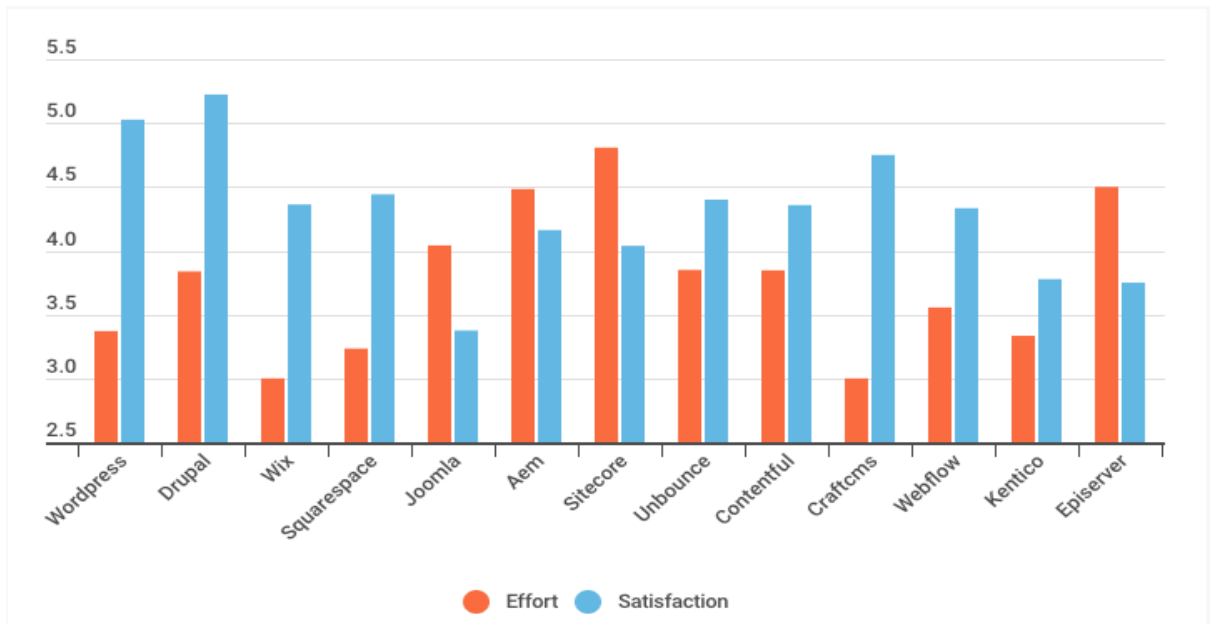


Figure 2.2: The figure shows the effort required and satisfaction of customer comparison (Prue, 2019).

Content Management Systems

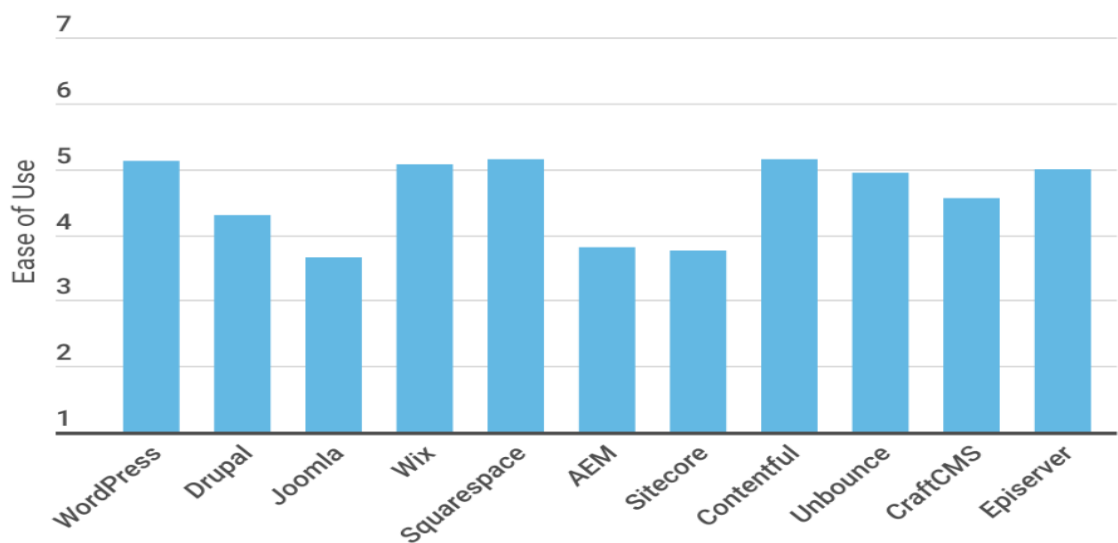


Figure 2.3: The figure above shows the comparison table of ease of use between content management system (Prue, 2019).

### 2.2.2 Joomla!



Figure 2.4: The figure above is the official logo of Joomla!

Joomla!, initially released 14 years ago on the 17<sup>th</sup> of August 2005 developed by Open Source Matters, Inc. Is an open-source CMS used to publish web content and is developed using MVC framework and written in PHP. Few of the websites that use Joomla includes Harvard University and The Hill (Contu *et al.*, 2016). Joomla!'s latest release is the version of 3.9.13 which was released on the 5<sup>th</sup> of November 2019. The latest version of Joomla! the release includes two security vulnerabilities and several bugs and improvements. Figure 2.6 below shows one of the security vulnerability which will be solved if the user updates their Joomla! to the latest 3.9.13 version. Joomla! 3.9.13 version improves PHP 7.4 compatibility, improves reverse proxy support, improving sending mass mails and more (*Joomla 3.9.13 Release*, 2019).

Strengths :

Flexible system, easy to extend and customize

- Number of free and high-quality templates available.
- Layout and overrides system, as well as built-in extendable functions, makes custom layouts, languages overrides, template overrides, custom CSS and much more achievable.

### Security patch to update vulnerabilities

- A dedicated group of people under the Security Strike Team of Joomla constantly release patches to fix exploits or before the exploits even make it to Joomla.

### Open Source Software

- Created, supported and maintained by group of community who believes that Joomla should be free and available to everyone.
- Community as well includes people who are good and experienced in developing and maintaining Joomla as they believe in Free Open Source Solutions.

### Multilingual Content Management System

- Includes over 70 translation packs available for the core and support provided for multilingual content management as well as language association.

### Weaknesses :

#### Costs

- Certain plugins come with a price tag for Joomla which limits the usage and scope of work for users who are using the free version and plugins.

#### Complicated to use

- Although there are articles that stress that Joomla is easy to use, personal experience is that Joomla's functions are hard to discover, for example, it took one quite some time before he was able to locate where he can edit his newly hosted testing website.

#### Changes are not immediate

- After personally trying out Joomla! through using their free hosting service, it is noticed that when a user edits his or her content from the editor, even though the result is saved and confirmed, the site does not refresh or redirect itself to implement the new changes whereas the site just stayed the same and user has

to refresh or redirect the site himself/herself in order for the changes to take place.

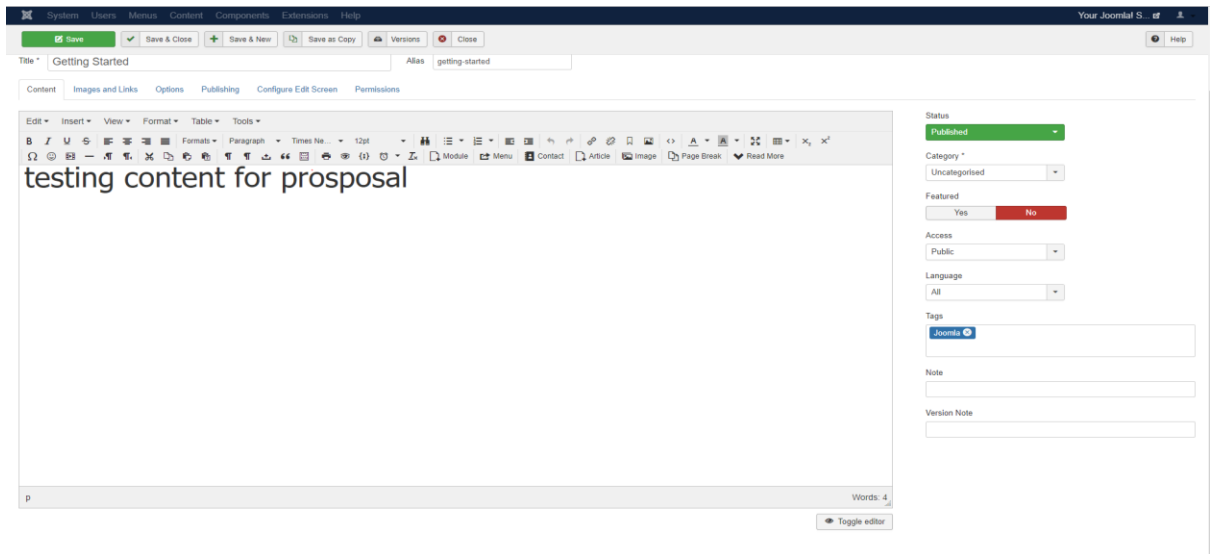


Figure 2.5: The figure above shows the content editor for Joomla! (*Joomla Content Management System (CMS) - try it for free!*, no date).

## Security Announcements

### [20191001] - Core - CSRF in com\_template overrides view

- **Project:** Joomla!
- **SubProject:** CMS
- **Impact:** High
- **Severity:** Low
- **Versions:** 3.2.0-3.9.12
- **Exploit type:** CSRF
- **Reported Date:** 2019-October-10
- **Fixed Date:** 2019-November-05
- **CVE Number:** [CVE-2019-18650](#)

#### Description

A missing token check in com\_template causes a CSRF vulnerability.

#### Affected Installs

Joomla! CMS versions 3.2.0 - 3.9.12

#### Solution

Upgrade to version 3.9.13

#### Contact

The JSST at the [Joomla! Security Centre](#).

**Reported By:** Lee Thao from Viettel Cyber Security

[< Prev](#)

[Next >](#)

Figure 2.6: The figure above shows one of the security vulnerabilities that is patched with latest version (*Joomla 3.9.13 Release, 2019*).

### 2.2.3 WordPress



Figure 2.7: The figure above is the official logo of WordPress (*Graphics & Logos / WordPress.org*, no date).

WordPress, started in 2003 by Mike Little and Matt Mullenweg. Supported by the community filled with skilled, enthusiastic developers, designers, and more personnel. WordPress, an open-source CMS built on PHP and MySQL and licensed under GPLv2 (*About Us: Our Mission / WordPress.org*, no date). The latest release for WordPress is version 5.3 “Kirk” inspired by Rahsaan Roland Kirk, renowned jazz multi-instrumentalist focus on expanding and refining WordPress’s block editor with more interactions and improved accessibility. Features such as automatic image rotation, improved sit health checks, and admin email verification also have been improved in the version’s release. Developer wise, WordPress’s latest version release fixes Date time component which makes it more reliable as well as PHP 7.4 compatibility to remove deprecated functionality and ensure compatibility (Mullenweg, 2019).

Strengths:

Built for Publishing

- The overall design of WordPress’s content editor is very clean and neat as it is very clear as to what they can do. There are also fewer buttons and is more to keyboards, for example, enter to trigger another textbox. The textbox as well

moves aligns downwards if no movement is made, making it very suitable and very blog-friendly.

#### Easy to use and manage

- As mentioned in previous strength WordPage is very easy to use and manage. Users can also preview his or her changes to their page before it is submitted to make sure it satisfies what they wanted.
- Adding and editing existing article as well is very easy and not very complicated looking as the content editor is not the usual content editor whereby this is more dynamic for example, the text box can be moved around on the spot unlike the usual content editor whereby changes are seen after it is saved and text boxes are not movable like WordPress.

#### Open Source Software

- Created, supported and maintained by a vibrant group of users who have solved many of the toughest challenges.

#### Weaknesses :

##### Performance

- There are feedbacks from online users that uses WordPress for large business complained that it is slow in terms of performance after a user started adding themes and plugins.



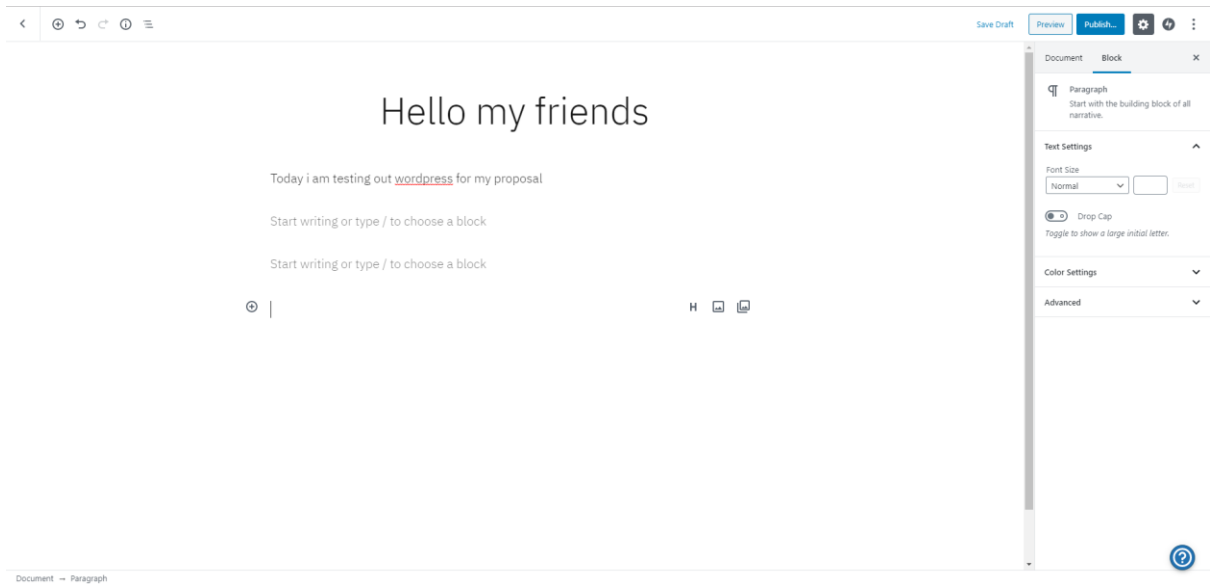


Figure 2.8: The figure above shows the content editor for WordPress (*Blog Tool, Publishing Platform, and CMS — WordPress.org, no date*).

### 2.3 Comparison Table

Features/Functions	Drupal	Joomla!	WordPress	Proposed System
Integrated E-commerce management system with normal content management system	No	No	No	Yes
Three-layer architecture	No	No	No	Yes
Auto delete old data	No	No	No	Yes
Manage content including images and text in certain designated places	Yes	Yes	Yes	Yes
Forum for discussion	Yes	Yes	Yes	Yes
User-Friendly	Yes	Yes	Yes	Yes
Ready to use Template	Yes	Yes	Yes	Yes
Other languages than English	Yes	Yes	No	No
Easy to use and learn	No	Yes	Yes	Yes
Photo book for collection of images in a photo book	Yes	Yes	Yes	Yes

Upcoming events inside content management system	No	No	No	Yes
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Table 2.1: The table above is a comparison of 3 reviewed system as well as what will be included in the proposed system

## 2.4 Recommendation

System reviewed each have their own strengths and weaknesses. Some say that Joomla is the best while others say that WordPress or Drupal are the best, user's opinion is always divided and there will never be a clear answer to who is the best. But in terms of learnability and first impression, Drupal and Joomla! did not provide a very good impression as it is kind of hard to locate how to edit an article at first and there is no proper tutorial for first-timers. WordPress, on the other hand, is very easy to use and learn and everything is very neat and tidy to see. Certainly an additional points for them. The proposed system will have to be able to match the reviewed system at least and then proceed to implement the proposed solution into the system to make it a better and more sustainable system.

## 2.5 Summary

The proposed system will include 3 new features that are not found in the currently reviewed system. The strengths and weaknesses of each system are carefully reviewed and will be put into mind during the development of the proposed system. With some of the basic and also existing features found in the comparison table by the reviewed system with the addition of 3 new features, it is hope that the proposed system will be able to provide what the reviewed system currently does not have.

## Chapter 3: System Design

### 3.1 Overview

Content management system allows one to control his or her control with ease. Some need basic knowledge in coding while others doesn't. All 3 reviewed CMS falls under open-source project which allows the public to have the ability to manage and add new contents to the CMS. All 3 reviewed CMS uses PHP and MySQL to develop their system which some claims that PHP allows a system to be more dynamic. Online users also claimed that PHP is easy to learn and easy to use (*Why do we use PHP?*, no date) which might be the reason why the 3 reviewed CMS is developed and maintained using PHP. For the proposed CMS, it will be implementing a C# programming language and ASP.NET MVC framework which consists of a model that is part of an application that implements the logic for the application's data domain (Solution, 2017). Model basically retrieves data out from the database and store the data in a declared variable which can be called in the view of an application. Efficient coder will use a global model and place all models inside to provide a cleaner and easier to manage coding. View is basically the user interface of the application which what the client will see. Data be pulled out from database will be assigned to the respective variable inside the specific model and the data will then be assigned to textbox for example. A controller is the key and most important part of ASP.NET MVC as it handles interaction from both the model and view to enable an ASP.NET MVC framework to work perfectly. Attached below are some of the images of coding done with ASP.NET MVC. Connection with database will also be done through the controller which will pass in an object full of data into a database and then pull out data from the database which will then be placed inside a model then to the view of an application. The code will be done in a clean and tidy way in order to ease the purpose of debugging an error which can be done using breakpoints inside ASP.NET MVC. AJAX will also be implemented as in the proposed system as it has the advantage of maintaining responsiveness of user interface while the javascript is communicating with the server behind (Tashtoush *et al.*, 2019).

## 3.2 System Design Diagrams and Description

### 3.2.1 Flow Chart

#### 3.2.1.1 Flow chart for Admin view

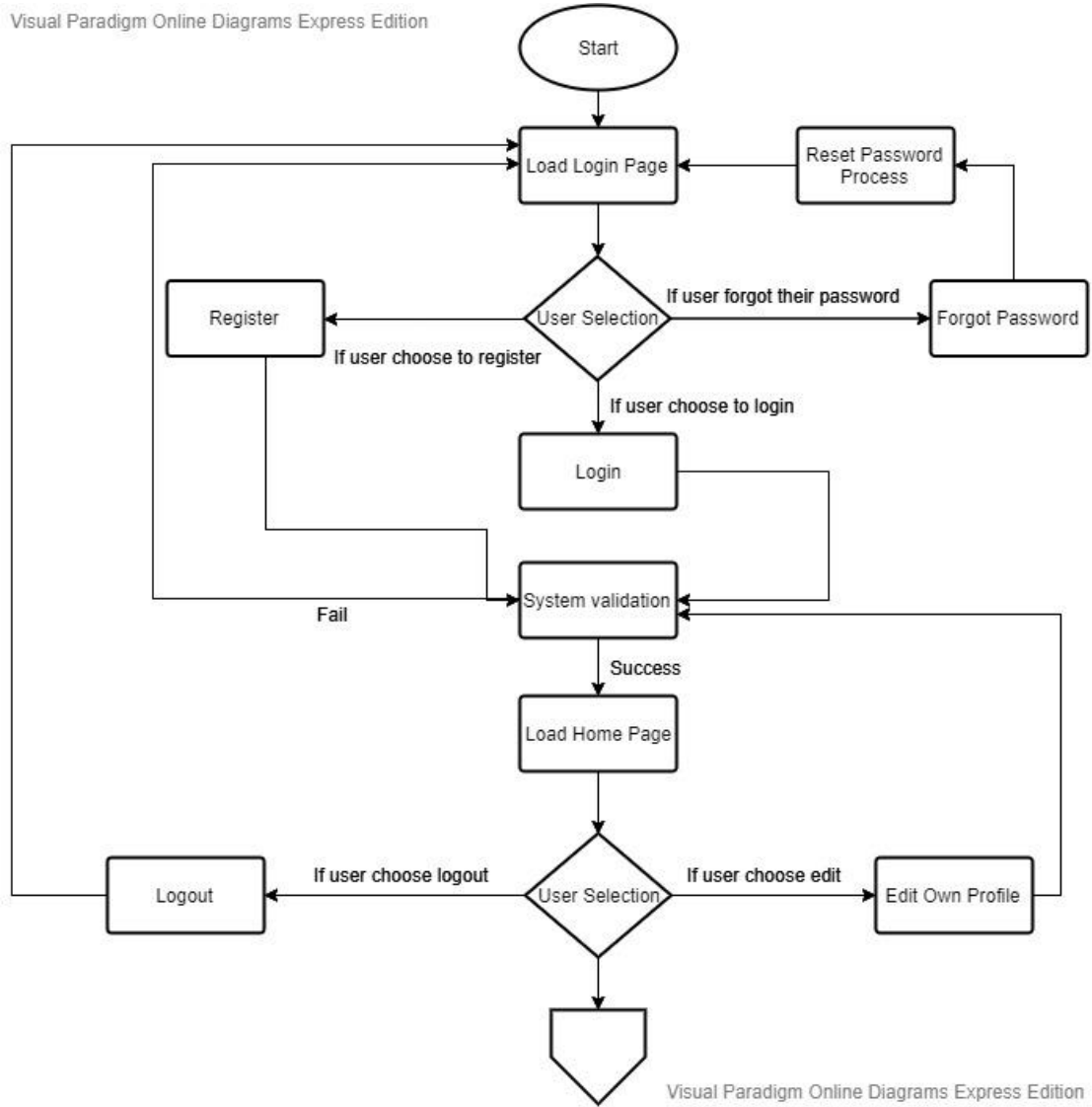


Figure 3.1: The figure above is to show the upper part of flow chart for admin view .

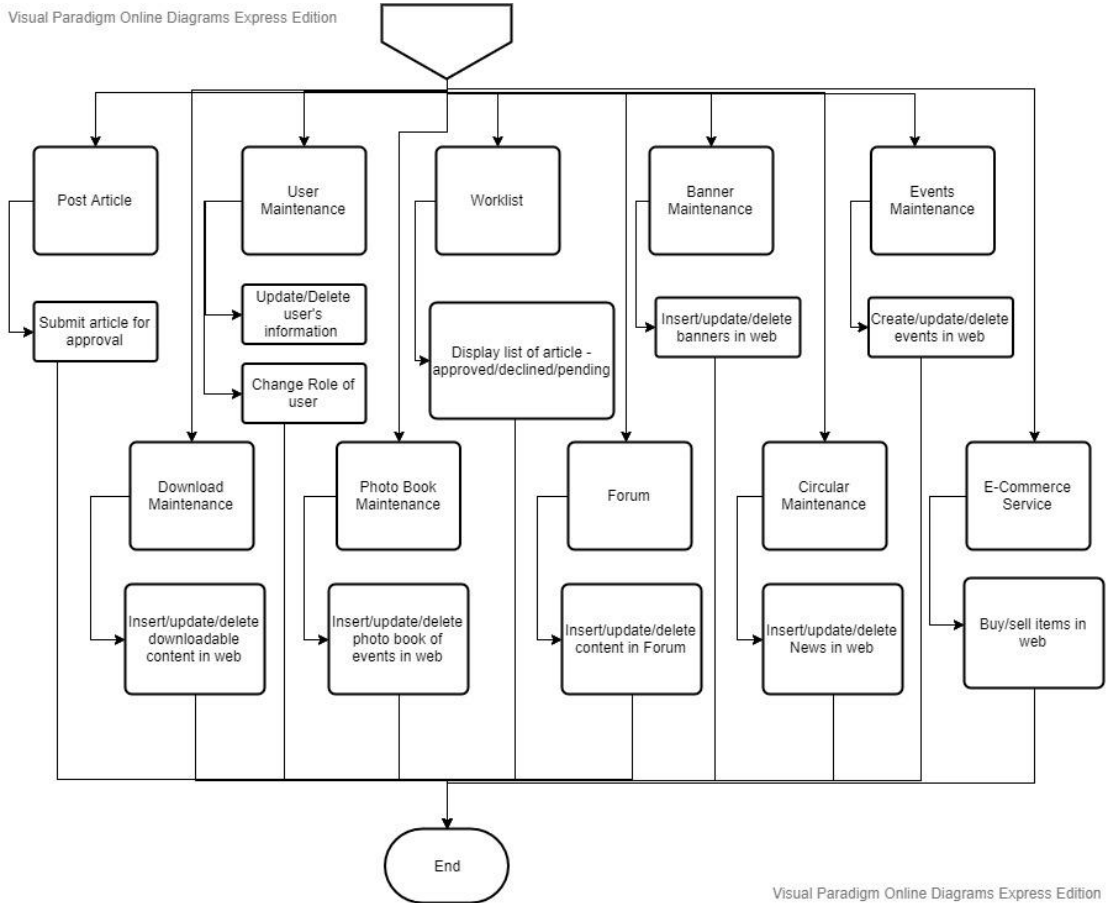


Figure 3.2: The figure above is to show the bottom part of flow chart for admin view.

### 3.2.1.2 Flow chart for Staff View

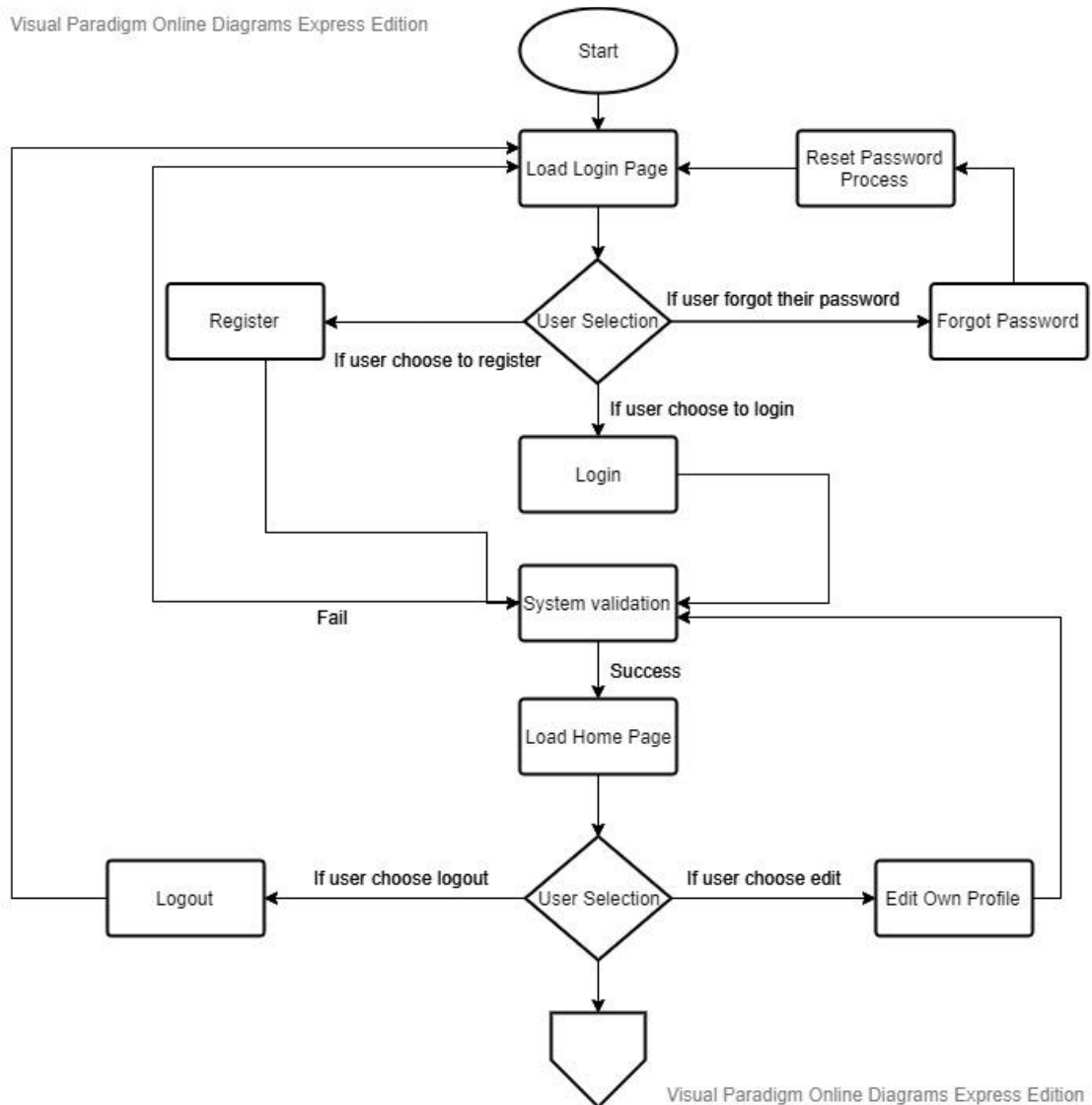


Figure 3.3: The figure above is to show the upper part of flow chart for staff view .

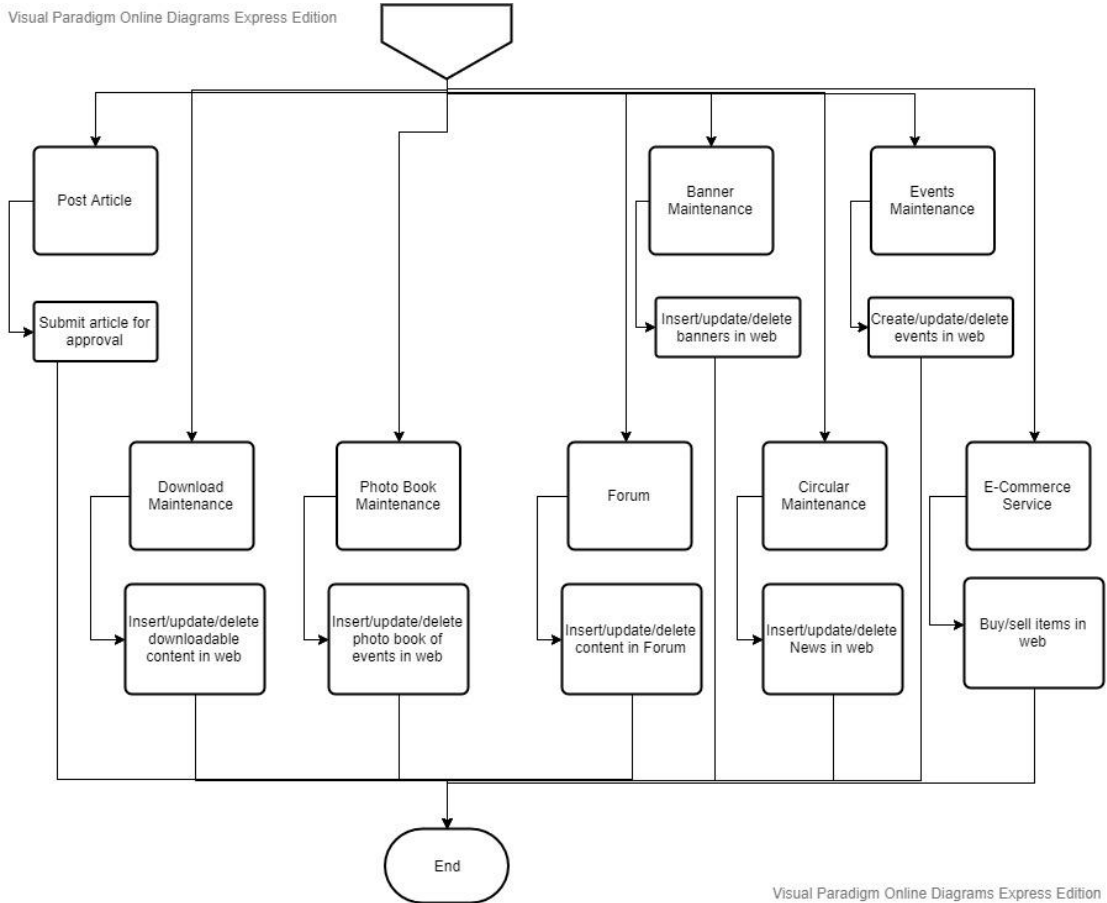


Figure 3.4: The figure above is to show the bottom part of flow chart for staff view.



### 3.2.1.3 Flow chart for Moderator View

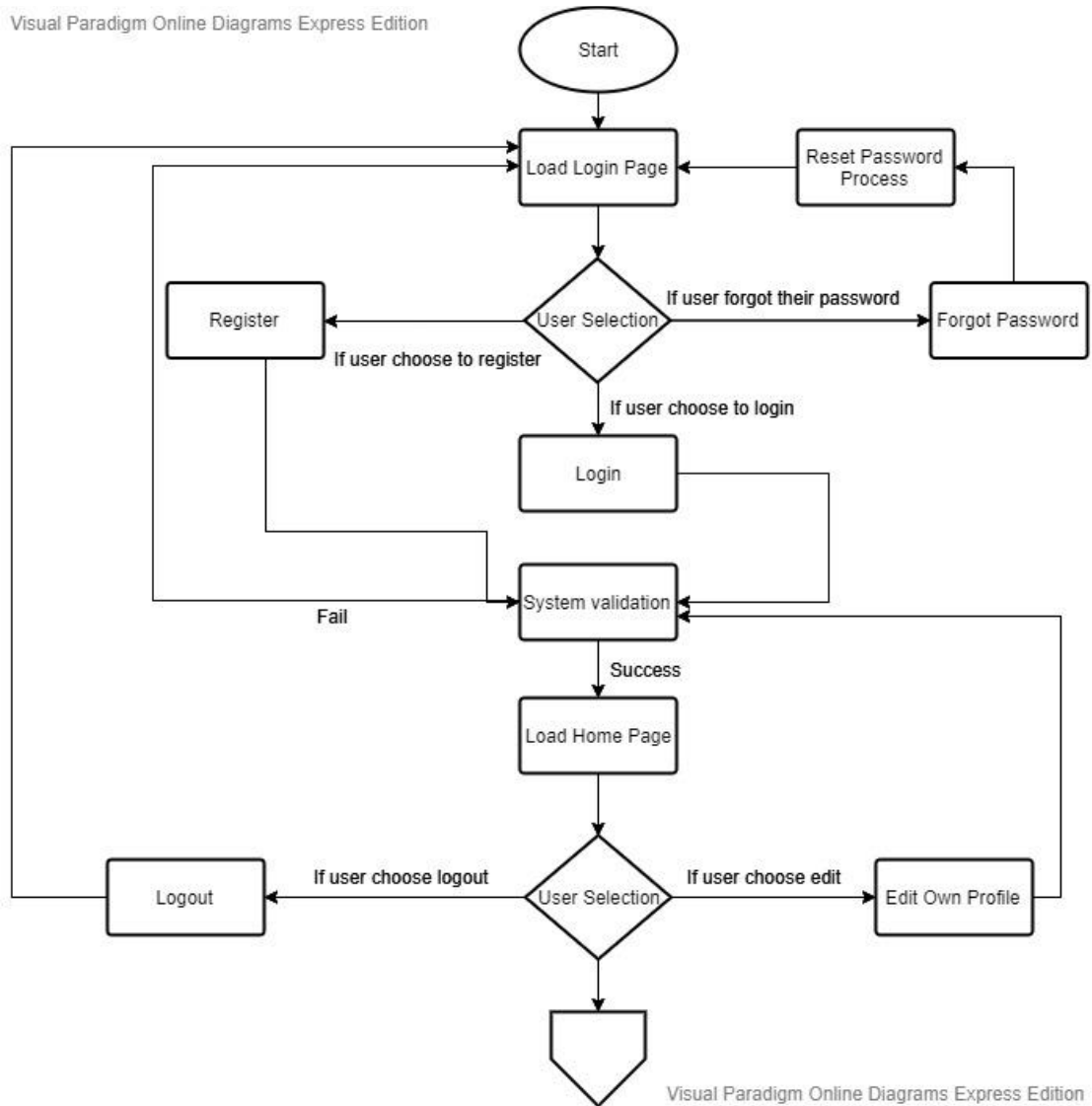


Figure 3.5: The figure above is to show the upper part of flow chart for moderator view.

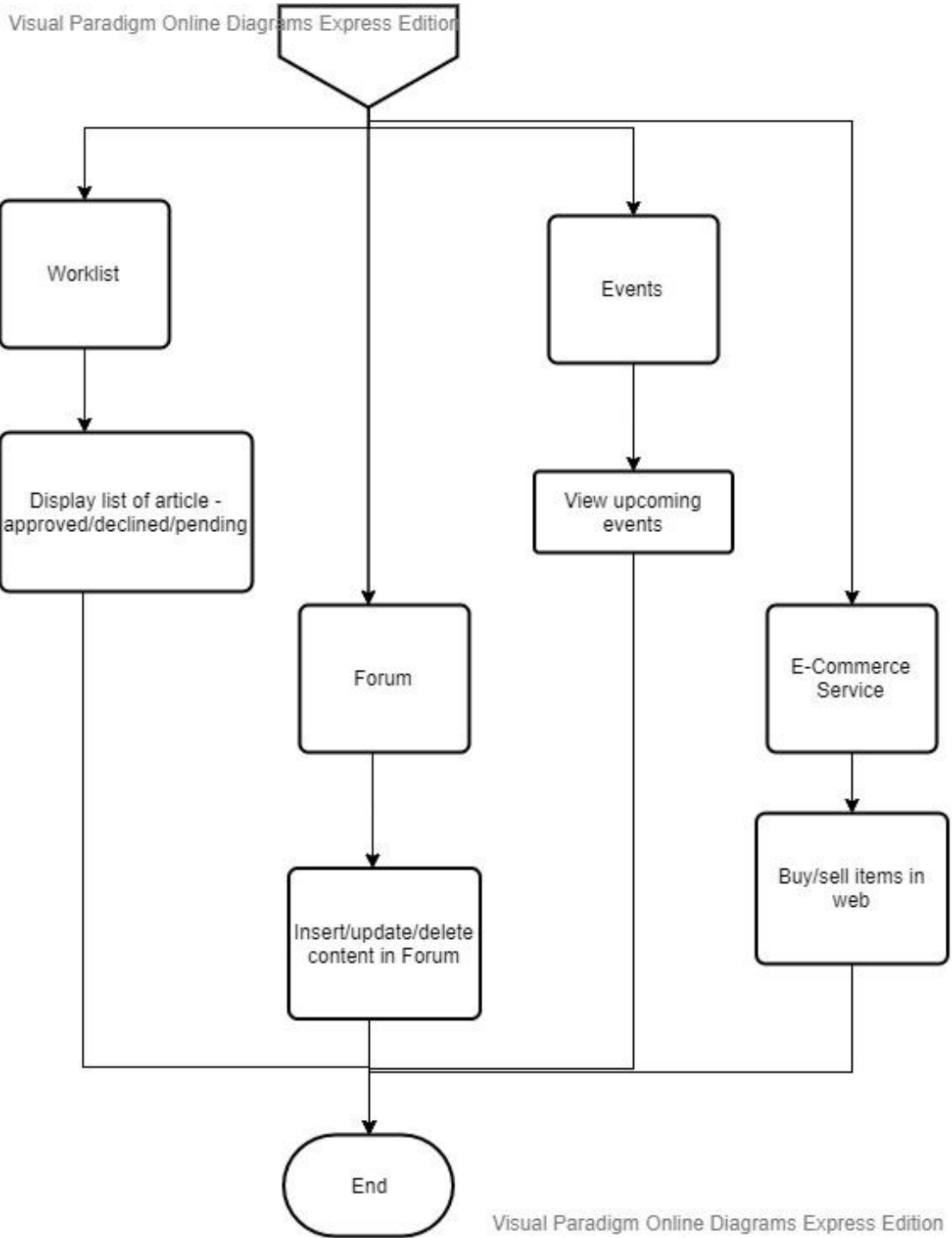


Figure 3.6: The figure above is to show the bottom part of flow chart for moderator view.

### 3.2.1.4 Flow chart for User View

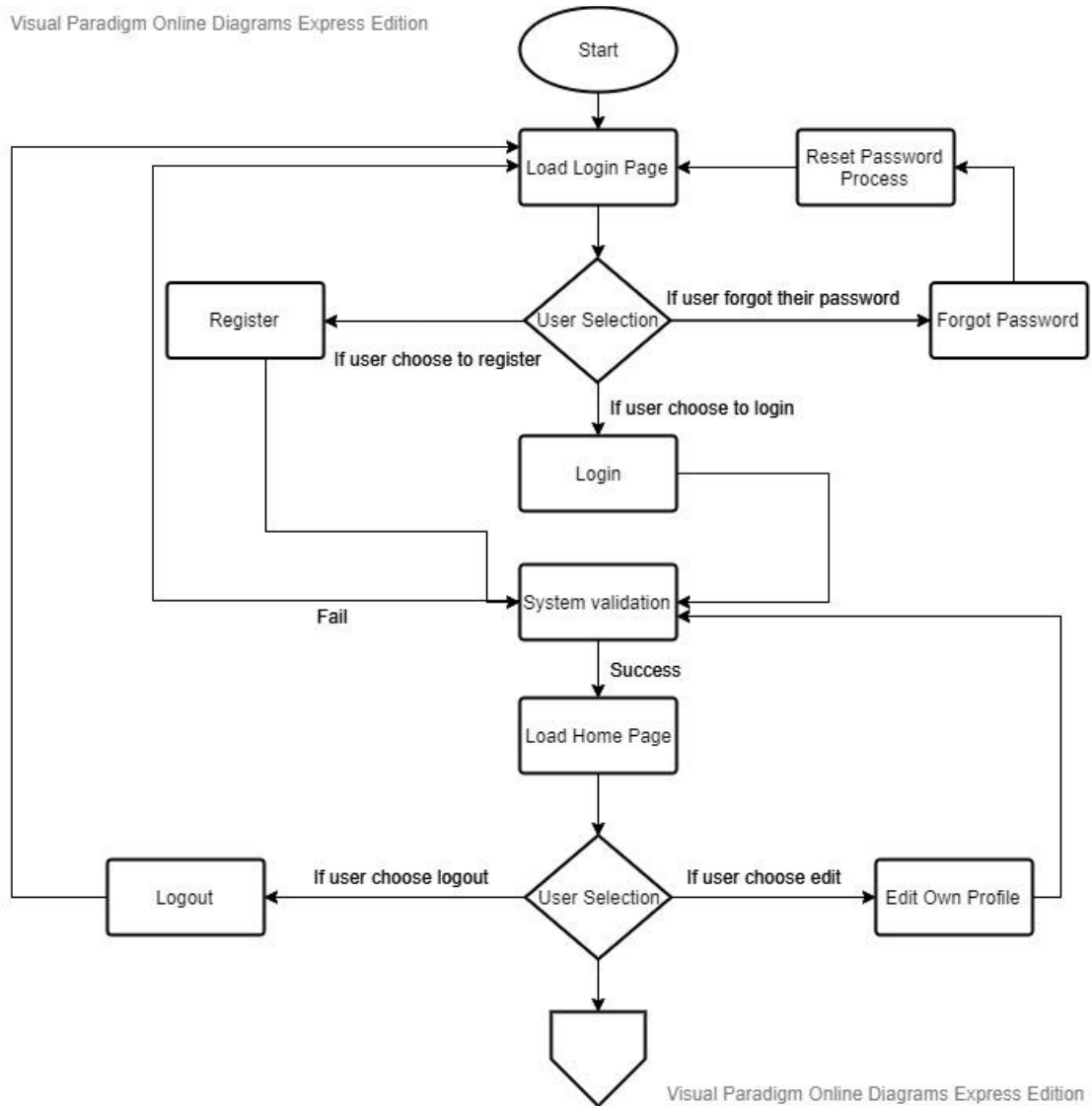


Figure 3.7: The figure above is to show the upper part of flow chart for user view.

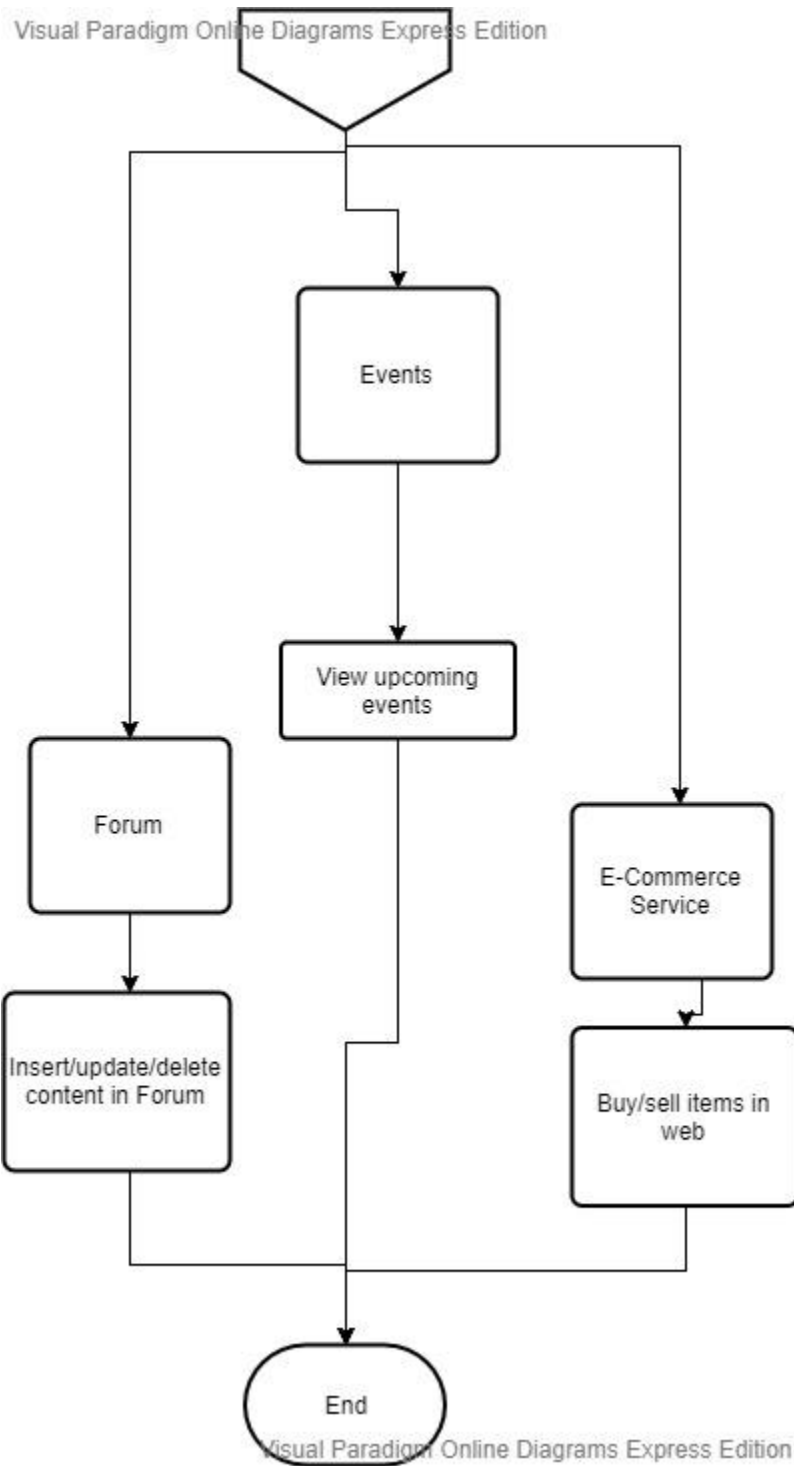


Figure 3.8: The figure above is to show the bottom part of flow chart for user view.

### 3.2.2 Use Case Diagram

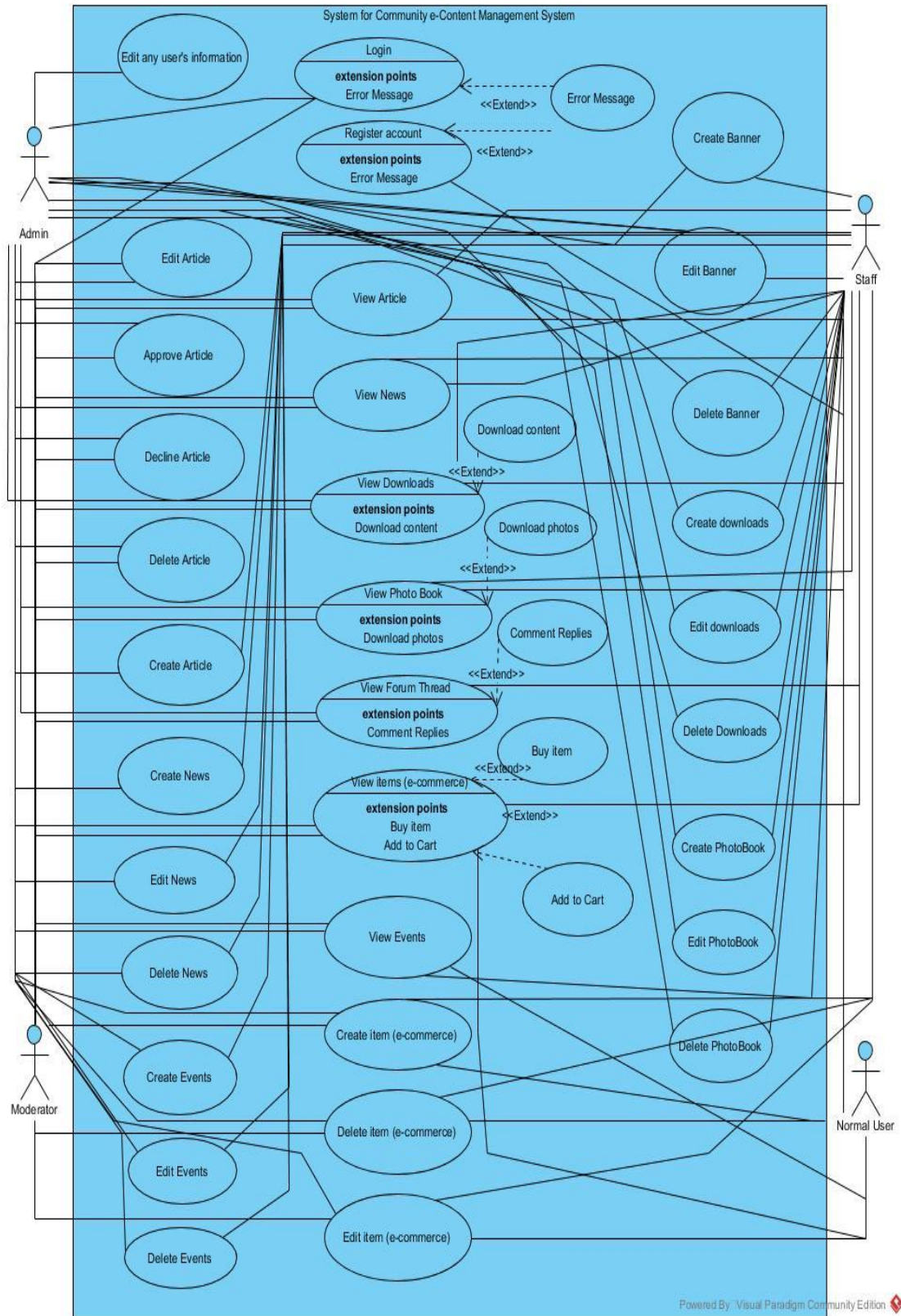


Figure 3.9: The figure above shows the use case diagram for the proposed system.

### 3.2.3 Activity Diagram

#### 3.2.3.1 Activity diagram for user signup

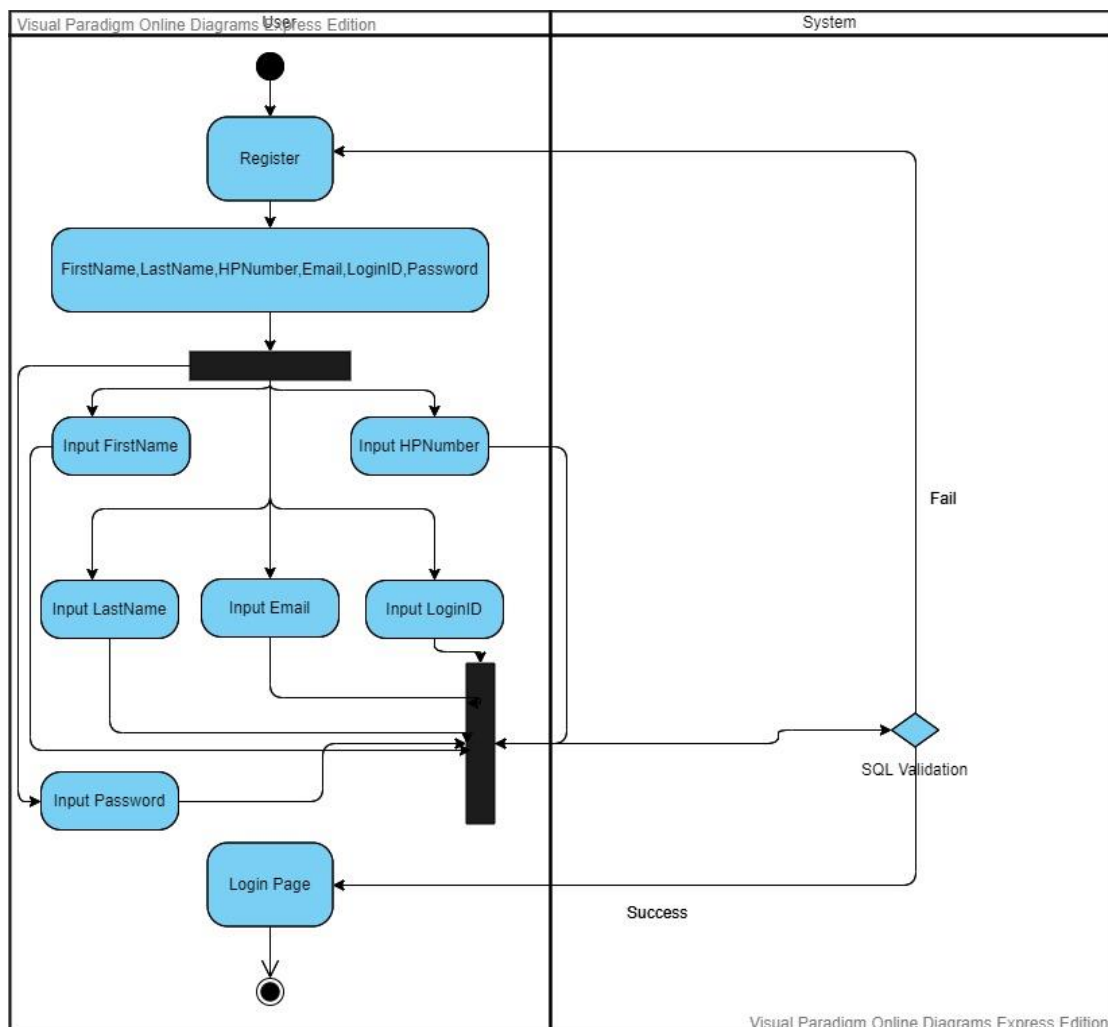


Figure 3.10: The figure above is to show the activity diagram for user signup.

### 3.2.3.2 Activity diagram for login

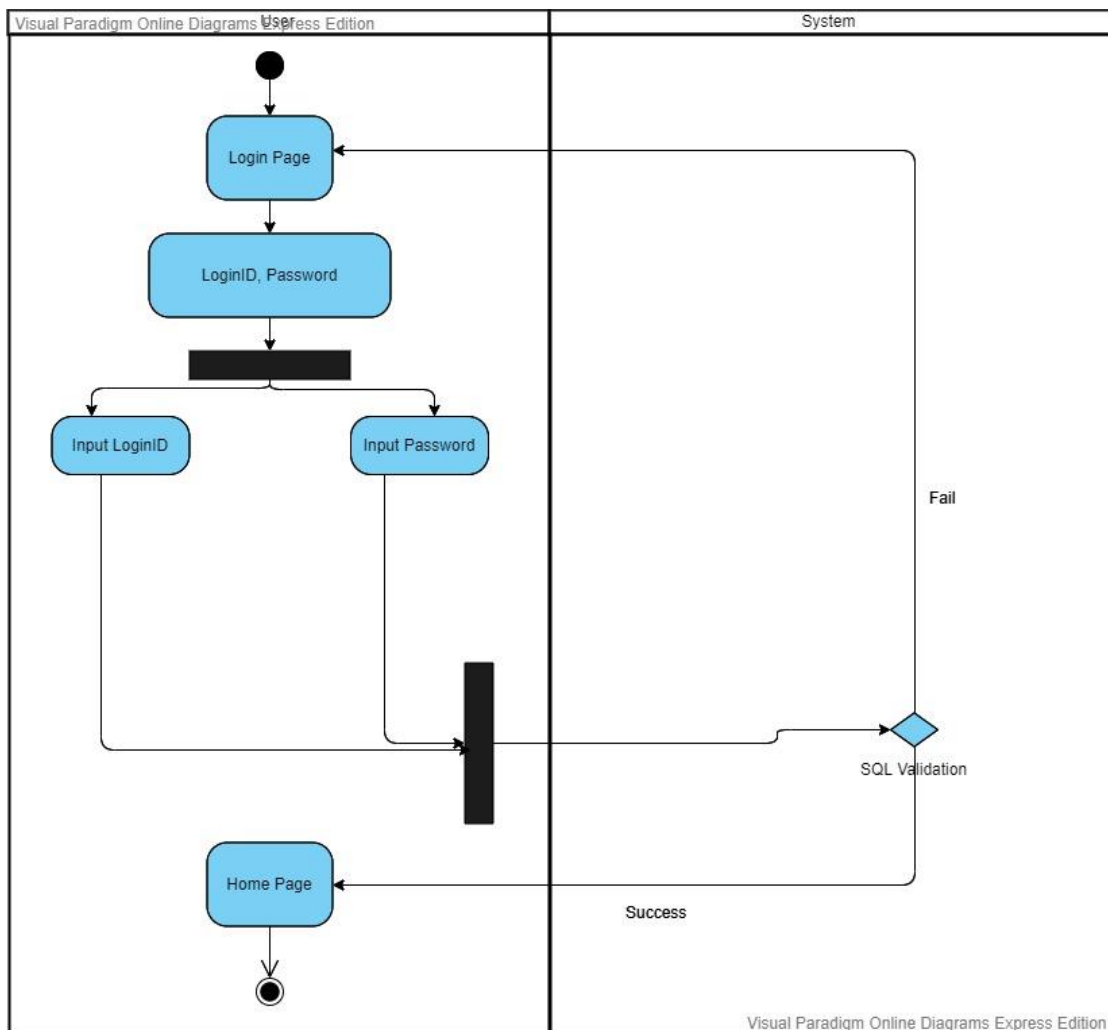


Figure 3.11: The figure above is to show the activity diagram for user login.

### 3.2.3.3 Activity diagram for User Maintenance (Admin only)

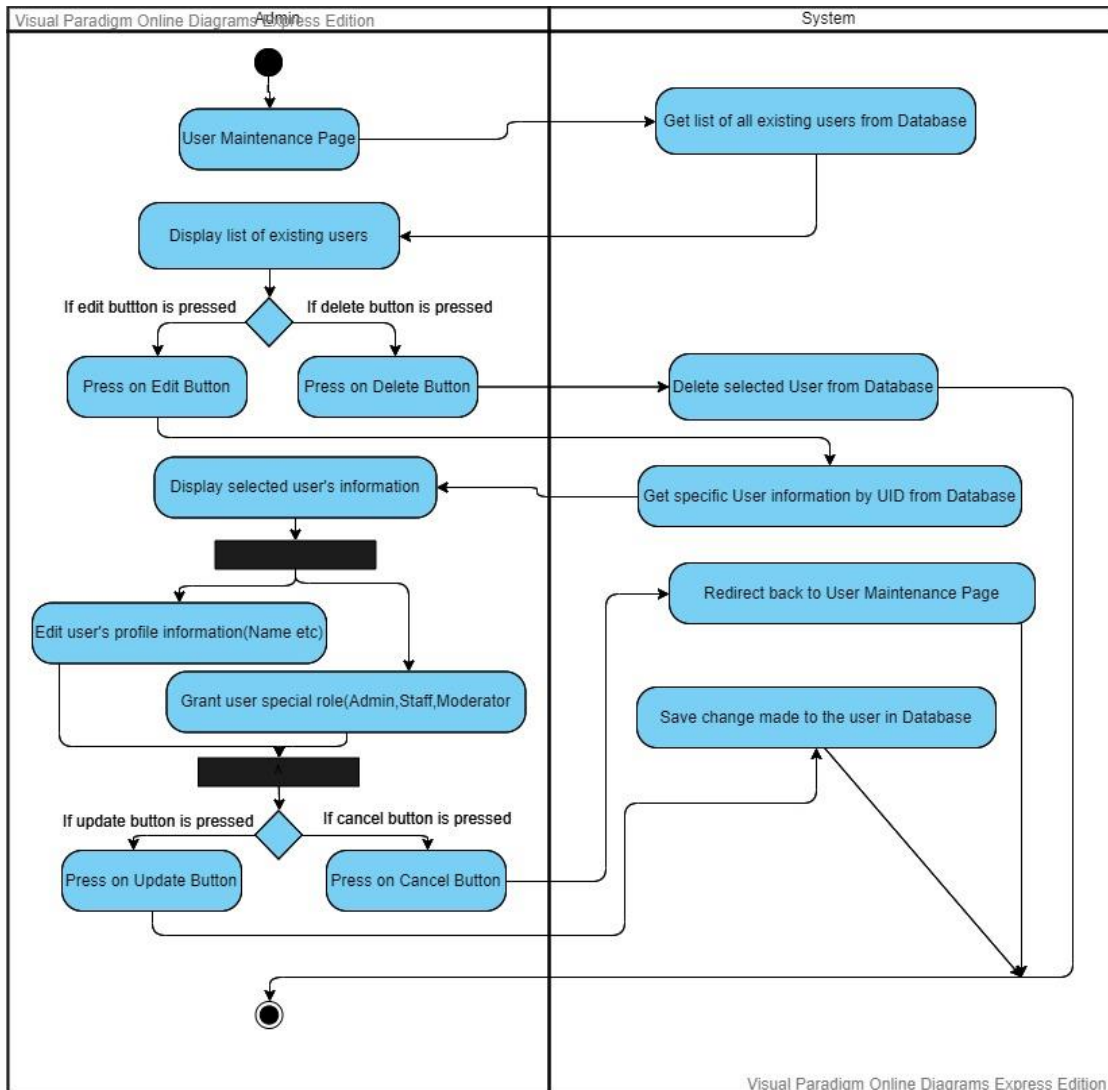


Figure 3.12: The figure above is to show the activity diagram for user maintenance (Admin use only).



### 3.2.3.4 Activity diagram for Post Article (Admin and Staff only)

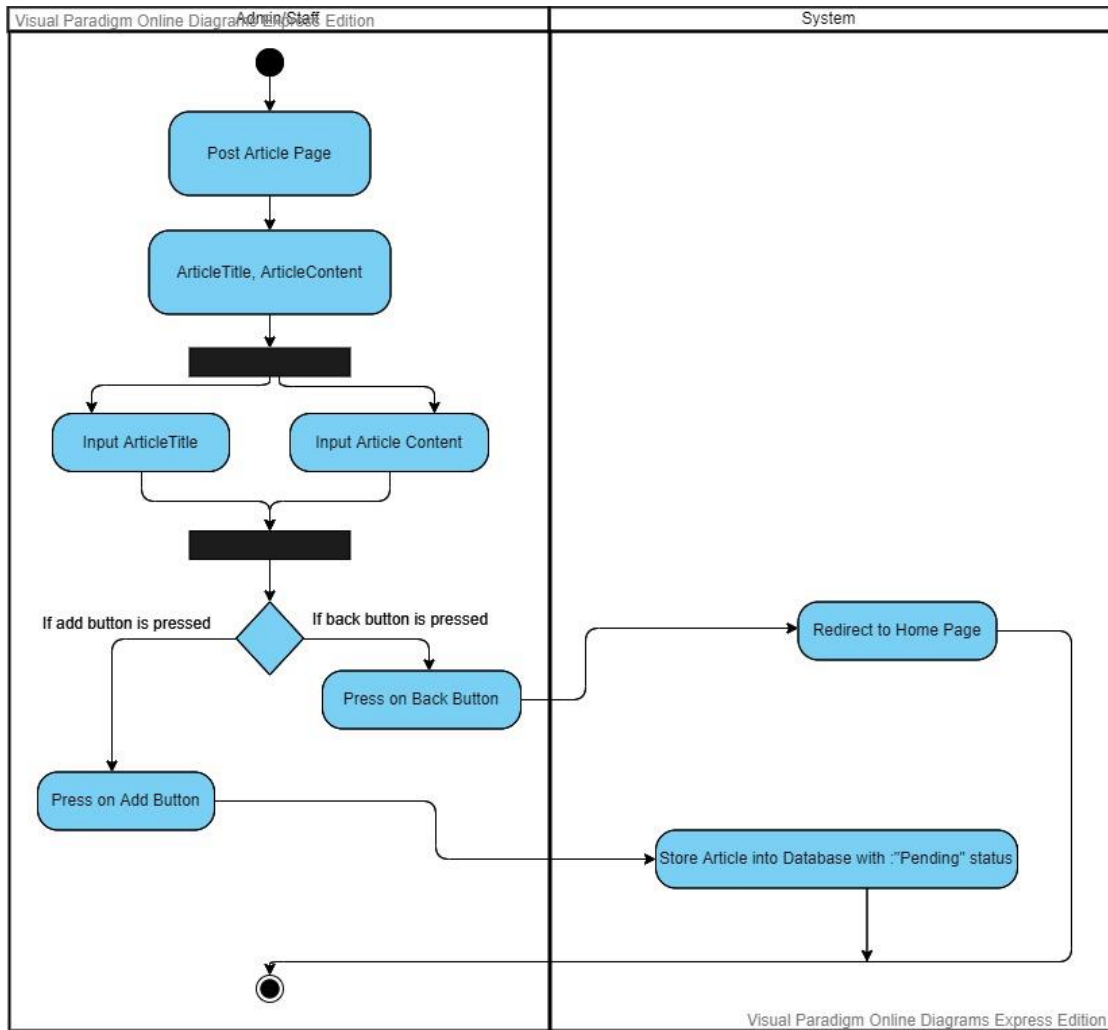


Figure 3.13: The figure above is to show the activity diagram for post article (Admin and staff use only).

### 3.2.3.5 Activity diagram for Worklist (Admin and Moderator only)

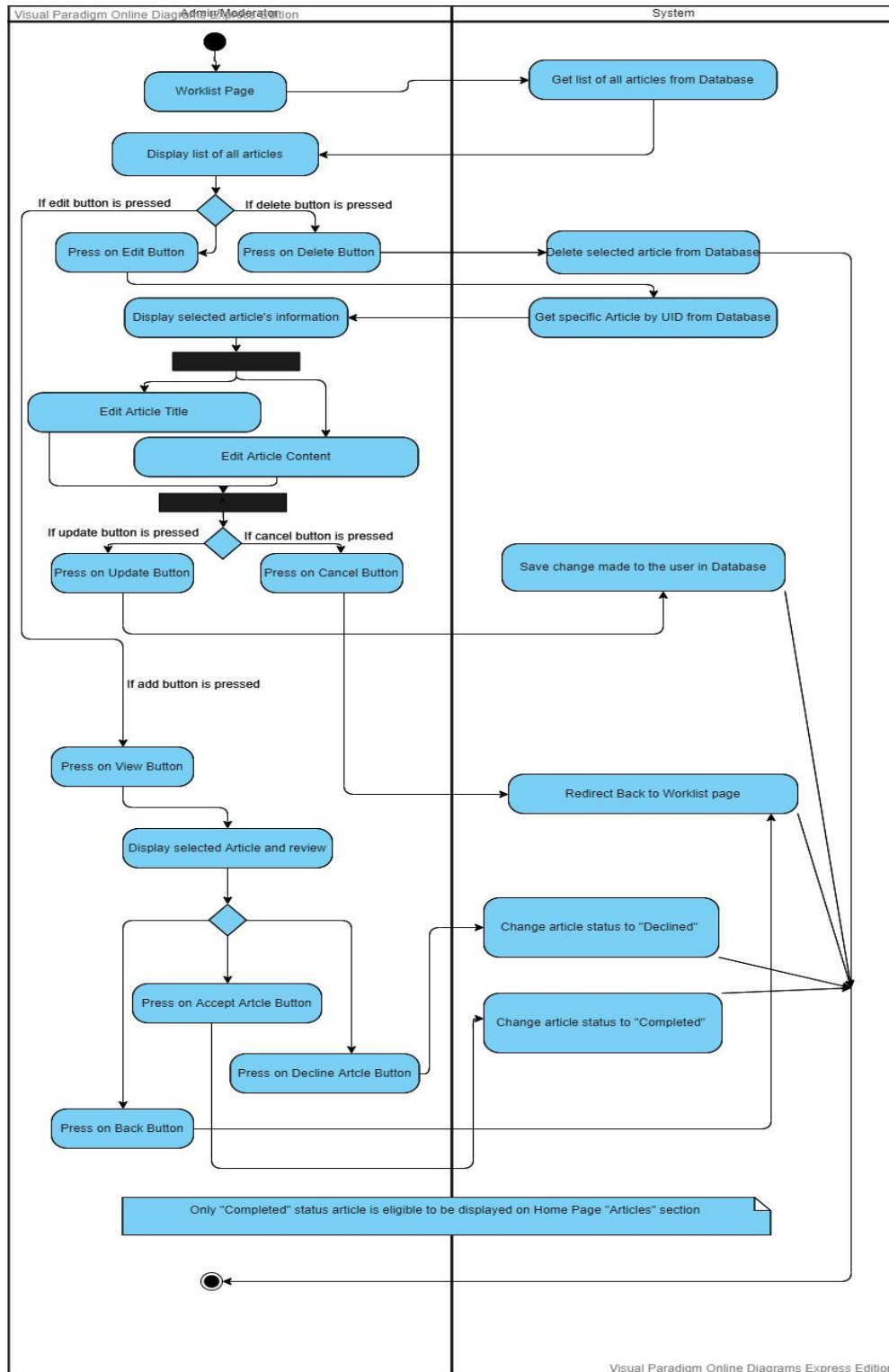


Figure 3.14: The figure above is to show the activity diagram for worklist (Admin and moderator use only).

### 3.2.3.6 Activity diagram for Banner Maintenance (Admin and Staff only)

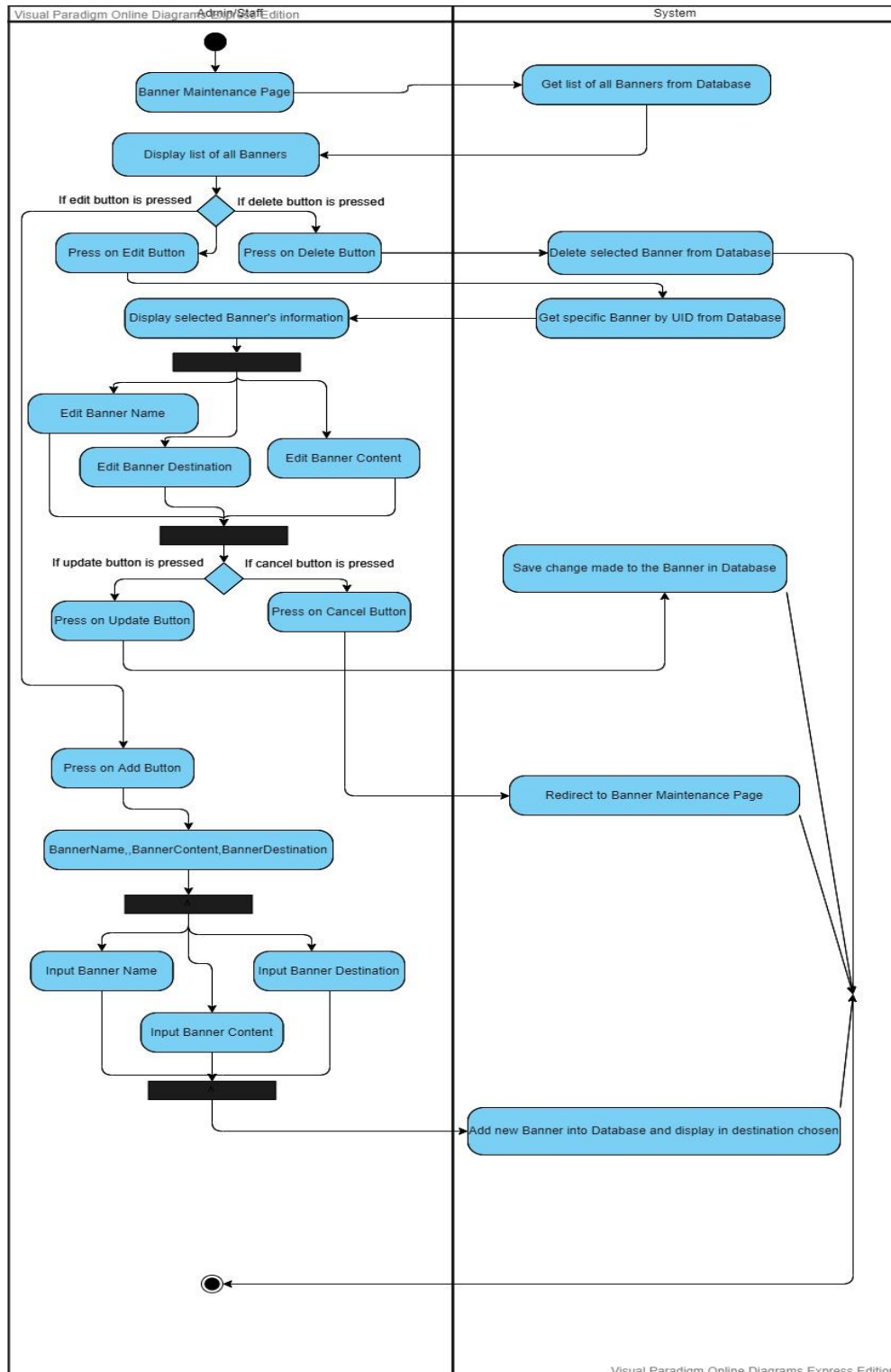


Figure 3.15: The figure above is to show the activity diagram for banner maintenance (Admin and staff use only).

### 3.2.3.7 Activity diagram for Download Maintenance (Admin and Staff only)

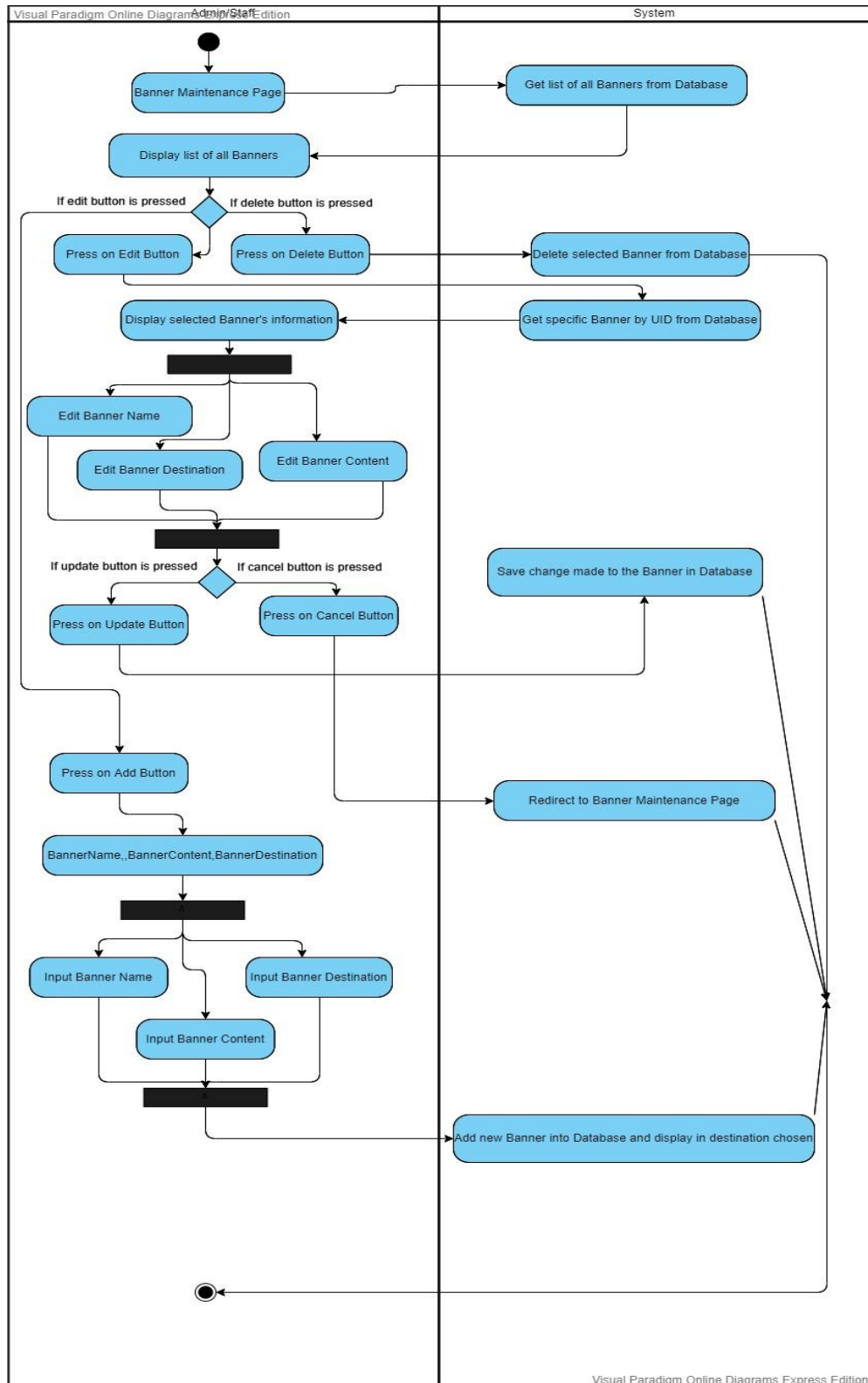


Figure 3.16: The figure above is to show the activity diagram for download maintenance (Admin and staff use only).

### 3.2.3.8 Activity diagram for Circular Maintenance (Admin and Staff only)

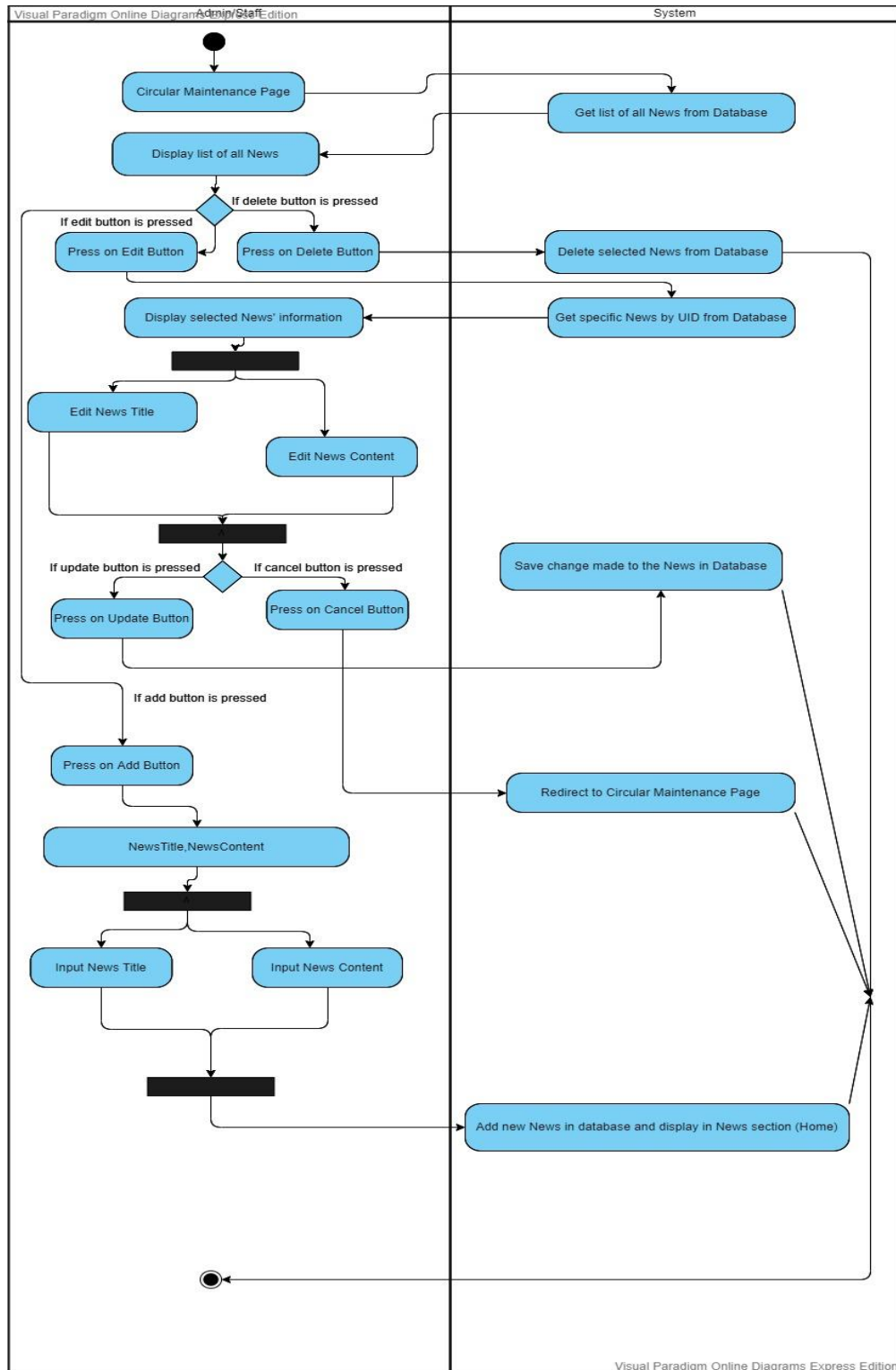


Figure 3.17: The figure above is to show the activity diagram for circular maintenance (Admin and staff use only).

### 3.2.3.9 Activity diagram for PhotoBook Maintenance (Admin and Staff only)

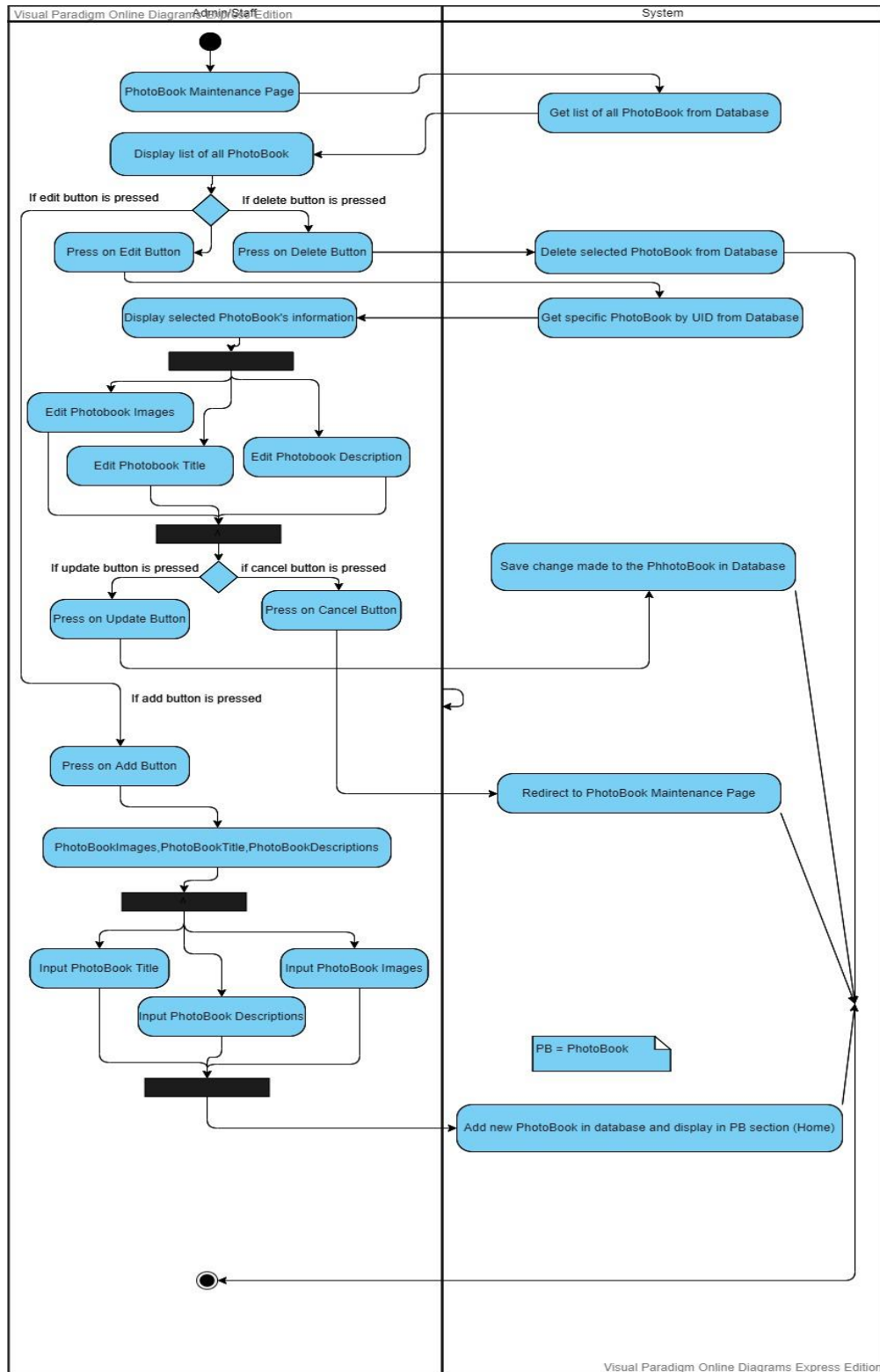


Figure 3.18: The figure above is to show the activity diagram for photobook maintenance (Admin and staff use only).

### 3.2.3.10 Activity diagram for Forum (All roles allowed)

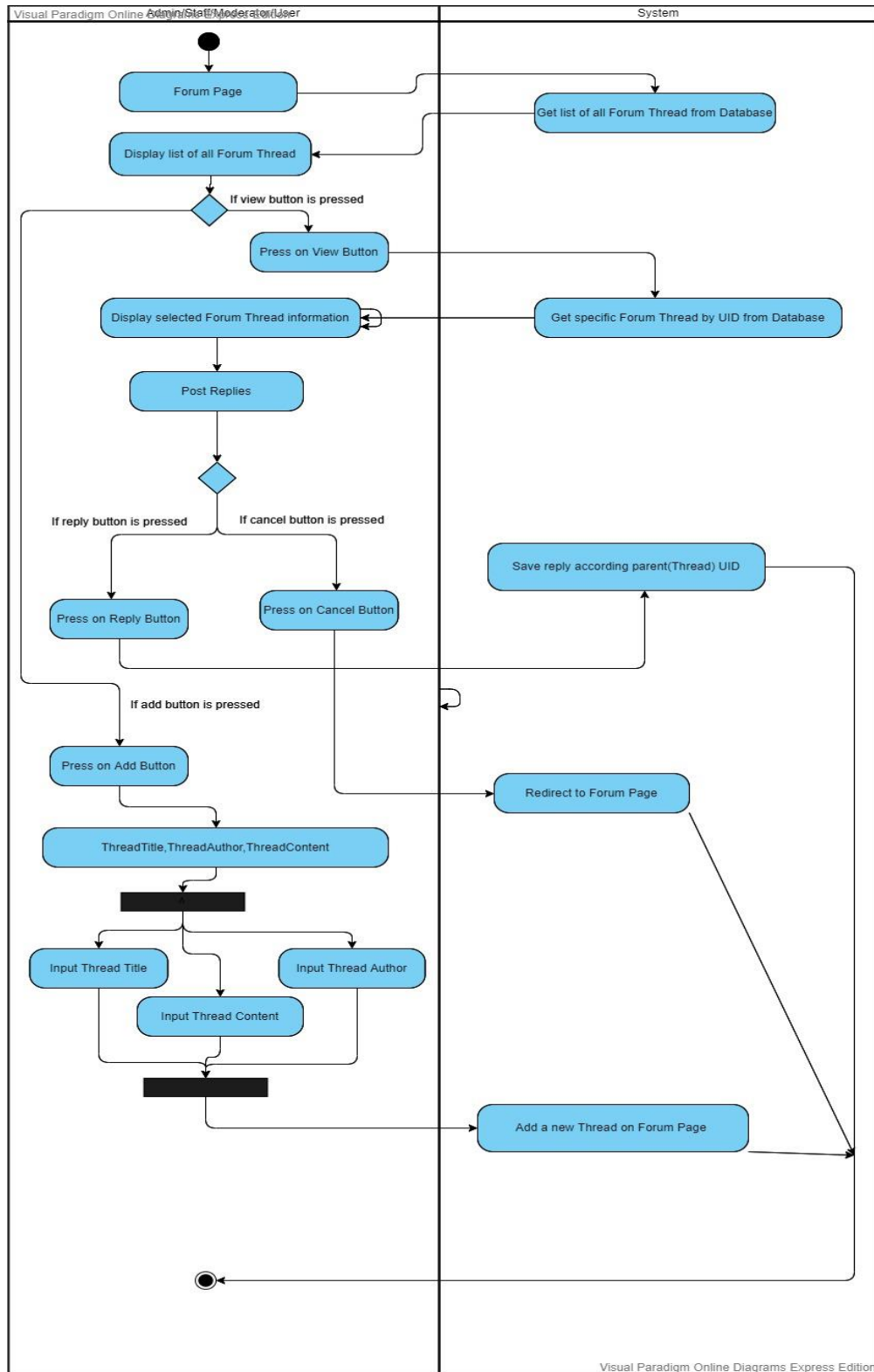


Figure 3.19: The figure above is to show the activity diagram for forum (Use by all roles).

### 3.2.3.11 Activity diagram for Event Maintenance (Admin/Staff)

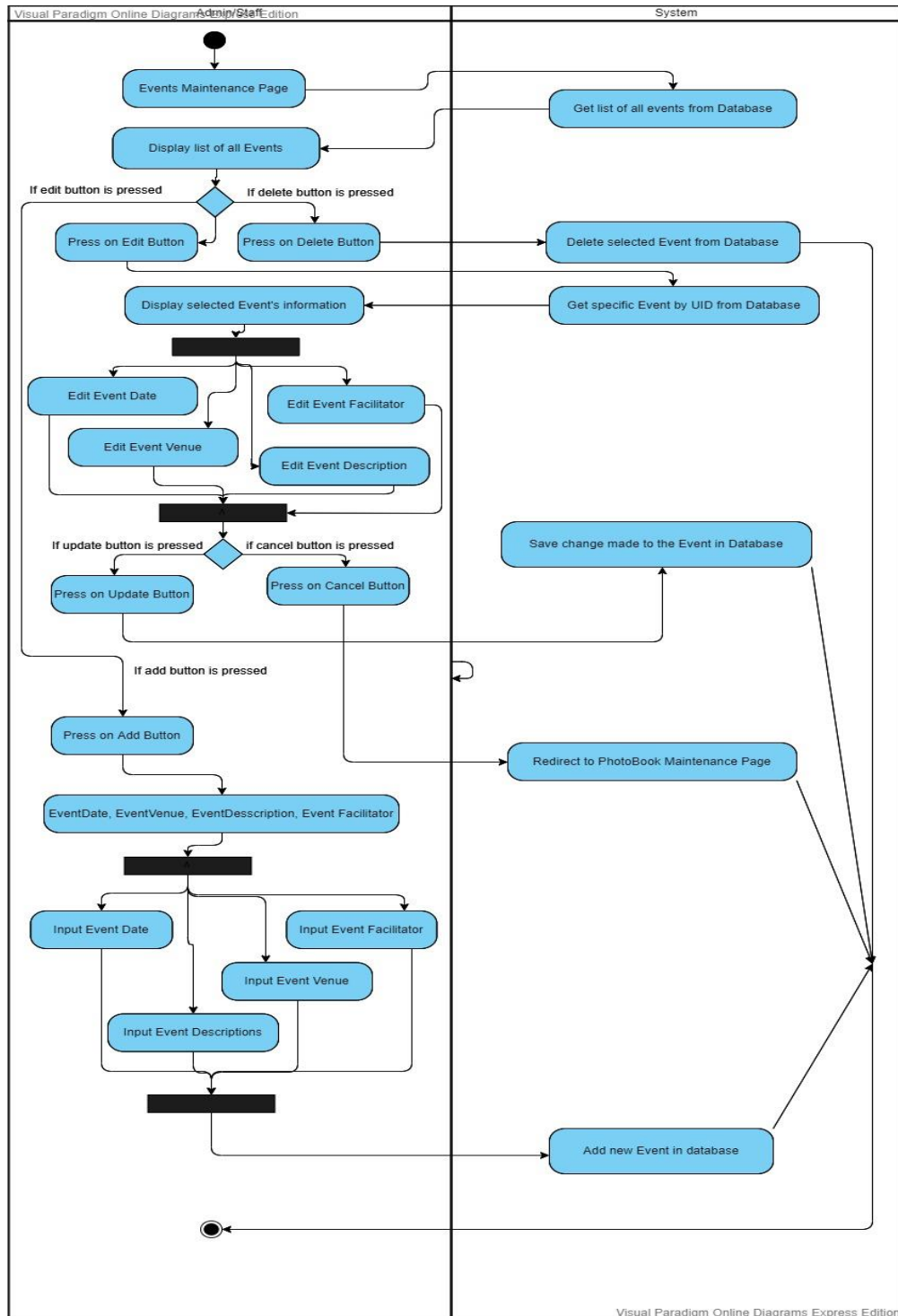


Figure 3.20: The figure above is to show the activity diagram for Event Maintenance (Use by Admin/Staff).



### 3.2.3.12 Activity diagram for E-Commerce (All roles allowed)

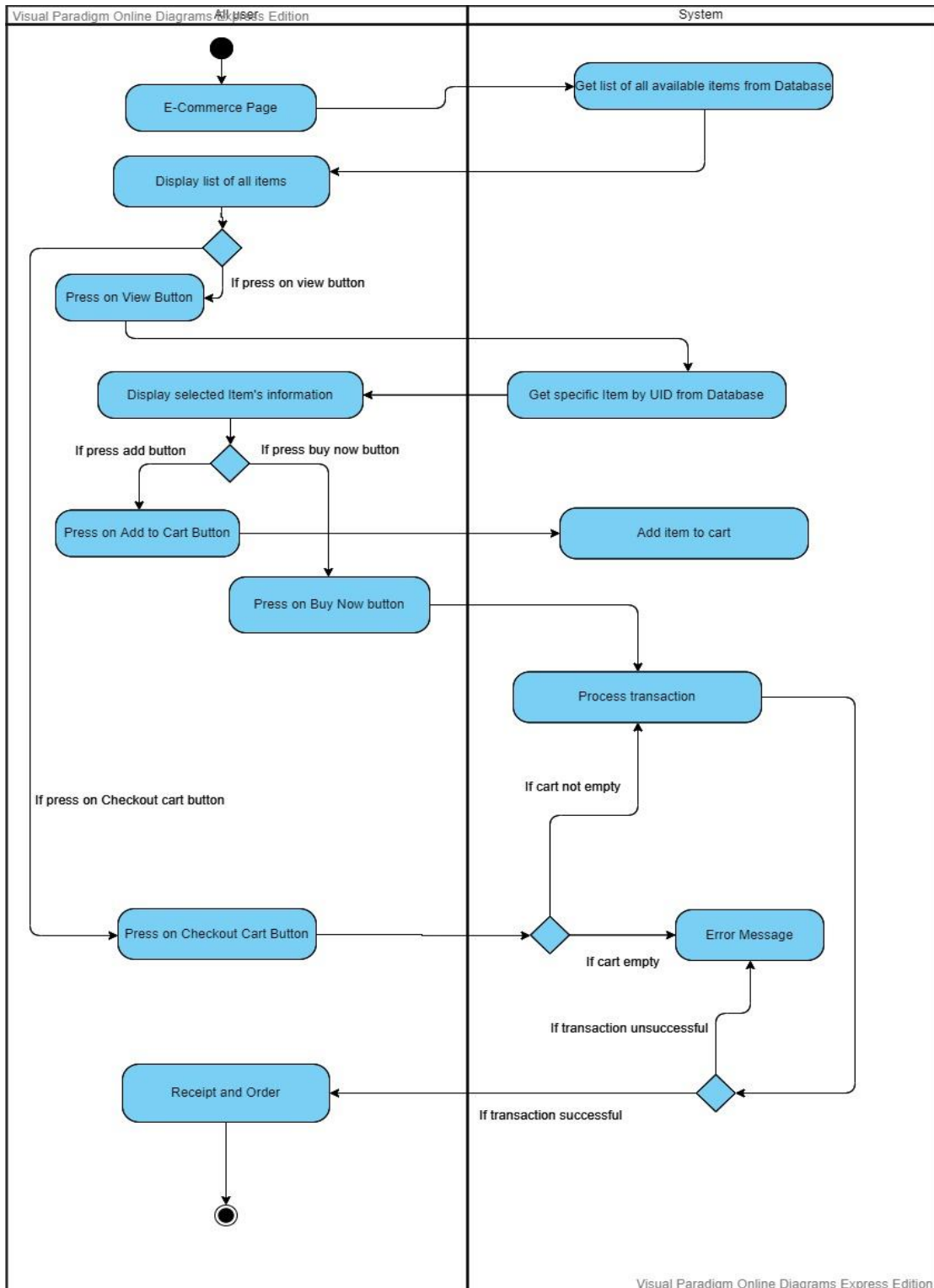


Figure 3.21: The figure above is to show the activity diagram for E-Commerce (All Roles Allowed).

### 3.2.3.13 Activity diagram for Three-Layer Architecture

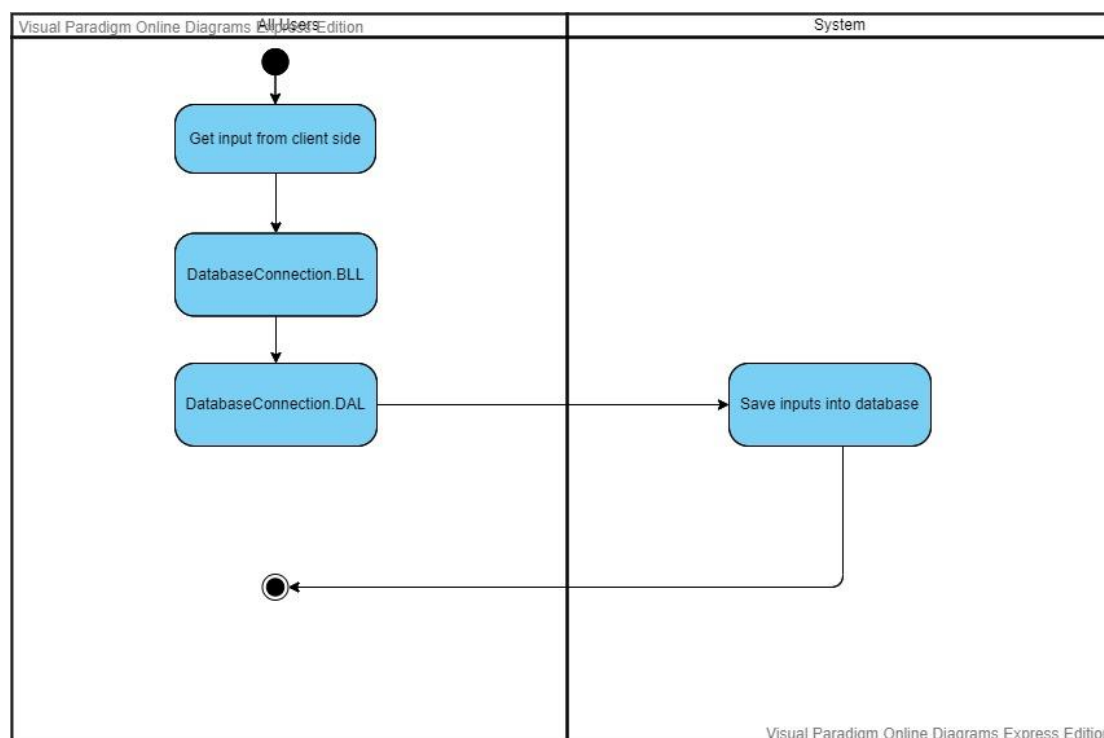


Figure 3.22: The figure above is to show the activity diagram for Three-Layer Architecture.

### 3.3 Implementation Issues and Challenges

Biggest issue and challenge for this project is finding the correct and playing around with CSS. It is hard to find a suitable CSS and it is hard to tweek around CSS as sometimes you want to just move a part of it but it ended up moving half of the page. Next is to establish connection to database in Microsoft SQL Sever. When the project first begun, the data wont enter the database althoght debugging has already been done multiple times can one can clearly see that the value that was get from a textbox has sucessfully move from view to controller but at the part where connection with database is establish, it returns a null table as nothing has been retrieved or inserted into the database. Problem was eventually solved after identifying the issue which lies in the WebConfig of the file where I had to make a connection string to my local database.

Finally another problem is the getting data into the database. When implementing the system design above, most of the time there would be more field requires than you initially planned. When these extra field is needed, tables have to be dropped and recreated, stored procedure has to be rewritten and also conntroller and javascript has to be redo in order to cater the extra data to enter the database.

### 3.4 Timeline

#### 3.4.1 Gantt Chart

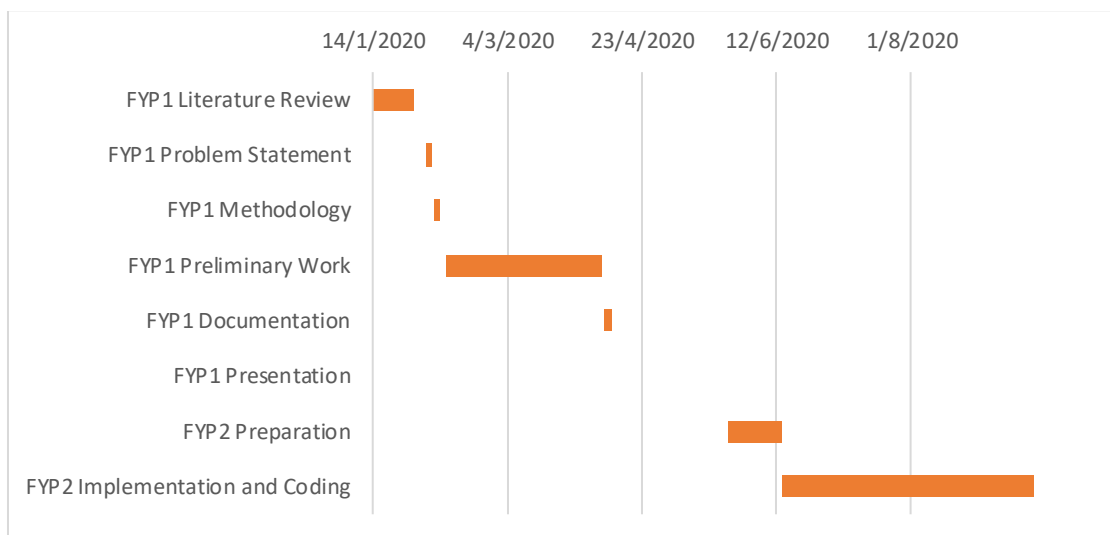


Figure 3.23: The figure above is the Gantt chart for the proposed system and process along the way.

<b>Task</b>	<b>Start Date</b>	<b>End Date</b>	<b>Duration</b>
FYP1 Literature Review	14/1/2020	29/1/2020	15
FYP1 Problem Statement	3/2/2020	5/2/2020	2
FYP1 Methodology	6/2/2020	8/2/2020	2
FYP1 Preliminary Work	10/2/2020	8/4/2020	58
FYP1 Documentation	9/4/2020	12/4/2020	3
FYP1 Presentation	22/4/2020	22/4/2020	0
FYP2 Preparation	25/5/2020	14/6/2020	20
FYP2 Implementation and Coding	14/6/2020	16/9/2020	94

Figure 3.24: The figure above is the detailed task, dates and duration for the Gantt chart (Duration is in days format).

### 3.5 Explanation of diagrams

There is certain feature which all users can use that includes viewing articles, viewing news, viewing news viewing and downloading content, viewing and download image from photobook, view forum and reply on forum thread, viewing event and finally using the e-commerce system inside the system. Worklist is a page where moderator and admin can view a list of articles (new/old). An admin or staff can create an article and submit it for approval where the status will be “Pending” and only moderator and admin can approve or decline the article where approving the article changes the status to “Completed” and declining the article will change the status to “Declined”. Only articles with completed status will be eligible to be displayed on Home page. Next is banner maintenance where banner maintenance is a page that shows a list of banners (new/old) which is images or text that are displayed at certain part of the page. Admin or staff can change the content for example from the vision of a company to the mission of a company which will still display in the same location for example, home page. Next is user maintenance where it is a page that allow admin to control all user in the website including changing their roles and updating their information. There is also download maintenance which can crate downloadable contents for users. Photobook is also like download maintenance where it shows photo collection and allow user to download the images. Finally, there is also news maintenance page where admin and staff can create, edit or delete news to update users regarding latest updates and news or discarding news.

### 3.6 Mock-up diagrams of system

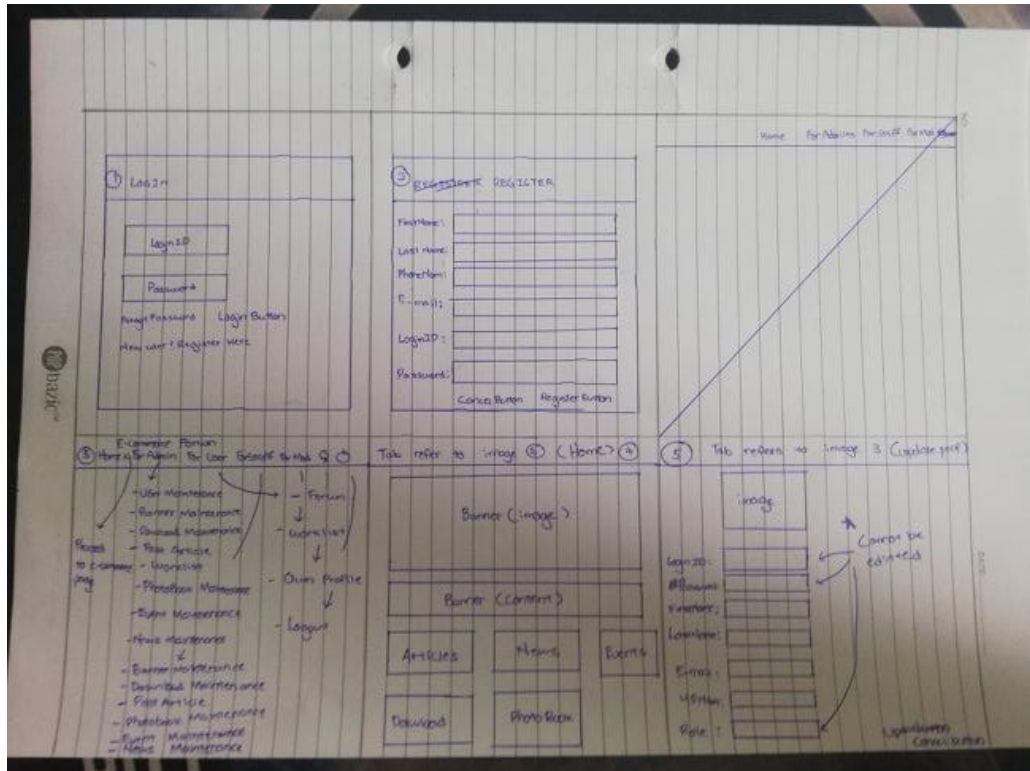


Figure 3.25: The figure above shows page 1 on mock-up system.

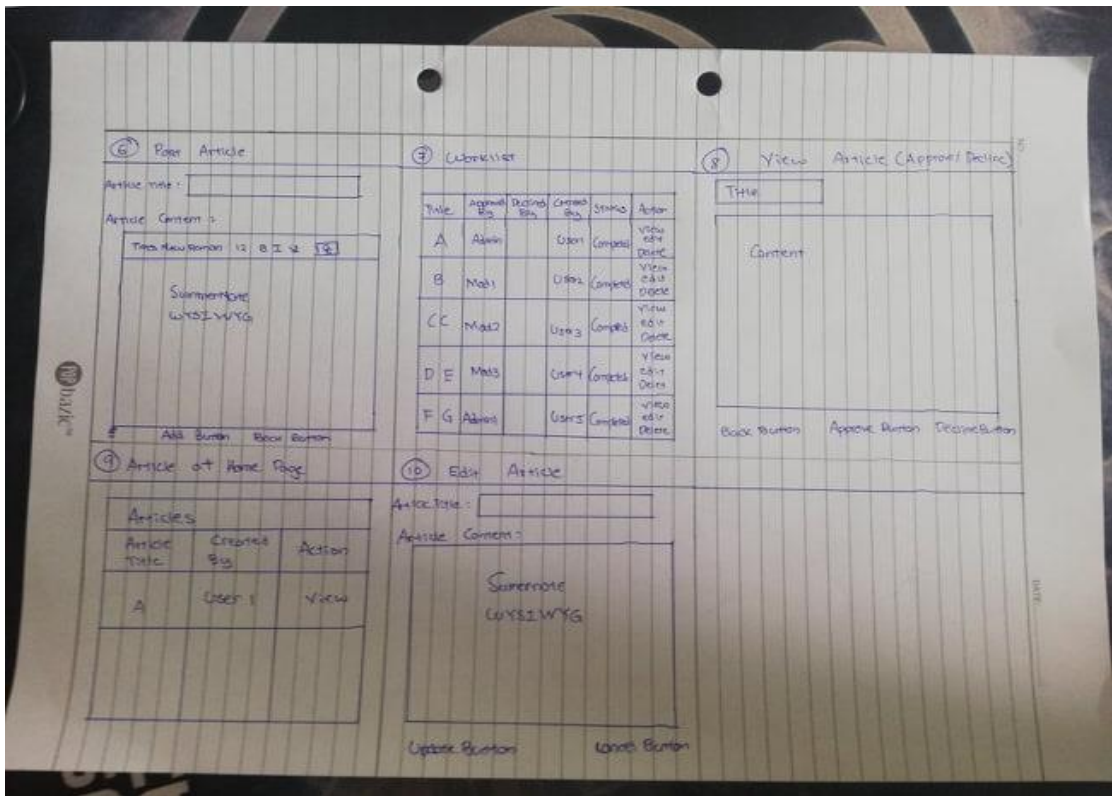


Figure 3.26: The figure above shows page 2 on mock-up system.

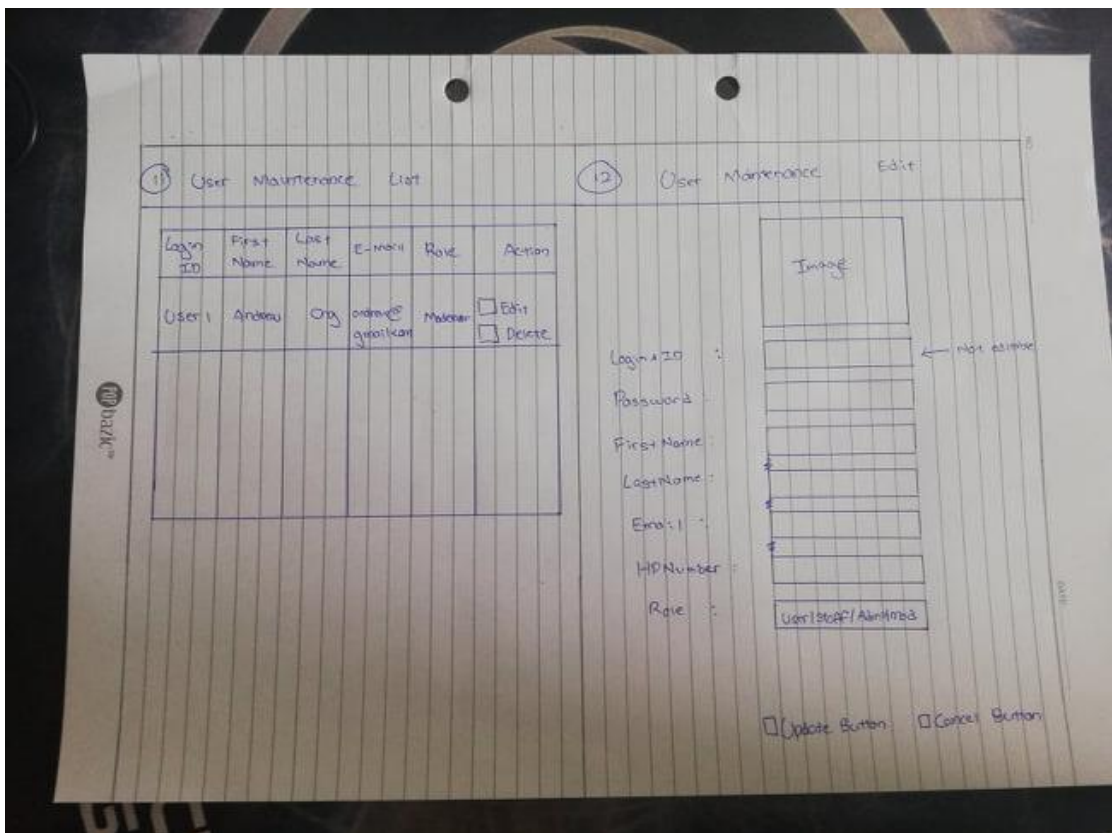


Figure 3.27: The figure above shows page 3 on mock-up system.

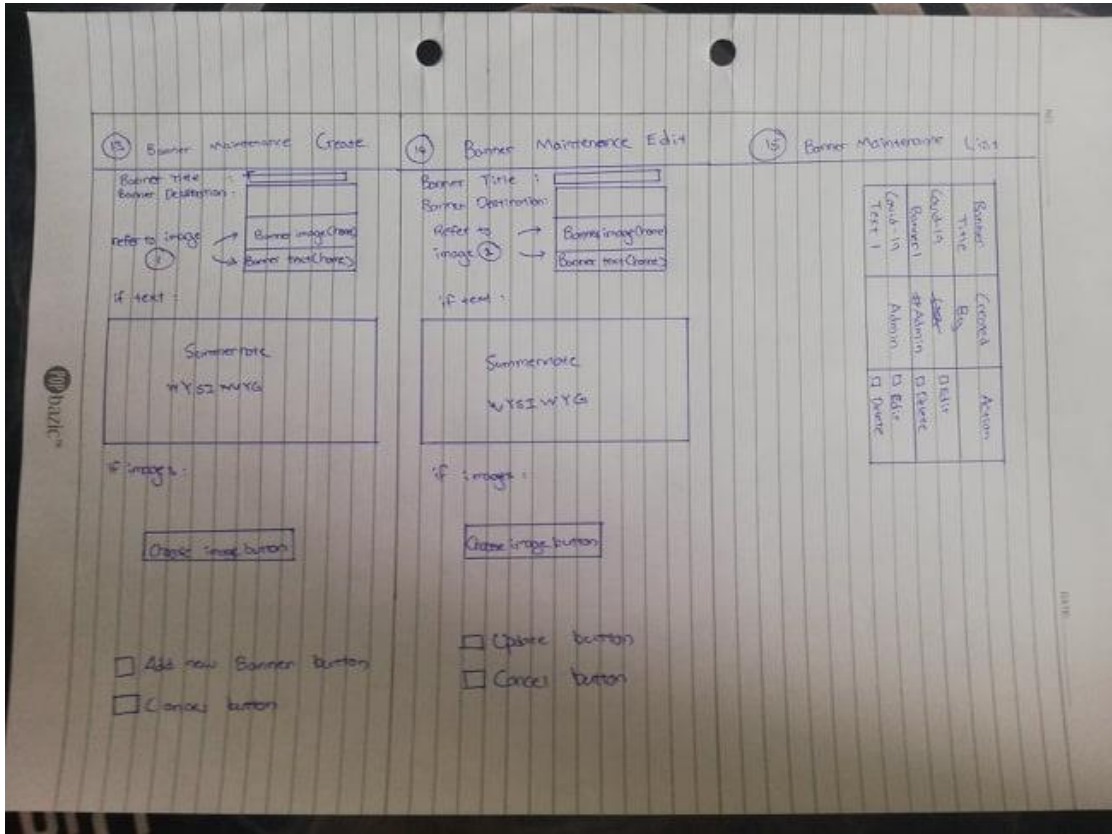


Figure 3.28: The figure above shows page 4 on mock-up system.

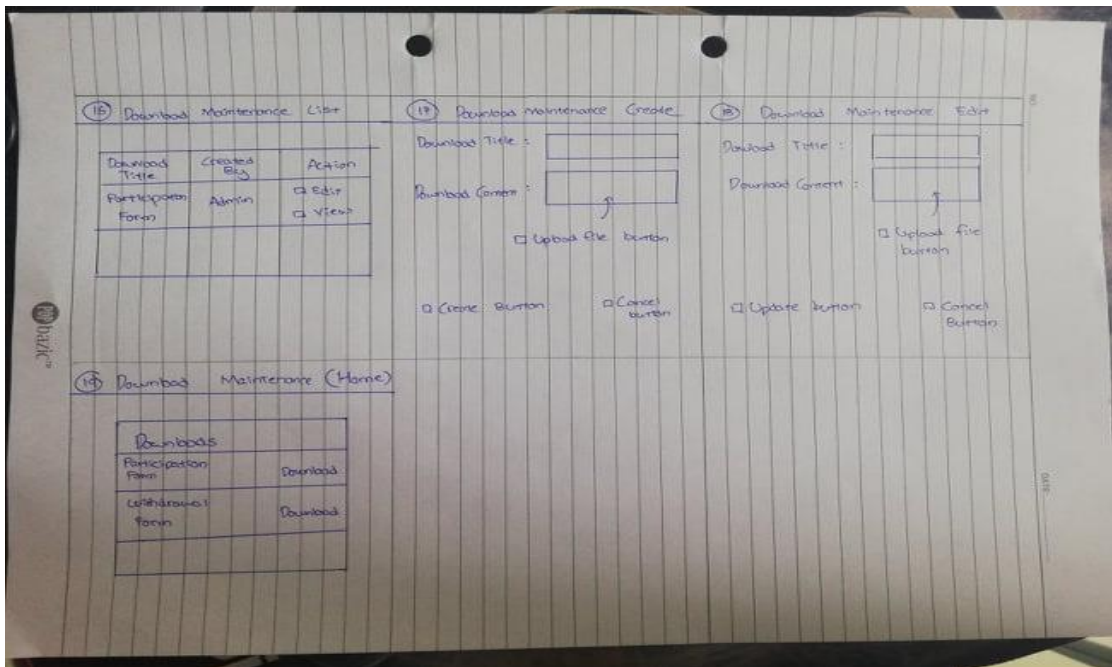


Figure 3.29: The figure above is to portray page 5 on mock-up system.

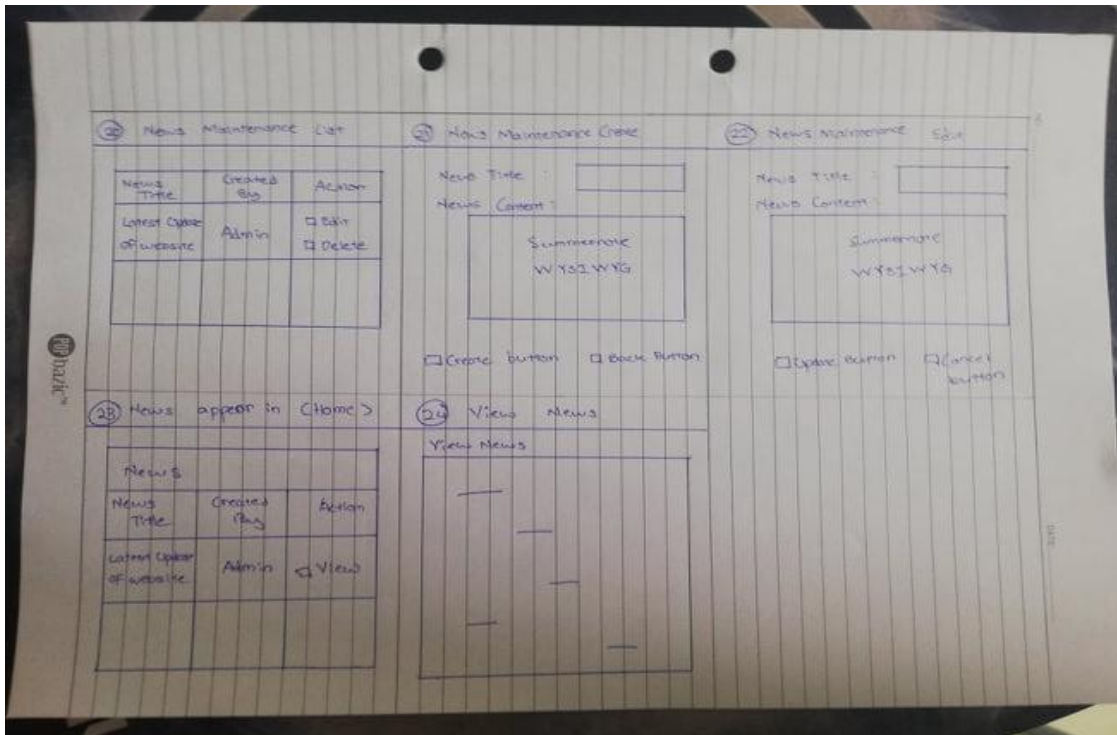


Figure 3.30: The figure above shows page 6 on mock-up system.

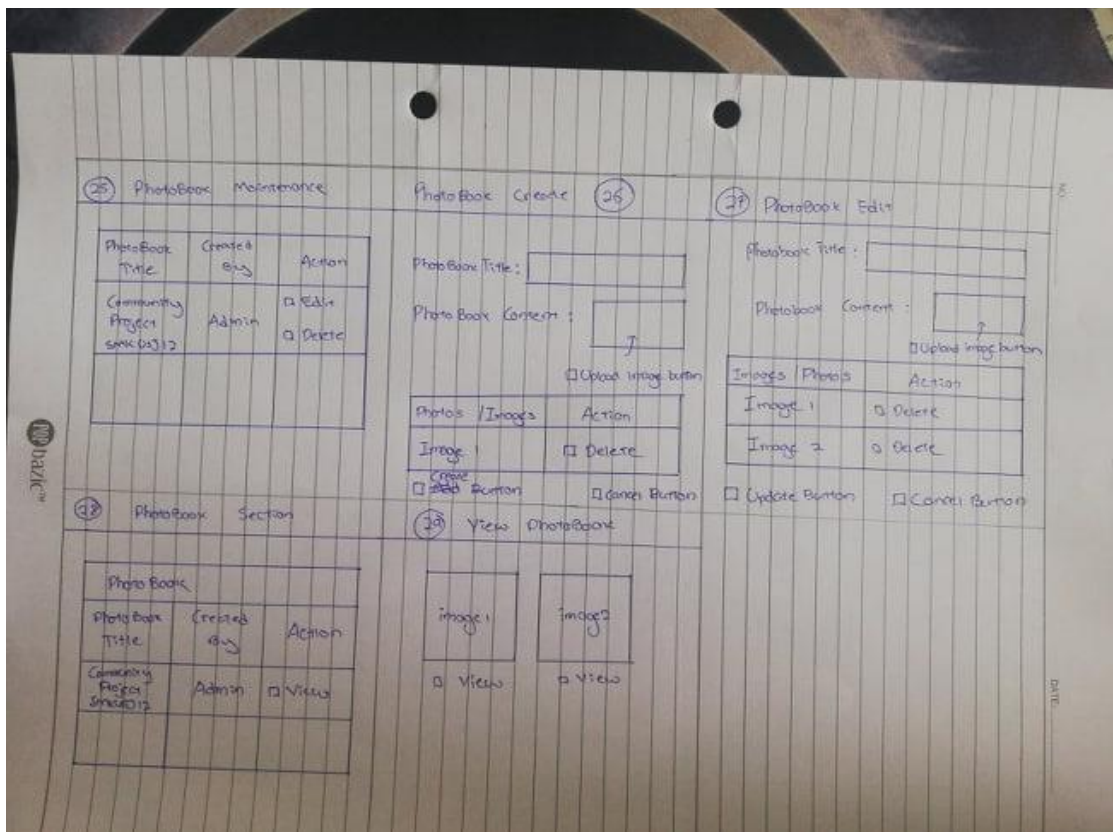


Figure 3.31: The figure above shows page 7 on mock-up system.



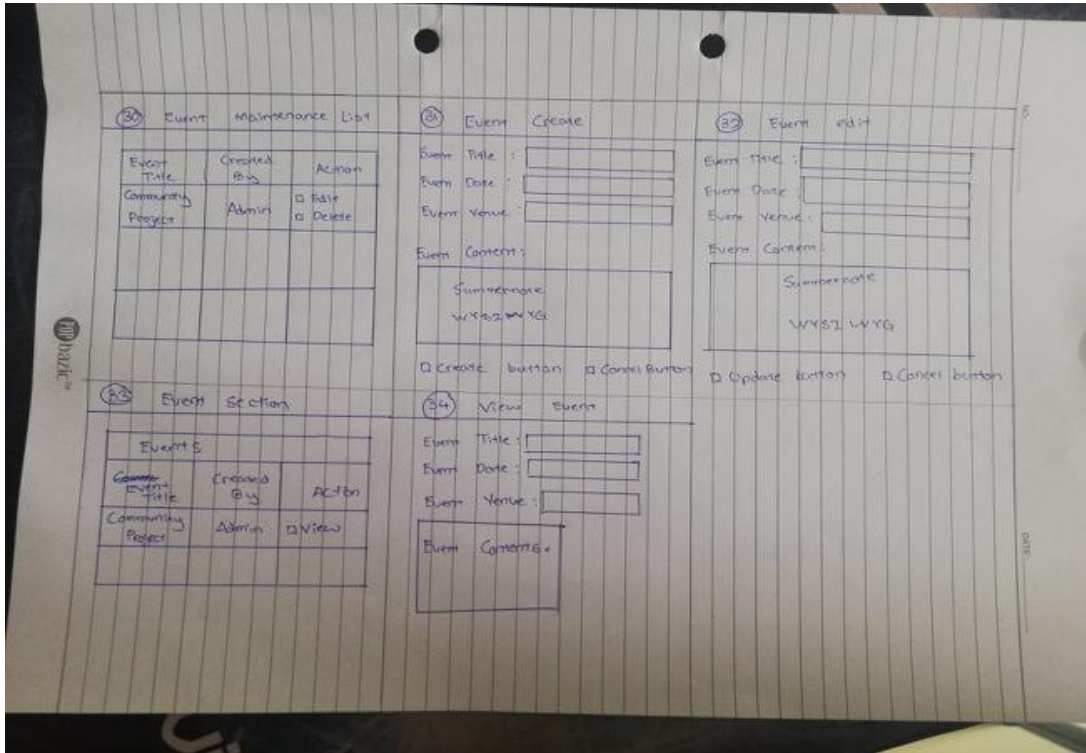


Figure 3.32: The figure above shows page 8 on mock-up system.

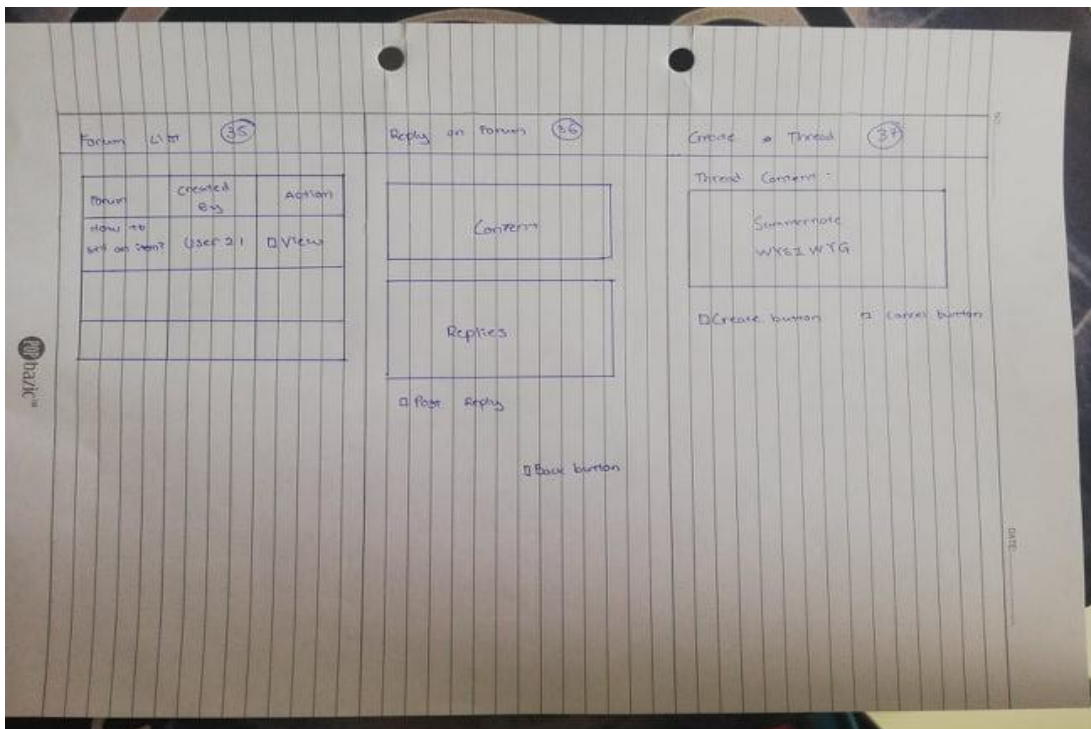


Figure 3.33: The figure above shows page 9 on mock-up system.

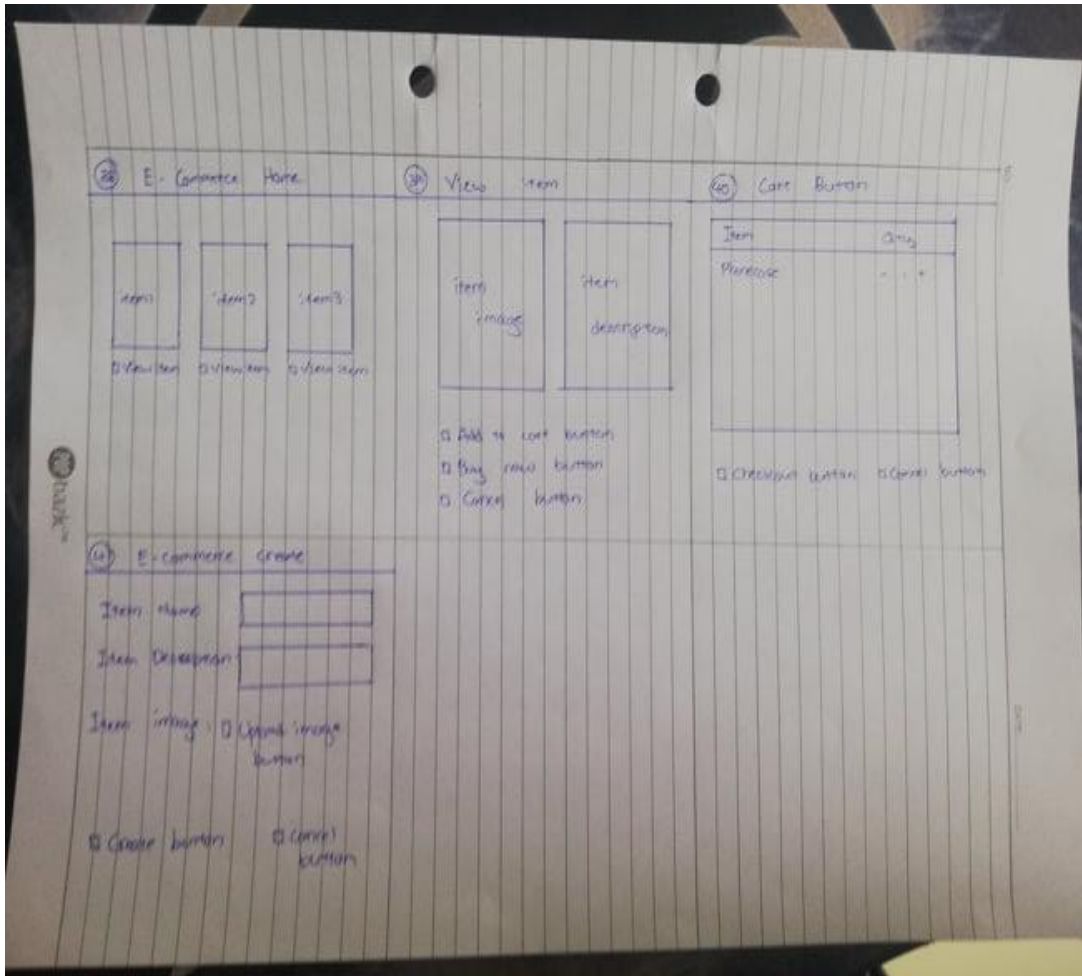


Figure 3.34: The figure above shows page 10 on mock-up system.

## Chapter 4: Methodology, Tools/technologies Involved and Requirements

### 4.1 Methodology

There are many different types of development strategies such as the waterfall model, research and development mode as well as agile model. All of the strategies pose different strengths and different ability to develop a system and each of them have their own strengths and weaknesses. For the proposed system, the phase of development will include five stages which are analyzing, designing, implementation, testing and lastly documentation.

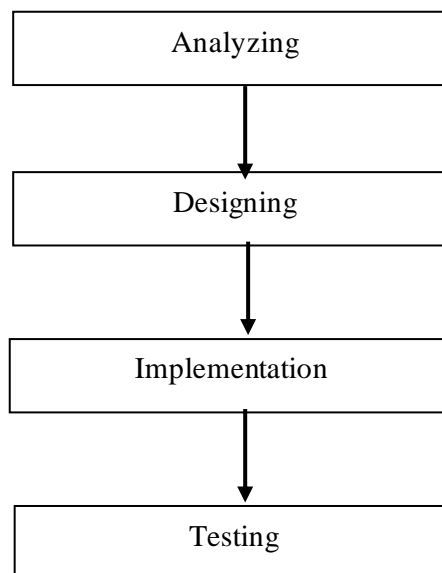


Figure 4.1: The figure above shows the development phases for the proposed system.

#### 4.1.1 Analyzing

A literature review is conducted in 3 system to understand and analyze each system carefully and find out each system's strengths and weaknesses. Data collected during this phase will then be used to study and improve the proposed system to ensure a better system when the development is done. The proposed solution has also been sorted out as a part of the analysis in order to provide a clear path of what the proposed system will solve and do in order to prove a better system

### **4.1.2 Designing**

During the designing phase, everything will be sorted out accordingly and designed part by part. Each and every basic function which a CMS should have will first be developed and then slowly adding the proposed solution on the system. The proposed solution that will be implemented in the system first will be the three-layer architecture followed by the maintenance shutdown feature then lastly the plugins submission system. The proposed solution will be done in this order because three-layer architecture will be included in the basic functions of CMS as the three-layer architecture will now be handling the process of data going in and out of databases. Followed by a maintenance temporary shutdown system which is developed to allow the creator to stop anyone from coming into their website when they are doing maintenance for a certain period of time. Creator will need to answer the security question as well before being granted access back in. Plugin submission system which is placed in last because as the proposed system is first developed, there will not be any user to test as testing will be done after implementation.

### **4.1.3 Implementation**

In the implementation phase, C# coding and Microsoft Azure will be used to perform function and feature in and out of databases. CSS will also be used to provide a better user interface for other users.

### **4.1.4 Testing**

Unit testing will be used as it is usually done by programmer and requires detailed knowledge of the internal program and code which is suitable to be implemented in proposed system. Integration testing will also be used to verify combined functionality of different web pages and codes. Regression testing will be used in later part where the project is almost done or fully done to test the full flow of the project.

## **4.2 Technologies and Tools Involved**

### **4.2.1 ASP.NET MVC Platform**

ASP.NET MVC is a web application platform developed by Microsoft and is an open-source software. ASP.NET MVC is developed by on MVC framework which consists of 3 parts that is the Model which is the state of an application or any business logic or operations that should be performed by it (Smith, 2019). Model basically pulls data out from the database and stored it in a declared variable which can be called in the view of an application. View is basically what the client can see or what we known as the user interface. Data stored in model will then be placed into the view through certain codes such as `value="@Model.ClsProposal.Name"` which the value of name inside the model `ClsProposal` will be placed into textbox or any other places. Controller controls the interaction between the view and model basically acting as a middle man where if a user insert something in the view, the data will then trigger the controller to pass the data to the database and then controller with the data will place it back to a model and the model will then give the data back to the view. One of the main strength of ASP.NET MVC is the testing ability of the framework (Y, 2019). The ability to put breakpoints and trigger the breakpoints ease the job of a coder to find error and bugs. With a simple try and catch and also breakpoints, one can easily identify the error and where it occurs as if there is error it the debugging line will jump straight to the catch. Coder and may fix it from there onwards.

### **4.2.2 C# Programming Language**

Being an object-oriented language (*A Tour of C# - C# Guide | Microsoft Docs*, 2019), C# has contributed to countless applications such as web application and has been an important part of the current generation. With the help of C# as well as the help of the ASP.NET MVC framework, the proposed system will be a dynamic and fast system.

### **4.2.3 Microsoft SQL Management Studio**

Launched as an application by Microsoft, Microsoft SQL management studio can be used as a database by enterprise to handle their data. Some of the features includes stored procedure which can act as a backend for a website. Microsoft SQL Management Studio will be used in the proposed system to act as a database to store and manipulate data triggered by user action from client-side.

### **4.2.4 Google Chrome**

Google Chrome will be used to test out the proposed content management system as well as keeping an eye on the 3 reviewed content management system for any updates. Google Chrome will also be used to do research regarding the proposed system as well as finding solutions to any problems.

### **4.2.5 Javascript and JQuery**

Javascript and JQuery will be used in order to handle all the functions of the system. AngularJs will be considered to be used but since the proposed system will be developed in a Microsoft platform as Azure and ASP.NET MVC is both Microsoft platform, AngularJs involvement will be highly impossible but there might be a chance in the search function on using AngularJs as it is capable of instantly displaying information based on what is typed in the search box which is fascinating and might apply it into the proposed system.

### 4.3 Requirements

- 1) User can login, register and logout
- 2) User able to change their password
- 3) Able to updates certain personal details of their profile in User Profile page except for LoginID, Role and Password.
- 4) Normal user can only post threads or reply on threads.
- 5) Moderators and Admins can approve, decline, edit or delete articles.
- 6) Admins can edit and delete all exiting user account.
- 7) Admins and staffs can add, edit and delete banners.
- 8) Admins and staffs can add, edit and delete downloads.
- 9) Admins and staffs can add, edit and delete news.
- 10) Admins and staffs can add, edit and delete photobooks.
- 11) All users can use forums.
- 12) All users can view and download contents in website.
- 13) All users can view Events in website
- 14) All users can participate in E-commerce in website (Buy/Sell)

## Chapter 5: Layered Architecture (Objective 1)

### 5.1 Overview

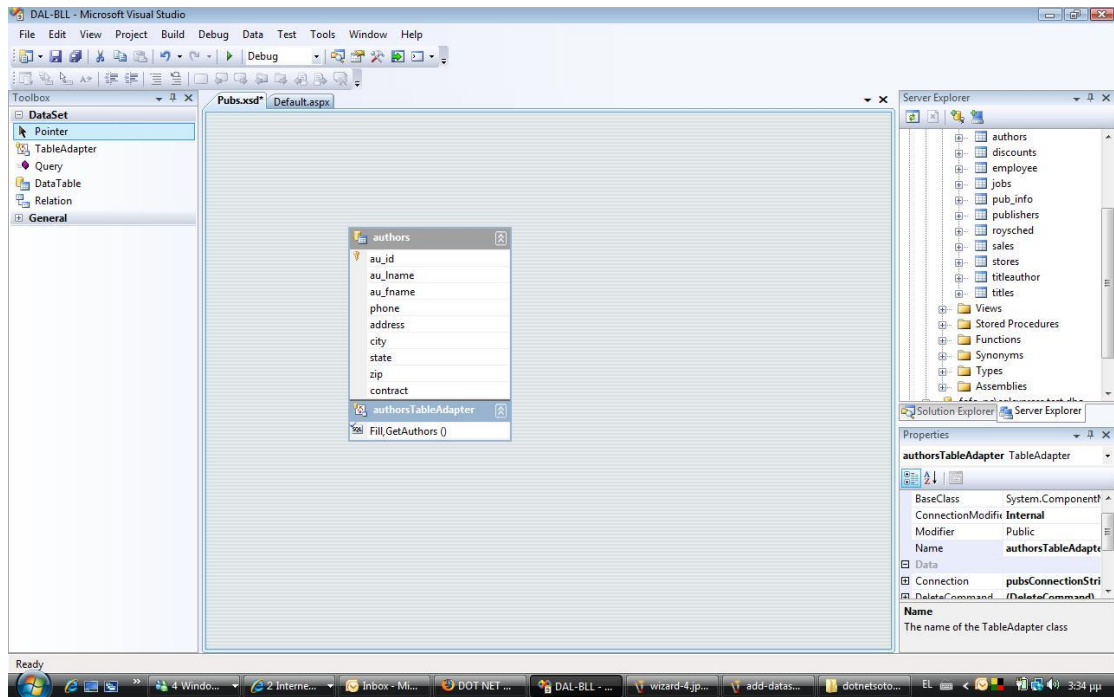


Figure 5.1: The figure above shows how a normal DAL would look like. (*Working with DAL (data access layer), BLL (Business Logic Layer) in asp.net web applications / DOT NET RULES, no date*)

Figure 5.1 shows how a normal Data Access Layered would look like where all the tables and relationships among table will be exposed in the program itself. This makes it more exposed to attacks from hackers. As a part of the objectives mentioned in Chapter 1, a different approach is taken to perform the layered architecture inside the proposed system where operations are done inside stored procedure of the database and updated directly from the stored procedure to the table making it harder to trace and the tables and attributes is not exposed when performing any action as the database is separated from the main code in the controller.



```

<asp:SqlDataSource
ID="SqlDataSource1" runat="server"
ConnectionString="<%= ConnectionStrings:NLayer %>"
DeleteCommand="DELETE FROM [ContactPerson] WHERE [Id] = @original_Id"
InsertCommand="INSERT INTO [ContactPerson] ([FirstName], [MiddleName],
[LastName], [DateOfBirth], [ContactPersonType]) VALUES (@FirstName,
@MiddleName, @LastName, @DateOfBirth, @ContactPersonType)"
SelectCommand="SELECT * FROM [ContactPerson]"
UpdateCommand="UPDATE [ContactPerson] SET [FirstName] = @FirstName,
[MiddleName] = @MiddleName, [LastName] = @LastName,
[DateOfBirth] = @DateOfBirth, [ContactPersonType] =
@ContactPersonType WHERE [Id] = @original_Id"
OldValuesParameterFormatString="original_{0}"
>
<DeleteParameters>
<asp:Parameter Name="original_Id" Type="Int32" />
</DeleteParameters>
<UpdateParameters>
<asp:Parameter Name="FirstName" Type="String" />
<asp:Parameter Name="MiddleName" Type="String" />
<asp:Parameter Name="LastName" Type="String" />
<asp:Parameter Name="DateOfBirth" Type="DateTime" />
<asp:Parameter Name="ContactPersonType" Type="Int32" />
<asp:Parameter Name="original_Id" Type="Int32" />
</UpdateParameters>
<InsertParameters>
<asp:Parameter Name="FirstName" Type="String" />
<asp:Parameter Name="MiddleName" Type="String" />
<asp:Parameter Name="LastName" Type="String" />
<asp:Parameter Name="DateOfBirth" Type="DateTime" />
<asp:Parameter Name="ContactPersonType" Type="Int32" />
</InsertParameters>
</asp:SqlDataSource>

```

Figure 5.2: The figure above shows how a normal database is created if using normal BLL and DAL method (*Building Layered Web Applications with Microsoft ASP.NET 2.0 - Part 1*, no date).

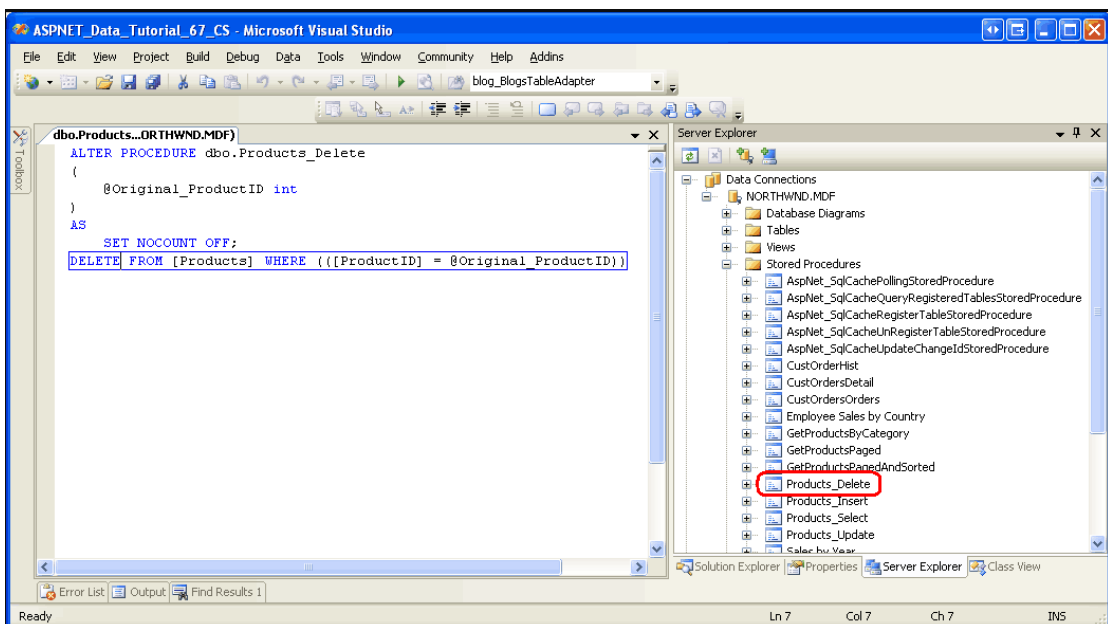


Figure 5.3: The figure above shows how a normal stored procedure is done if using normal BLL and DAL method.

As mentioned above the method applied on the proposed system is different because all table creation, stored procedure creation as well as how the data passed into the stored procedure is different from the normal BLL and DAL, as shown in figure 5.1, it is already explain that the relationships, table attributes as well the entire table is more exposed as the entire structure is done inside the program itself. Hence, for example if the program file is somehow leaked, the entire structure of how thing perform will be exposed. If one were able trace inside the main program as well, they can see what attributes there are meaning that they will know what information to steal such as the name or contacts from contact table in order to perform phishing activities. The proposed system separates the entire database from the program itself by creating the database in a separate program and form a connection to the program. Once the connection has been formed, data will be passed in through action triggered by users and then slowly pass into the database's stored procedure to perform its designated operation. As the entire database is separated from the main program itself, the tables, stored procedure and attributes are not as exposed to the mainstream BLL and DAL which exposes everything inside their main program and if something happens in between, is bound to leak the entire structure of their program as well as database to the outside world. Both figure 5.2 and figure 5.3 shows how the stored procedure and tables is created in a normal BLL and DAL method which is done directly inside the main program itself making it expose its attributes, datatype as well as the operations it is doing.

## 5.2 Implementation/Flow and Testing

```

189 <script>
190
191
192     function btnAddBanner_Click() {
193
194         var BannerTitle = $('#BannerTitle').Dval(); BannerTitle = "Hello123"
195         var BannerDestination = $('#BannerDestination').val(); BannerDestination = "Home 1"
196
197         $('#FileName').val($('#File').prop('files')[0].name)
198         var BannerFileName = $('#FileName').val(); BannerFileName = "Banner2.jpg"
199
200         var serve = JSON.stringify({ BannerTitle: BannerTitle, BannerDestination : BannerDestination, BannerFileName : BannerFileName });
201         $.ajax({
202             type: "POST",
203             url: "/" + "Home/InsBannerImage",
204             data: serve,
205             contentType: "application/json; charset=utf-8",
206             async: false,
207             dataType: "JSON",
208             success: function (data) {
209
210                 var formData = new FormData();
211

```

Figure 5.3: The figure above shows that a user fired and action from the User Interface.

Admin has chosen to add a new Banner into the system, and it triggered the button which passed 3 crucial information to the controller which is needed that is the Banner's title, Banner's destination as well the Banner's filename (image name).

```
//Added By Andrew 18/4/2020
0 references
public JsonResult InsBannerImage(string BannerTitle, string BannerDestination, string BannerFileName)
{
    DbConnectionBLL dbConnBLL = new DbConnectionBLL();
    ClsBannerImage objBannerImage = new ClsBannerImage();
    ClsLogin objLogin = ClsSessGlobalModels.ClsSessLoginModel;
    string LoginID = objLogin.Username;
    DataTable dtBannerIns = new DataTable();
    Global objGlobalModel = new Global();
    dtBannerIns = dbConnBLL.InsBannerImageBLL(BannerTitle, BannerDestination, BannerFileName, LoginID);
    objGlobalModel.ClsBannerImage = objBannerImage;
    return Json(new { objGlobalModel });
}
//Added By Andrew 18/4/2020
```

Figure 5.4: The figure above shows the information has been successfully passed into Controller.

The figure above shows that the information has been passed on to the Controller and the controller will now pass the information to the first layer of the layered architecture, BLL.

```
1 reference
public DataTable InsBannerImageBLL(string BannerTitle, string BannerDestination, string BannerFileName, string LoginID)
{
    DbConnectionDAL dbConnDAL = new DbConnectionDAL();
    Global objGlobalModel = new Global();
    DataTable InsBannerImageDAL = new DataTable();
    InsBannerImageDAL = dbConnDAL.InsBannerImageDAL(BannerTitle, BannerDestination, BannerFileName, LoginID);
    return InsBannerImageDAL;
}
```

Figure 5.5: The figure above shows the information has been successfully passed to BLL from Controller.

The data are now currently in BLL as an added layer of security before being passed on to the DAL for the final step of data passing.

```
//Added by Andrew 18/4/2020
1 reference
public DataTable InsBannerImageDAL(string BannerTitle, string BannerDestination, string BannerFileName, string LoginID)
{
    52ms elapsed
    DataSet ds = null;
    DataTable dt = new DataTable();

    try
    {
        string query = "[MST_INS_ImageBanner]";
        using (SqlCommand cmd = new SqlCommand(query))
        {
            cmd.CommandType = CommandType.StoredProcedure;

            cmd.Parameters.AddWithValue("@ip_BannerTitle", BannerTitle);
            cmd.Parameters.AddWithValue("@ip_BannerDestination", BannerDestination);
            cmd.Parameters.AddWithValue("@ip_BannerFileName", BannerFileName);
            cmd.Parameters.AddWithValue("@ip_CreatedBy", LoginID);

            using (SqlConnection con = new SqlConnection(strConString))
            {
                ds = new DataSet();
                using (SqlDataAdapter sda = new SqlDataAdapter())
                {
                    cmd.Connection = con;
                    cmd.CommandTimeout = 0;
                    sda.SelectCommand = cmd;
                    if (con.State != ConnectionState.Open)
                    {
                        con.Open();
                    }
                    sda.Fill(ds);
                }
            }
        }
    }
}
```

Figure 5.6: The figure above shows the information has been successfully passed to BLL from Controller.

The DAL then open a connection with the database which points to the stored procedure of coded specifically for this action. The information is passed in and will be matched directly with the stored procedure before the stored procedure proceed to perform its next step.

```

CREATE PROCEDURE [dbo].[MST_INS_ImageBanner]
(
    @ip_BannerTitle VARCHAR(150) = '',
    @ip_BannerDestination VARCHAR(150) = '',
    @ip_BannerFileName varchar(150)='',
    @ip_CreatedBy VARCHAR(max) = ''
)
AS
BEGIN
    BEGIN Transaction
        BEGIN
            INSERT INTO
                MST_ImageBanners
            (
                Banner_Title,
                Banner_Destination,
                Banner_FileName,
                CreatedBy
            )
            Values(
                @ip_BannerTitle,
                @ip_BannerDestination,
                @ip_BannerFileName,
                @ip_CreatedBy
            )

            END
            COMMIT TRANSACTION
            --IF @@ERROR <> 0
            --BEGIN
            -- SET @op_ReturnCode=@@ERROR
            -- SET @op_ErrorMsg = 'Insert into CASE table failed'
            -- RETURN(1)
            --END

            --SET @op_ErrorMsg = NULL
            --SET @op_ReturnCode = 0
            --RETURN(0)
        END
    GO

```

Figure 5.7: The figure above shows the stored procedure which has received the information and will perform actions.

The stored procedure received the information in the form of input known as @ip\_BannerTitle, @ip\_BannerDestination, @ip\_BannerFileName and @ip\_CreatedBy and proceeded to insert the information into the table intended.

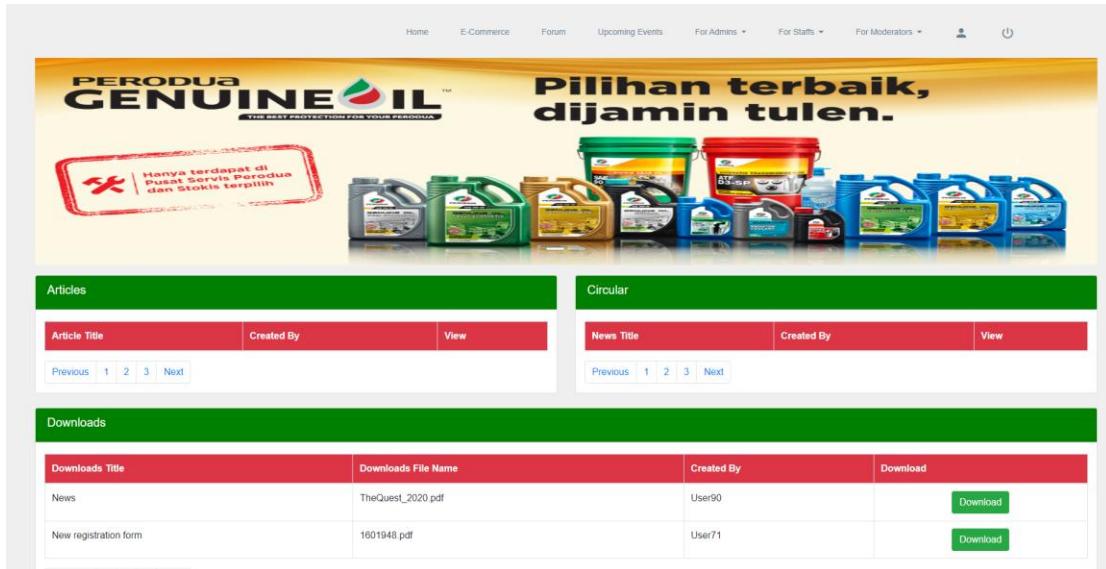


Figure 5.8: The figure above shows the Banner appearing in Home page after the operation.

All the figures above shows the flow of how the layered architecture performs and how it is different and not so exposed than the normal one where everything is done in the main program itself which is more exposed and dangerous where the layered architecture of proposed system perform its operation in another program making it more secured and does not exposed too many information such as tables names and table relationships if exists. As you can see in the entire flow as well there is not a trace of how the tables and stored procedure is created as well as the attributes inside as everything is done inside the database itself in a separate program and not together with the main program. The main program focuses on handling user inputs and outputs where the database handles all data operations and serves as a back end to the main program making it not visible and exposed compared to normal BLL and DAL.

<b>Flow of Layered Architecture</b>				
<b>Test case name: Flow of Layered Architecture</b>			<b>Date created: 8 September 2020</b>	
<b>Test case description: To test the flow of proposed system's layered architecture performing correctly and shows how it is different from normal layered architecture</b>				
No	Test Scenario	Expected Results	Actual Results	Pass / Fail - Comments
1	User input and trigger and add Banner button in User Interface.	The javascript and jquery triggered will run and pass the data to controller.	The javascript and jquery triggered and passed the data to controller.	Pass
2	Controller pass the information to BLL	The controller that received the data will pass the data to BLL.	The controller passed the data to BLL.	Pass
3	BLL passed the data to DAL	The specific BLL that received the data will pass the data to DAL.	The specific BLL that received the information passed the data to DAL.	Pass
4	DAL open a connection to Database and connect to store procedure	The specific DAL will open connection to Database and pass the data to the specific stored procedure.	The specific DAL opened a connection to Database and passed the data to the specific stored procedure.	Pass
5	Stored procedure performs operations	Stored procedure perform operation based on data passed in.	Stored procedure executed operation correctly.	Pass

Table 5.1: The table above is unit testing for layered architecture.



## Chapter 6: e-Commerce (Objective 2)

### 6.1 Overview

The e-Commerce feature is available for all users in the system regardless of their role in the system. The feature allows one to sell and buy items in the system at their own risk which means that they have to handle everything themselves among the buyer and seller and the admin or the owner of the system will not be held responsible if anything happen in between as it is not meant to be a complete e-Commerce feature and just a community e-Commerce feature which allows users to maybe sell what they don't want any more or any item that they have common interest in such as K-Pop fandom item. This is good for the owner and the admin as they would not be the middleman compared to big companies such as Shopee and Lazada which are proper e-Commerce system and not a community one incorporated in the proposed system.

### 6.2 Implementation/Flow and Testing

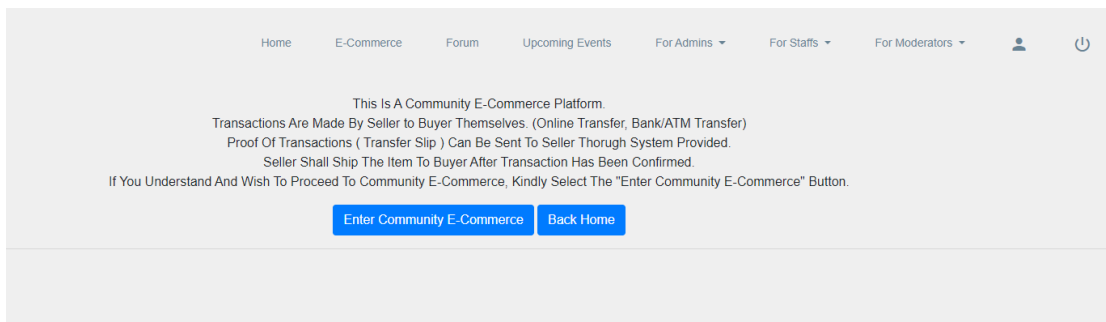


Figure 6.1: The figure above shows the message before a user enter the community e-Commerce page.

This message serves as a warning and reminder that buyer and seller has to take responsibility in what they perform in the e-Commerce and that a platform is provided for them to do so but they have to make sure they do it the right way.

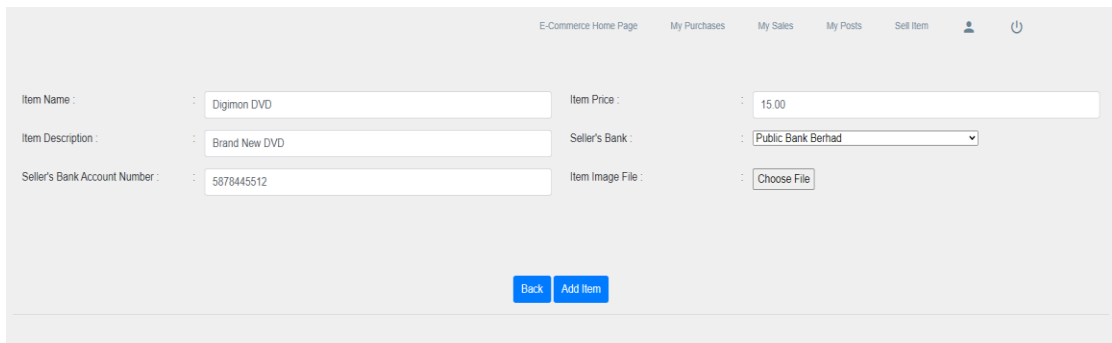


Figure 6.2: The figure above shows an Admin trying to sell an item.

The figure above shows an admin trying to add a new item into the e-Commerce and sell it among the community.

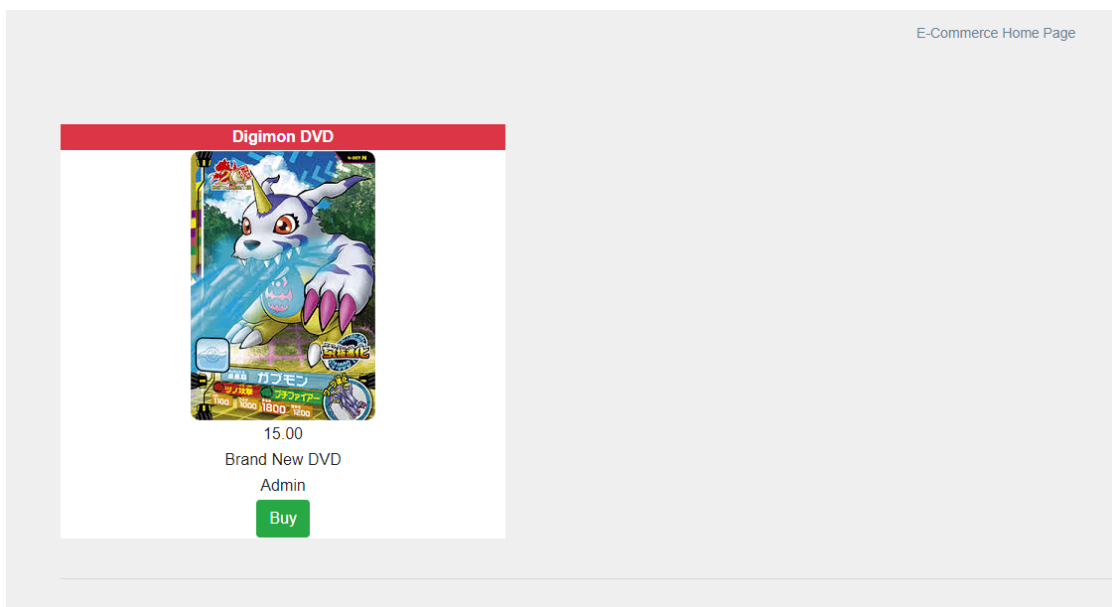


Figure 6.3: The figure above shows the item posted by Admin appearing in the e-Commerce home page.

The item posted by the admin has been added into the home page of the e-Commerce website so that other users can purchase it.

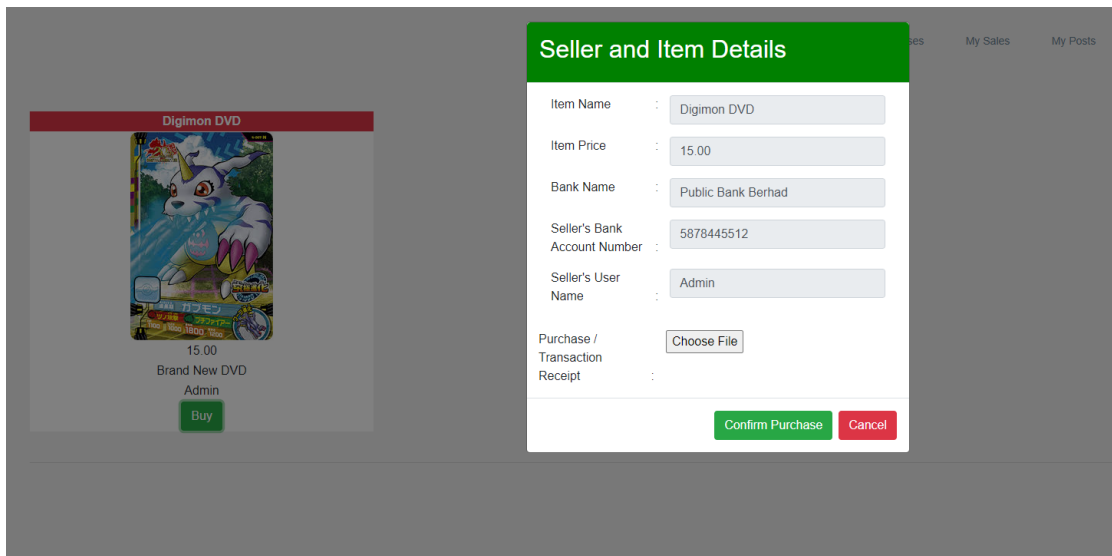


Figure 6.4: The figure above shows User71 trying to purchase the item.

The figure above illustrates User71 trying to purchase the item posted by Admin and is required to upload a transfer receipt before Admin can confirm the purchase.

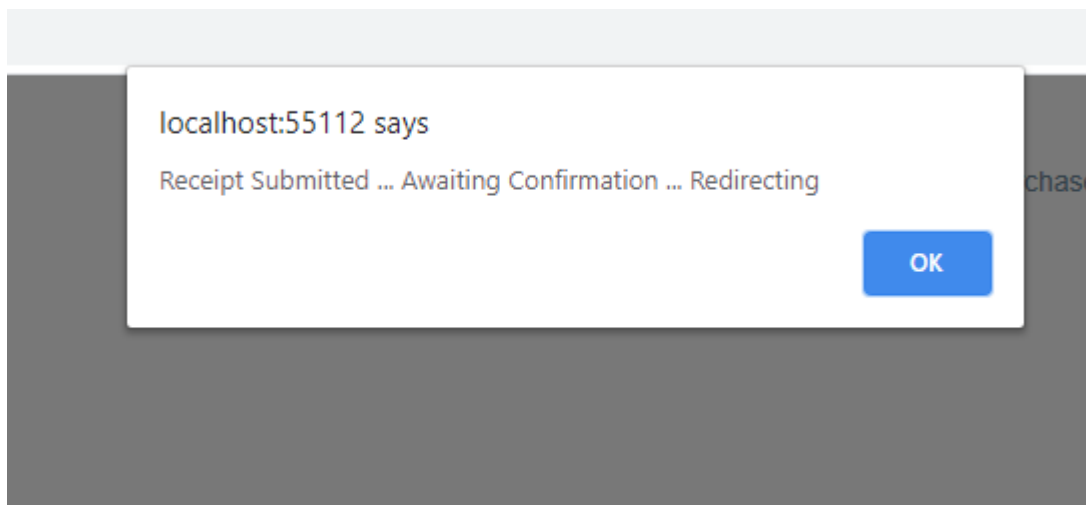


Figure 6.5: The figure above shows the message when User71 uploaded the transfer slip.

Item Name	Item Price	Status	Purchased By	Sold By	Action
Digimon DVD	15.00	Buyer Has Submitted Copy Of Transfer Receipt	User71	Admin	<input type="button" value="Converse"/> <input type="button" value="Order Received"/>

Figure 6.6: The figure above shows the purchase history for User71.

As shown above, User71 now has the item in the account's purchase history with a status of "Buyer has submitted copy of transfer receipt".

Item Name : Digimon DVD      Item Price : 15.00

Buyer Payment Receipt:

Seller Shipment Receipt:

Buyer's User Name : User71      Seller's User Name : Admin

Status : Seller And Buyer Has Submitted Receipt      Upload Transfer / Receipt File :

Messages

Message	Message Sender
I have already paid for the item. Please ship out item ASAP	User71
I have shipped out the item	Admin

Figure 6.7: The figure above shows the conversation between seller and buyer.

Figure above illustrate how a buyer and seller can communicate with each other with message feature provided and can update each other such as receiving the order or shipping the order. The receipt and the shipment will also be shown in the conversation page.

Item Name	Item Price	Status	Purchased By	Sold By	Action
Digimon DVD	15.00	Buyer Has Received The Item	User71	Admin	<input type="button" value="Converse"/> <input type="button" value="Order Received"/>

Figure 6.8: The figure above shows the change of status to complete.

Figure above shows that User71 clicked on the order received button and the status has been updated to “Buyer has received the item”, completing the purchasing and selling process between them.

<b>e-Commerce features</b>				
<b>Test case name: e-Commerce features</b>			<b>Date created: 8 September 2020</b>	
<b>Test case description: To test the flow of e-Commerce in the proposed system and features such as adding, editing and deleting.</b>				
No	Test Scenario	Expected Results	Actual Results	Pass / Fail - Comments
1	Admin tries to sell and item	Item will be added and displayed in e-Commerce homepage.	Item added and displayed in e-Commerce homepage.	Pass
2	User71 tries to buy an item	The item will not appear in homepage after User71 submitted transfer receipt.	The item did not appear in homepage after User71 submitted transfer receipt	Pass
3	Admin confirming purchase and upload shipment receipt	The Admin will enter converse page and upload his shipment receipt.	The Admin uploaded the shipment receipt.	Pass
4	User71 trigger the order received button	Changes status of the purchase to Buyer has received the item.	Status of the purchase changed to Buyer has received the item.	Pass
5	Admin able to edit the information on	Information of the item to be updated	Information of the item updated.	Pass

	item before anyone purchase it	accordingly before anyone bought it.		
6	Admin able to delete the item before anyone purchase it	The item will be deleted from the system when delete button is click before any purchase	Item is removed from the system.	Pass

Table 6.1: The table above is unit testing for e-Commerce.

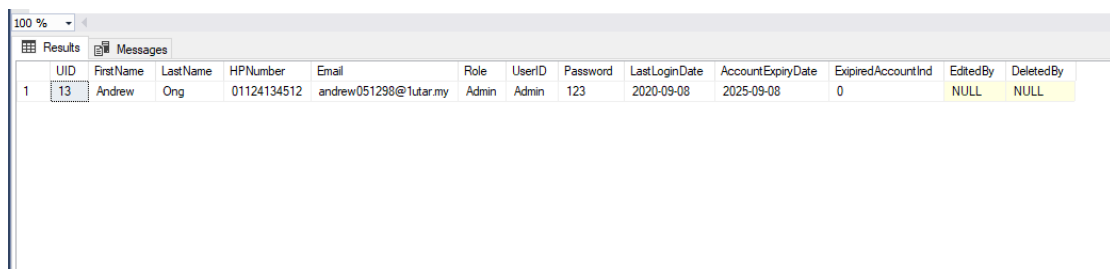
## Chapter 7: Auto-delete feature (Objective 3)

### 7.1 Overview

Considering the unused data issue, the auto-delete feature has been born with the intention to delete any unused data created by previous users. Every time a user login to an account, the last login date is renewed and updated to today's date and the account expiry date is 5 years away from today's date. If the account expiry date is less than today date, means that the user's account has already expired, and all data associated with the user previously will be deleted. Else, the user would still be able to login and perform their usual activity as normal effectively freeing up spaces for the future of the website.

### 7.1 Implementation/Flow and Testing

The feature is implemented by doing certain things in a flow. First, when an account is created or when an old account is logged in, it will update or create a last login date inside the database to note that today is the latest login date. On the other hand, a code is being generated to add 5 years to the last login date in order to generate an account expiry date which is to be used to compared with today's date so that the system can determine whether the account has expired or not. When the today's date matched the account expiry date, it automatically deletes all related data associated with the account making more new spaces for upcoming datas.



The screenshot shows a database query results window with a table containing one record. The table has 14 columns: UID, FirstName, LastName, HPNumber, Email, Role, UserID, Password, LastLoginDate, AccountExpiryDate, ExpiredAccountInd, EditedBy, and DeletedBy. The record shows a user named Andrew Ong with a last login date of 2020-09-08 and an account expiry date of 2025-09-08. The ExpiredAccountInd is 0, and EditedBy and DeletedBy are NULL.

UID	FirstName	LastName	HPNumber	Email	Role	UserID	Password	LastLoginDate	AccountExpiryDate	ExpiredAccountInd	EditedBy	DeletedBy
13	Andrew	Ong	01124134512	andrew051298@1utar.my	Admin	Admin	123	2020-09-08	2025-09-08	0	NULL	NULL

Figure 7.1: The figure above shows a non-expired account.

As today's date is larger than the account expiry date, the account is not yet expired hence, the indicator for account expiry is 0.

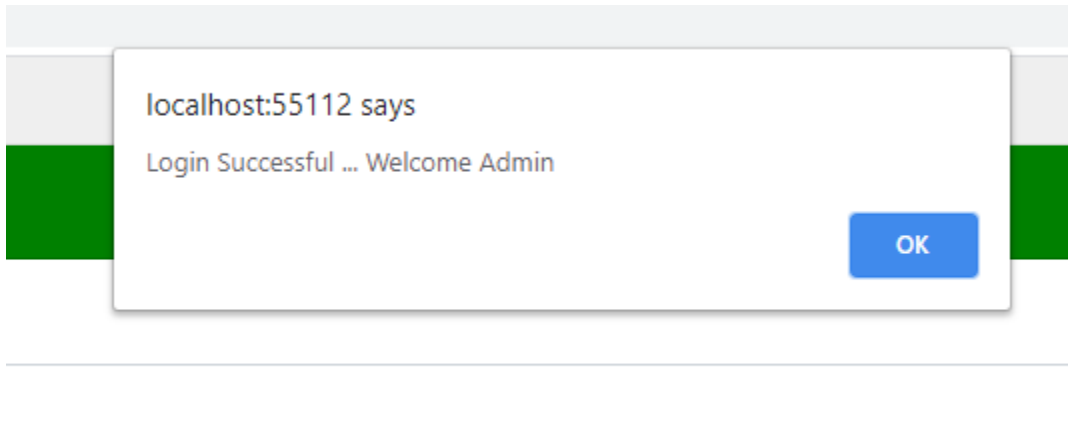


Figure 7.2: The figure above shows a successful login.

A screenshot of a database query results window. The window title is '100 %'. It shows a table with columns: UID, FirstName, LastName, HPNumber, Email, Role, UserID, Password, LastLoginDate, AccountExpiryDate, ExpiredAccountInd, EditedBy, and DeletedBy. The first row contains the following data: 1, 13, Andrew, Ong, 01124134512, andrew051298@utar.my, Admin, Admin, 123, 2020-09-08, 2001-09-08, 1, NULL, NULL.

UID	FirstName	LastName	HPNumber	Email	Role	UserID	Password	LastLoginDate	AccountExpiryDate	ExpiredAccountInd	EditedBy	DeletedBy	
1	13	Andrew	Ong	01124134512	andrew051298@utar.my	Admin	Admin	123	2020-09-08	2001-09-08	1	NULL	NULL

Figure 7.3: The figure above shows an expired account.

As today's date is lesser than the account expiry date, the account is not yet expired hence, the indicator for account expiry is 1. Hence, all data associated with the account will be deleted and cleared from the database.

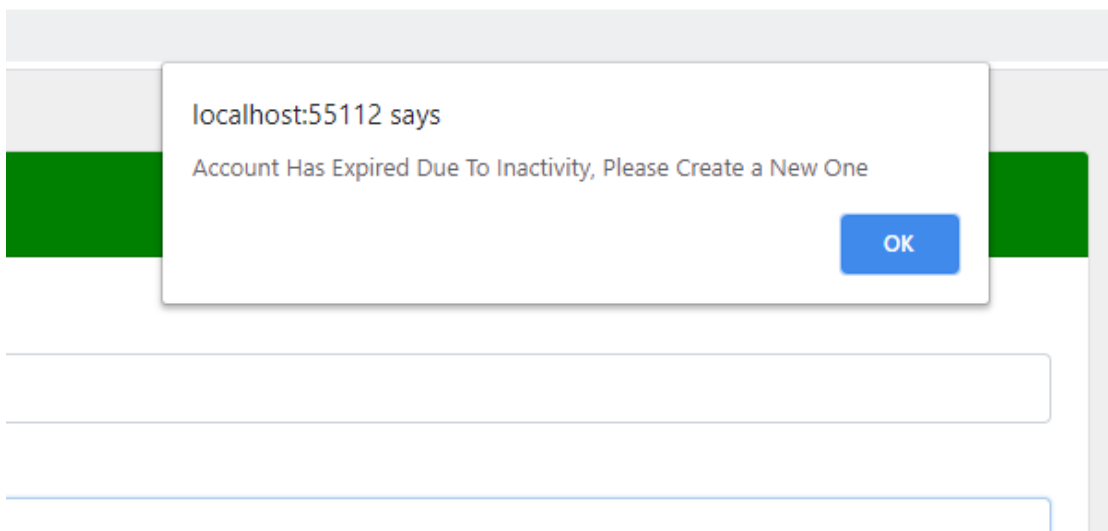




Figure 7.4: The figure above shows an unsuccessful login.

<b>Auto-Delete Feature</b>				
<b>Test case name: Auto-Delete Feature</b>			<b>Date created: 8 September 2020</b>	
<b>Test case description: To test the flow of proposed system's auto-delete feature is performing correctly and shows how it clears away data for new data.</b>				
No	Test Scenario	Expected Results	Actual Results	Pass / Fail - Comments
1	User login or register	The last login date is renewed, and new account expiry date is updated 5 years from the date.	The last login date and account expiry date has been renewed.	Pass
2	Retain data of non-expired account	Non-expired account's data should be still existing.	Non-expired account's data is still kept in database.	Pass
3	Delete data of expired account	Expired account indicator changes to 1 and delete all data associate with the account.	Expired account indicator changes to 1 and all data associated has been deleted.	Pass

Table 7.1: The table above is unit testing for auto-delete feature.

## **Chapter 8: Conclusion**

### **8.1 Project Review, Discussions and Conclusion**

In conclusion, the result desired is to achieve an easy to use and learn e-content management system which allows user to perform various activities such as view articles, view news, view photo books as well as download content that are put onto the website. Currently, all the features have been achieved expect for forum and photobook while all the objectives have been completed. Through the proposed system as well a better and more secured layered architecture has been achieved, breaking away from the maintain of keeping everything in their controller. The layered architecture focus on passing in data with added layers of security so that it is harder to trace and debug and the data is then passed on the to the backend on database store procedure to run its operation providing minimal leak of data and table information. Besides that, a new community e-Commerce has been incorporated into a content management system making users inside able to sell and buy things. Serving as a platform to assist users to generate a secondary income by selling unused or items that the community shared the same interest on is the purpose of the e-Commerce. Not only that, the owners or co-owners of the system will not have to take responsibility should anything happen in the middle as the buyer and seller has to agree that only a platform is provided for them to buy and sell things and the rest is maintained by them such as shipment of item, it poses no risk to the owner and co-owners to compensate anything should anything happen. Finally, a solution to save costs as well as space on database. Costly database storage as well as unused data are now easily solved should a user become inactive continuously for 5 years where all data related to the user will be deleted and cleared to make way for new and upcoming data. This will be able to help the system to automatically free unused spaces instead of requiring user to do it themselves making it very convenient to use.

## 8.2 Problems encountered

The first problem that has been encountered is the problem with CSS. CSS is highly complex and is hard to find a suitable CSS as well as tweak CSS as one minor tweak can affect the whole system. The solution to this problem was to choose to use CSS that is simple but not too simple. In order to avoid repeat the same coding for every page such as the navigation bar and background colour, CSS is fitted into one view called layout and is called by using code in every page (Layout = "[~/Views/Shared/\\_Layout.cshtml](#)";) to reduce the number of coding in pages as well.

The second problem encountered was connection to database. As the database used in preliminary work is Microsoft SQL Server and not cloud server such as firebase, connection must be established through WebConfig which was not known at the beginning. After researching, it was found that a connection string has to be formed in WebConfig first before one can call it in a class in order to establish a connection to the database.

```
<connectionStrings>
  <add name="Connection"
connectionString="Server=ANDREWONG\SQLEXPRESS;Database=Perodua;Truste
d_Connection=True;" />
</connectionStrings>
```

Above is how the connection string is made in WebConfig before it is called in a class through code shown below.

```
strConnectionString =
ConfigurationManager.ConnectionStrings[DB_CONNECTION].ToString();
```

The third problem involves passing the correct data into the BLL and DAL before opening a connection to the database. Compared to normal DAL, it is easy to trace errors as one can simply debug and trace which line the error is. But having to do the operation in the store procedure and cannot be debugged, everything has to be passed in correctly and stored procedure has to be written correctly in order to not mix up data.

### **8.3 Future Works**

There are certainly improvements that can be done in the future in order to make this system a better one.

Firstly, although layered architecture has been upgraded and done in a new method, hacker will always find ways to try and tackle the program. Hence, improvements can be done in this are for example, encrypting the data before being passed in the stored procedure. This will further strengthen the system's security.

Secondly, for the community e-Commerce, augmented reality can be implemented in order to improve the e-Commerce feature making it more dynamic and realistic where the item can be viewed in augmented reality.

Lastly, the user interface can be tuned and made into a more interactive one compared to the current system. More interactive features as well as design can make the system more appealing to users.

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**APPENDICES**  
**FINAL YEAR PROJECT WEEKLY REPORT**  
*(Project I / Project II)*

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 2</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

**1. WORK DONE**

[Please write the details of the work done in the last fortnight.]

Review and refresh memories on what I did on FYP 1

**2. WORK TO BE DONE**

To start coding again as soon as possible

**3. PROBLEMS ENCOUNTERED**

**4. SELF EVALUATION OF THE PROGRESS**

Acceptable progress as it is only the beginning of the semester

*Sun Teik Heng*

Supervisor's signature



Student's signature



# FINAL YEAR PROJECT WEEKLY REPORT

(Project I / Project II)

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 4</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

No work done during these 2 weeks as I went for a holiday with my family

## 2. WORK TO BE DONE

Start coding as soon as possible

## 3. PROBLEMS ENCOUNTERED

No problems encountered as I dint do anything these 2 weeks.

## 4. SELF EVALUATION OF THE PROGRESS

Should at least did something and make even a bit of progress



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I / Project II)

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 6</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Done the entire download maintenance feature which allow people to download content

## 2. WORK TO BE DONE

Start objectives as soon as possible

## 3. PROBLEMS ENCOUNTERED

It was confusing and hard to make files downloadable but with the help of a colleague from my internship days I overcame the issue.

## 4. SELF EVALUATION OF THE PROGRESS

Very satisfied as I started to do something instead of doing nothing.



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I / Project II)

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 8</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Completed my 1<sup>st</sup> objection which is the layered architecture after continuous studies and researching.

## 2. WORK TO BE DONE

Start doing e-Commerce as soon as possible

## 3. PROBLEMS ENCOUNTERED

Took longer time than I expected as I did a lot of research.

## 4. SELF EVALUATION OF THE PROGRESS

Very happy to have progress on my objectives



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I / Project II)

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 10</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Completed e-Commerce which is my 2<sup>nd</sup> objectives

## 2. WORK TO BE DONE

Start on 3<sup>rd</sup> objectives as soon as possible

## 3. PROBLEMS ENCOUNTERED

No problem encountered as I already had an idea on how to do it

## 4. SELF EVALUATION OF THE PROGRESS

Very happy with the progress but is running out of time



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I / Project II)

<b>Trimester, Year: Y3S3</b>	<b>Study week no.: Week 12</b>
<b>Student Name &amp; ID: ANDREW ONG TAN HUI 1602268</b>	
<b>Supervisor: Ts SUN TEIK HENG @ SAN TEIK HENG</b>	
<b>Project Title: COMMUNITY E-CONTENT MANAGEMENT SYSTEM</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Completed all objectives and started on report but pending 2 features.

## 2. WORK TO BE DONE

Finish the system and report

## 3. PROBLEMS ENCOUNTERED

Changes in report as well as lack of time for remaining features

## 4. SELF EVALUATION OF THE PROGRESS

Acceptable but is running out of time.



Supervisor's signature



Student's signature

## POSTER

### COMMUNITY E-CONTENT MANAGEMENT SYSTEM

#### **INTRO**

A SITE FOR EVERYONE  
AND EASY TO MANAGE  
WITHOUT THE NEED  
OF CODING !

#### **RESULT**

- E-COMMERCE INCLUDED
- EXTRA SECURITY WITH LAYERED ARCHITECTURE
- EXTRA SPACE IN DATABASE WITH AUTO DELETE FEATURE

#### **METHODS**

- ASP.NET MVC PLATFORM
- JAVASCRIPT
- JQUERY
- MICROSOFT SQL MANAGEMENT STUDIO

#### **CONCLUSION**

A C# DEVELOPED INTERACTIVE AND FREE WEBSITE FOR EVERY USER DEVELOPED WITH E-COMMERCE INSIDE FOR USERS TO BUY AND SELL AMONG EACH OTHER.

**SUPERVISED BY ; TS SUN TEIK HENG @ SAN TEIK HENG**

**DEVELOPED BY: ANDREW ONG TAN HUI**

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[Chapter 1: Introduction 1.1 Problem Statement Problem](#) statement found below is listed after conducting a research content management system. The first problem statement is regarding security issues as a common issue among content management system. Some research finds that security issues happened due to content management system being an open-source software that was exposed to people who have the intention of improving it as well as people who are trying to harm it. Common security issues include SQL injection as well as phishing activities. A system was proposed to solve such issues which was inspired by issue tracker of Joomla! (Contu et al., 2016) but after studying about the proposed system, there is certain limitation and doubts regarding the proposed system. The system allows a user to submit issues as well as view a list of issues that have been solved. There are chances that the issues will not be solved as there might be no one with the expertise despite having a community of people backing the software. By constantly submitting issues as well would not be feasible as there might be an overflow of issues but not enough people to solve it, simply putting it is not a permanent solution to the existing problem. In order to solve the problem, three-layer architecture is proposed to be implemented and used during the CRUD process of the content management system as three-layer architecture can improve security as well as improving data integrity (Pal, 2013). The second problem the choices of content management system. Drupal and Joomla both have a separate workflow and system which is specifically for e-commerce. Unlike their usual [content management system](#), the [e-commerce content management system](#) will be separated from the original content management system which means users need to manage 2 websites. This is very troublesome and requires more manpower to handle. The final problem statement is the storage of database. Yes, one cannot deny that you can just purchase more databases when you are running out of storage. But that will cost the company or user extra money or cost in order to purchase extra storage for new data while the old data just stayed in the database and do nothing. This is a wastage of space and in a large amount will be a very hefty lost for a company. Hence, if a company manages the data one by one, it will be a waste of time and manpower to do so. 1.2 Project Background Content Management System also abbreviated as CMS is a software that helps and allow users to perform create, read, update and delete on a content of theirs without needing the knowledge of coding or HTML mark-up. Users will be easily accessed for example a blog and simply add a textbox in which they can edit the content inside the textbox to create what we called a content to put in their blog and other users can then view it. Without having the knowledge to code from scratch, users can create their own website easily which resulted in content management system being known to the world for their convenience of services.

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*Sun Teik Heng*  
Signature of Supervisor

Signature of Co-Supervisor

Name: **Sun Teik Heng**

Name: \_\_\_\_\_

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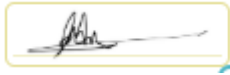
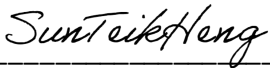
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