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DYNAMIC DOCUMENT MANAGEMENT SYSTEM

By

CALVIN SON ZHIA JIE

A REPORT

SUBMITTED TO

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for the degree of

BACHELOR OF INFORMATION SYSTEM (HONS)

INFORMATION SYSTEM ENGINEERING

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DECLARATION OF ORIGINALITY

I declare that this proposal entitled "**DYNAMIC DOCUMENT MANAGEMENT SYSTEM**" is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : _________________________

Name : _________________________

Date : _________________________

Acknowledgement

First of all, I would like to thank all the people whom guided me in doing this project. I feel very grateful to have Mr. Tan Teik Boon as my supervisor for my project in this subject. Without his guidance and support, I would not finish the prototype in time. Besides, I would also like to thank my friend Wong Weng Hong for providing me new ideas when doing this project whenever there is a problem met. Lastly, I would like to thank Mr. Tan Teik Boon again for taking time to review what have I done on the past few weeks and giving me clear guidance so that I'm not out of scope.

Abstract

This project shows how Dynamic Document Management System helps people of the organizations and companies to manage their document. First of all, this is a web based system, where a server is needed to run this system. After server has been set-up, user can start to use the system to create, upload, view or print document. Besides, it also allows dynamic filling of data, which allows user to fill in multiple records at one time so that it could be printed. Moreover, documents printed by this system will have a QR code on top of the page to allow easy tracking of the document. Furthermore, this system also allows versioning of documents, which store all previous version of documents so that user can retrieve it on later use.

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LIST OF ABBREVIATIONS

QR code	Quick Response code
2D	Two-dimensional
GPS	Global Positioning System
SGML	Standard Generalized Markup Language
XML	Extensible Markup Language
HTML	HyperText Markup Language
USB	Universal Serial Bus
PDF	Portable Document Format
GIF	Graphics Interchange Format
PNG	Portable Network Graphics
MySQL	My Structured Query Languages

Chapter 1: Introduction

1.1 Problem statement

Nowadays, organizations and companies often create standard forms or documents to be used within operations. All these forms and documents are only to be written and filed manually. Therefore, unintended damage of forms and documents or even missing of forms and documents will still be possible to happen. Solving this problem will allow user to use less paper and organize their documents more easily.

Besides, organizations and companies are not able to generate customizable standard forms for the users to fill in. If they are to print dozens of same forms/documents but with different personal details such as name, address or Identity Card number, it would be hard thing as the user has to edit the document each time he/she prints it. Therefore, solving this problem will save a lot of user's time which is used to fill and print each and every documents one by one. Besides that, it could also save user time if the system could use database to populate those forms, minimizing the amount of information the user needs to fill up each forms.

Other than these, organizations and companies also have a hard time searching for documents, there might be slightly similar name but completely different documents. Such as user account information and payment account information. Solving this problem will help user to be able to search for documents they want faster and in less time without going through each and every documents with similar names.

Lastly, organizations or companies are not able to handle the standard forms and documents as they need to file the forms and documents manually and take care of version control. If any incident happened such as dropping the whole stack of forms and documents on the floor, it would be difficult to identify each and every forms' name and version. Solving this system will reduce the time of user differentiating each documents from each other. Other than this, user can also access the older version of the file if any wrong updates are applied. This can simply save a lot of time by helping user to avoid recreating the whole old version of that document.

1.2 Background information and motivation

In the old times, organizations and companies often write and file each and every forms and documents by hand. However nowadays, organizations and companies often use their computer and laptops to create or draft standard forms and documents. All these forms and documentation are then printed and then filed manually. Other than that, filed documents are taken out often to be referred to and checked when doing similar project or project that is related to it.

Besides that, when typing or writing same letters, forms or documents to different person with the same content but different people, organizations' or companies' employee has to manually write all those letters. However, with the help of computers the problem has been reduced to just editing the row where the name and other different information after printing each copy.

Therefore, Document Management System is used. Document Management System is a system that uses computer programs to track, store and manage document in order to reduce paper usage. Most of the document management system are able to keep track of various version of the documents created and modified by users.

However, the Document Management System has some limitation as it focuses on capturing, storing, indexing and retrieving of image file format, which can't be filled in dynamically. Therefore, Dynamic Document Management System is proposed. The motivation of proposing this system is to help to minimize the manual work of organizations' and companies' employees like a normal Document Management System would do, as well as allowing user to fill in forms before printing it dynamically. Besides, it is often happened that a particular employee moving a whole stack of documents and forms. Accidents may happen and all the documents will be mixed up. In such a case that will be happen, this system proposed allows user to quickly re-organize the pile of work by tracking the documents information using the attached symbol or icon on the form.

1.3 Project scope

The project scope of this Dynamic Document Management system is to create system that allows companies' or organizations' employees to manage their documents more easily. This system allows user to easily store standard organization documents and retrieve it at any time. Besides, document created by this system will be able to store dynamic content that ease the job of printing multiple documents to different people and have a specific symbol to help user to recognize each document easily.

1.4 Project Objective

- To develop a template system that allow user to store a series of standard organization documents.

This objective' aim is to create a system that allows user to create documents template and store them in the system as a backup. Besides, this system allows user to access the document at any time to update or modify it.

- To develop a system that is able to store dynamic content.

This objective' aim is to create a system that is able to create a dynamic document. The term dynamic state that it is changeable such as user is able to create a document with blanks and state what to fill in the blanks or not to fill in the blanks such as signature. Signature needs to be sign by the original person and not by printing. Therefore, it is not filled by system. However, those that user chosen to fill in by system, user can insert a list data into the database so that when printing the documents or forms, the system will automatically fill up the blanks with existing database item and then print it.

- To create a system that allows automated tracking and tagging.

This objective's aim is to create a specific symbol or icon at the form. This specific symbol is used to store the document's information such as the name of the document and the version of the document. Besides tagging system is used to allow user to search document more fast and efficient.

1.5 Impact, Significance and Contribution

This project is proposed to help organizations' and companies' employees to manage their document with ease. From the other document management system that are available on the internet, most of it only allow user to store documents and some other systems allow user to create documents with dynamic contents. Therefore, this system adapts both storing documents and creating documents with dynamic contents function to ease the job of an employee creating a document. However, these two functions are not enough, and an extra feature is added into it, which is a symbol/icon that is generated when the document is ready to print. This particular symbol/icon can store the information of that particular document including its name, its department and its version. This feature can save a lot of space of a paper as most of the basic information is stored in a small yet compact symbol.

1.6 What Have Been Achieved

The system currently is able to get documents from user and store in the web server. Then, every update of that document will store the old version of it as archive for easy retrieval next time. Besides, this system can generate HTML form from the form document for user to fill in on the website and print the document with filled data. User can also choose to fill in multiple copies of HTML forms to directly print out multiple copies of form documents. It can also use the data from database to populate the HTML forms when user choose to print with database. Then, user can add, edit or delete whatever details and then proceed to printing. Every file uploaded to this system can accept up to 10 tags, the tags are used for filtering purpose. Such that user can search files using tags fast and easily. Admin can choose to add or delete user from the database to add user to access the system. Lastly, a HTML form for user to create a PDF document online.

Chapter 2: Literature Review

2.1 Background

This system requires the use of a two-dimensional bar code as symbol or icon that will be generated onto the documents. This specific symbol or icon will represent the documents' name, department, versions and any related information. Besides, this system is made up by markup language, therefore literature review on this point also needed to be done as to pick the best document markup language to write this system for tagging purpose. Other than that, it also reviews existing database system to determine which is more suitable for this project. Lastly, this literature review also reviews existing document management system to compare the functionality between this system and reviewed system.

2.2 Existing Solutions

2.2.1 Two dimensional bar code

QR code

QR code is the short term of Quick Response code for the speed of reading this code. This code is mainly made up by three position detection patterns and data area according to Figure 2.2.1.1(Chang, 2014). This two dimensional bar code is reviewed by studying a journal related to it to check its strength and weakness.

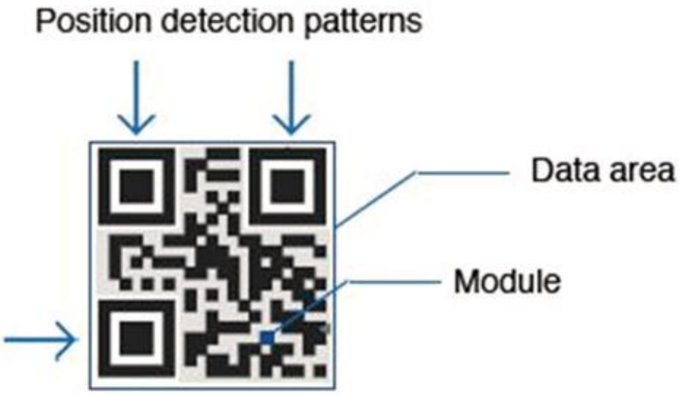


Figure 2.2.1.1: QR code patterns

The strength of QR code is:

- High data capacity and small printout size.

QR code is a 2D bar code which allows storing up to 10 times more information than an ordinary barcode but with the size of a small square.

- Simple to generate

QR code generator is widely available on the internet as long as keyword “QR Code generator” is entered in Google.

- Able to read from many directions.

With the help of 3 position detection patterns, image taken from any angle could be decoded as well as the QR code is clear enough.

- Can be designed.

User can add their own design onto it as long as it doesn’t cover the module and 3 position detection patterns and doesn’t cover much of the data area.

- QR code reader is widely available.

QR code reader is widely available on any device for its popularity for the last 2 years.

The weakness of QR code is:

- Unable to read if camera out of focus.

Blurry image taken cannot be decoded. However, this problem could be easily solve by focusing the camera to the code properly or have a clean lens.

Microsoft Tag

Microsoft tag is a colourful, visually appealing code which made out of triangles. This tag can also use GPS which directs customers to the location it refers to (Pamela, 2010). This Microsoft tag is studied by studying a website which comparing both QR Code and Microsoft Tag.

The strength of Microsoft tag is:

- High data capacity compared to QR code.

This is because Microsoft tag uses colour for its code, different colour can gives different meaning. If QR Code with black and white represents binary code, then Microsoft code should be a Hex code.

- Contents and information could be updated.

This provides constant update for the code such as expiry date of a coupon, after a certain date, the coupon would not be able to use anymore.

- Can read even out of focus.

The reader can identify each colour and read the code even if the image captured is out of focus.

The weakness of Microsoft tag is:

- Hard to read.

This is because the reader is now available for android only. Other mobile device is unable to decode and read this code.

- Colour might be distorted by light.

As the reader decodes and reads this code by using colour, different contrast of light might misleads the reading process.

Multi-color 2D datamatrix

Multi-color 2D datamatrix is another 2D barcode. However, this data matrix can contain up to 3 colours which is cyan, magenta and yellow (Bogataj, n.d.). This datamatrix is different from QR Code as it uses finder patterns and QR Code uses 3 position detection patterns as in Figure 2.2.1.1. This multi-color datamatrix is reviewed by a proposal which is found online.

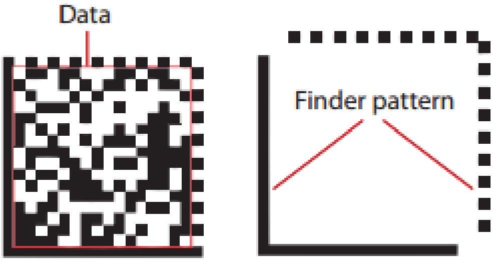


Figure 2.2.1.1: Datamatrix finder pattern

The strength of multi-color datamatrix is:

- ➢ High data capacity compared to both QR code and Microsoft Tag.

This is because multi-color datamatrix uses pattern of QR code which has a large data area and uses the multi-color to increase its data capacity.

The weakness of multi-color datamatrix is:

- ➢ Hard to read.

This is because the reader is now available for android only. Other mobile device is unable to decode and read this code.

- ➢ Colour might be distorted by light.

As the reader decodes and reads this code by using colour, different contrast of light might misleads the reading process.

To conclude, QR Code is chosen to be used as the two dimensional barcode which is used to generate the symbol on a document to represent its information. This is because the documents need to be accessed by most of the employees, and wide access to code reader is a must for different phone user to have the option to decode or read the code. Besides, the information needed to store is not that much, therefore QR Code is chosen.

2.2.2 Markup language

Standard Generalized Markup Language (SGML) is a standard used to define generalized markup language for documents, which is a metadata (Rouse, 2005). In this case, we are comparing both PHP language and Extensible Markup Language (XML) which both is somehow related to SGML. This markup language decided is used when building the system to mark each paragraph using elements like Header, Body, Footer or even P which stands for a paragraph. With these markings, we can easily know which part of the documents is introduction and which part is the conclusion.

PHP

PHP is chosen to be reviewed in this project is that its compatibility with HTML. HTML is the subset of SGML and it defines a list of fixed elements that allows document type of web pages to be mark up easily such as headings, paragraphs, lists and illustrations to ease web page of document types (SGML - XML - HTML -XHTML All together, 2007). To create a page PHP page with HTML code inside and PHP code embedded, simply enclose the php code with "<?php" and "?>". Other than HTML, PHP also can be embedded into XML, SGML and even ASP. Besides, PHP can run on almost every operating systems and installing PHP is not a hard thing as there are custom installer on the internet that allows user to install PHP together with MySQL database which is used to store data. The other advantage of using PHP language is that it is not limited on only outputting HTML pages, it can also export PDF files, GIF files and PNG images by using functions created by the PHP community which is very useful for this system that we are going to build (Lerdorf & Tatroe, 2002). This language is reviewed by studying an e-book on PHP language and an article about comparing SGML, XML and HTML.

The strength of PHP language is:

- Compatibility with HTML code which allows SGML style coding.
- Compatible with most of the operating system so that user can be on any platform to use this system.
- Has a database to store data and retrieve data from.
- Can be outputted into different types of file for ease of use.

The weakness of PHP language is:

- Low security parameters. However, this can be overcome by creating functions to encrypt the data to be stored inside the database so that hacker won't be able to retrieve the data easily (PHP GOOD OR BAD, 2015).

XML

XML is built by XML Working Group in order to overcome the problem that SGML is not compatible with most mainstream browsers. XM L have the power and flexibility of SGML and have the difficult and complex features of SGML that makes design of software difficult and costly. However, XML still lacks of some capability that SGML can do because it is not designed to replace SGML. (SGML - XML - HTML -XHTML All together, 2007). This language is reviewed by studying comparison between SGML and XML.

The advantages of using XML are:

- Allows writing own markup language such as not using limited sets of tags that are predefined.
- The code is more easy to pickup by someone with little programming knowledge as the markup tags are created by own such as html <li> Calvin Son</li> and XML <name> Calvin Son </name>. From XML, it is easily to be understood that Calvin Son is the name (Sol, n.d.).
- Compatible with most of the operating system so that user can be on any platform to use this system.

The disadvantages of using XML are:

- Not allowing unclosed start tag and end tags which somehow cause error if tag is not closed.
- More restrictions are imposed compared to SGML which causes some errors when writing the system if restrictions are not studied properly (Clark, 1997).

To conclude, PHP language is chosen. Although XML have the advantages of writing own markup language, but there are more restrictions that need to be studied and research. On the other hand, PHP has the compatibility with MySQL which makes storing and retrieving data from database easy and can be outputted into different file formats which allows easy extract of documents into Universal Serial Bus (USB) drives from this system created.

2.2.3 Database system

MySQL

MySQL or My Structured Query Languages is one of the database that uses SQL language to write and retrieve data from the database (Heng, 2010). With the basic understanding of SQL syntax such as SELECT query, WHERE clause as well as INSERT and UPDATE queries, one can easily pick up on how to use MySQL (Lavin, 2005).

The advantages of using MySQL are:

- It is easy to use as long as having understanding on SQL language.
- It is inexpensive as it is free to download and use.
- It is compatible to multiple operating system ranging from Windows to Linux as well as UNIX.
- It is well scalable as the default file size is 4gb which allows user to store a whole lot of data to populate all 4gb.

The disadvantages of using MySQL are:

- It has poor performance once there are high read and write ratio, therefore it is not suitable for big project.
- Its development is not driven by community as the company does not accept any community developed patches.

This database system is chosen to be used as it is easy to use and free to use. As this project are going to use database just to store the file's version, therefore it doesn't have high read and write ratio. Besides, it is also available on multiple operating system which makes developing an easier job.

2.3 Existing Products

	Nuance Paperport	Office Gemini	ColumbiaSoft DL
Scan paper into digital documents	✓	✓	✓
Export PDF file	✓	✓	-
Electronic filing	✓	✓	✓
Cloud storage / Database	✓	✓	✓
Creates dynamic document	-	-	-
Generate code/symbol to represents the document's information	-	-	-
Versions control	-	-	✓
Mobile device support	✓	✓	-
Photo editing tools	✓	-	-

Table 2.3.1: Comparing similar systems

Chapter 3: System Design

3.1 Use-case Diagram

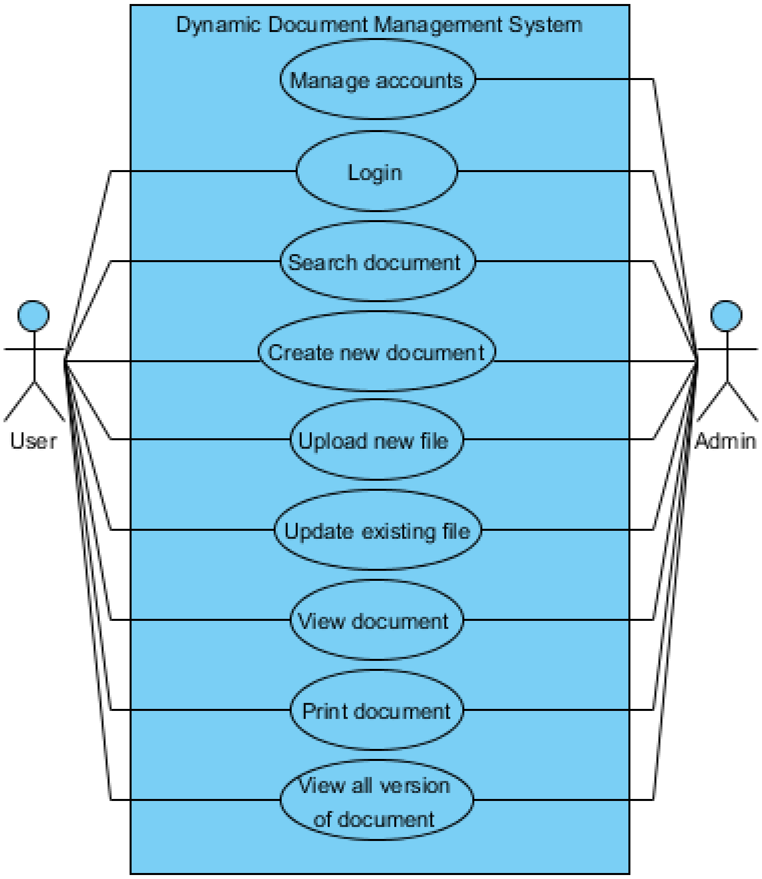


Figure 3.1.1: Use-case diagram

This diagram shows what a user can do with this Dynamic Document Management System.

3.2 Use-case Analysis

Use Case Name	Login
Primary Actor	Admin/User
Preconditions	User access the system.
Success End Conditions	Once user done login, the system will bring user to home page.
Basic Flow	1. User fill in username and password, then press the login button. a. System will display wrong username or password if username or password mismatch. 2. System will redirect user to home page.

Table 3.2.1: Login use-case analysis

Use Case Name	Search document
Primary Actor	Admin/User
Preconditions	User press the search document by tag at the navigation bar.
Success End Conditions	Once user done searching, related documents will be shown.
Basic Flow	1. User press the search document by tag at the navigation bar. 2. User select tags to filter the documents 3. User select documents filtered to view it

Table 3.2.2: Search document use-case analysis

Use Case Name	Create document
Primary Actor	Admin/User
Preconditions	User need press the create document on the navigation bar.
Success End Conditions	Once user done creating the document, user can add tags to newly created file.
Basic Flow	1. User press the create document button 2. User create document with title and paragraphs to be filled in later 3. System ask user to add tags for the document

Table 3.2.3: Create document use-case analysis

Use Case Name	Upload document
Primary Actor	Admin/User
Preconditions	User need press the upload document button and choose file to be uploaded to upload the document.
Success End Conditions	Once user done uploading the document, user can add tags to this new document.
Basic Flow	1. User choose document to be uploaded 2. User press the upload document button 3. System checks for the document format a. System will display wrong format if wrong file format is uploaded. 4. System ask user to add tags for the document

Table 3.2.4: Upload document use-case analysis

Use Case Name	Update existing file
Primary Actor	Admin/User
Preconditions	User need to select a new document first, then press the update document button.
Success End Conditions	Once user done upload a document, system will store the old document in archive and rename the new document to the updated name.
Basic Flow	1. User choose document to be uploaded 2. User press the upload document button 3. System checks for the document format a. System will display wrong format if wrong file format is uploaded. 4. System shows newly uploaded document as latest version

Table 3.2.5: Update existing file use-case analysis

Use Case Name	View document
Primary Actor	Admin/User
Preconditions	User can select document to view the document.
Success End Conditions	Once user select the document, the document will be opened in new tab.
Basic Flow	1. User press view on specific document 2. Document will be opened in new tab

Table 3.2.6: View document use-case analysis

Use Case Name	Print document
Primary Actor	Admin/User
Preconditions	After user press the print document button on specific document.
Success End Conditions	Once user done filling for document, the system will download document to user's computer in a WinRAR file.
Basic Flow	1. User press the print button on specific document 2. User select to print blank, any number of filled copies or fill forms with database. 3. User fill in form fills 4. System will download multiple document on user's computer

Table 3.2.7: Print document use-case analysis

Use Case Name	View all version of document
Primary Actor	Admin/User
Preconditions	User click on view all version button of the document.
Success End Conditions	Once user press view all version button, there will be all versions of that document being shown.
Basic Flow	1. User press to view all version button of specific document 2. System will show all previous version of document 3. User click one of the previous version of document to view document.

Table 3.2.8: View all version of document use-case analysis

Use Case Name	Manage accounts
Primary Actor	Admin
Preconditions	User click on account management on the navigation bar.
Success End Conditions	Once user add a user, the user will be stored into database.
Basic Flow	1. User press account management on the navigation bar 2. System will show all user in the database 3. User can fill in forms to add new user to select to delete any user.

Table 3.2.9: Manage accounts use-case analysis

3.3 Activity Diagram

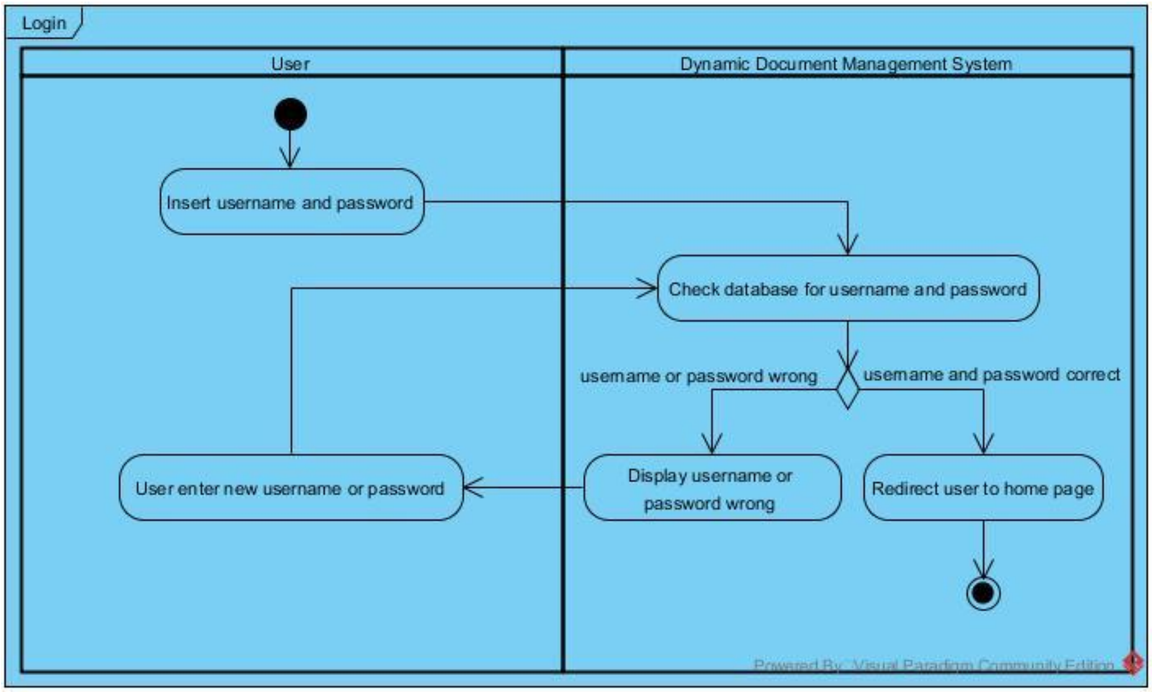

Login
User
Dynamic Document Management System
Insert username and password
Check database for username and password
username or password wrong
username and password correct
Display username or password wrong
Redirect user to home page
User enter new username or password
Powered By: Visual Paradigm Community Edition

Figure 3.3.1: Login activity diagram

This activity diagram shows what happened when user tries to log in. Firstly, the system will display panel for user to fill in their username and password. Then, database will check if username and password user fills in matches the username and password in the database. If the username and password both correct, the system will redirect user to homepage. However, if username or password is wrong, system will display that username or password wrong and request user to re-enter username and password.

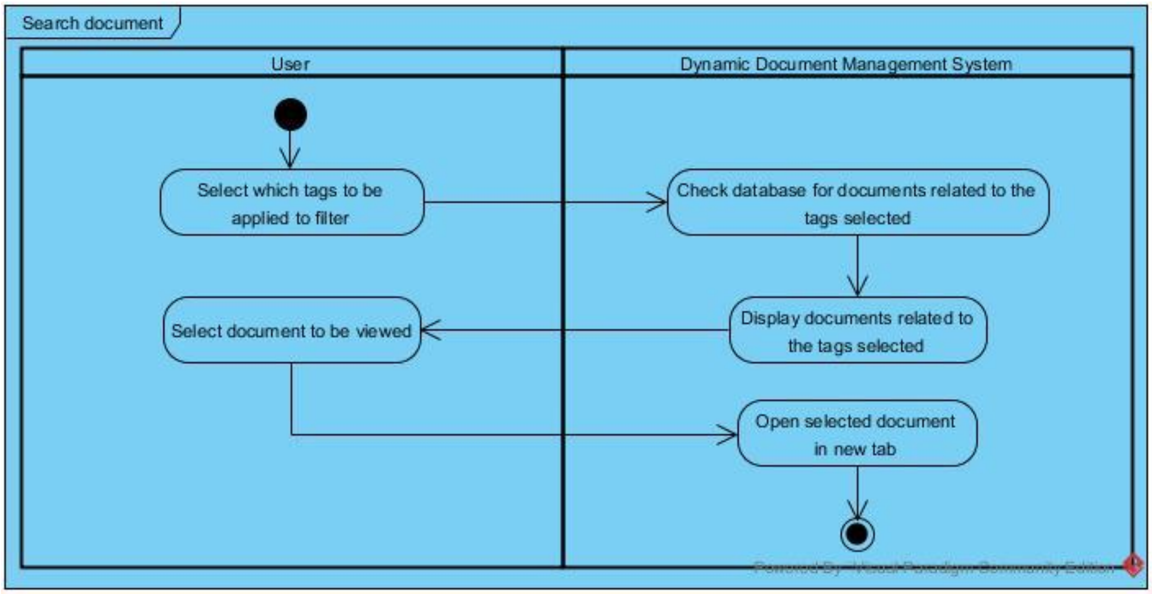

Search document
User
Dynamic Document Management System
Select which tags to be applied to filter
Check database for documents related to the tags selected
Display documents related to the tags selected
Select document to be viewed
Open selected document in new tab
Powered By Visual Paradigm Community Edition

Figure 3.3.2: Search document activity diagram

This activity diagram shows what happened when user search documents. Firstly, the system will display a numbers of different tags for user to select. Then, the system will search for documents with the tags user selected as a filter and display it. User then can select which document to be viewed and the document will be opened in a new tab.

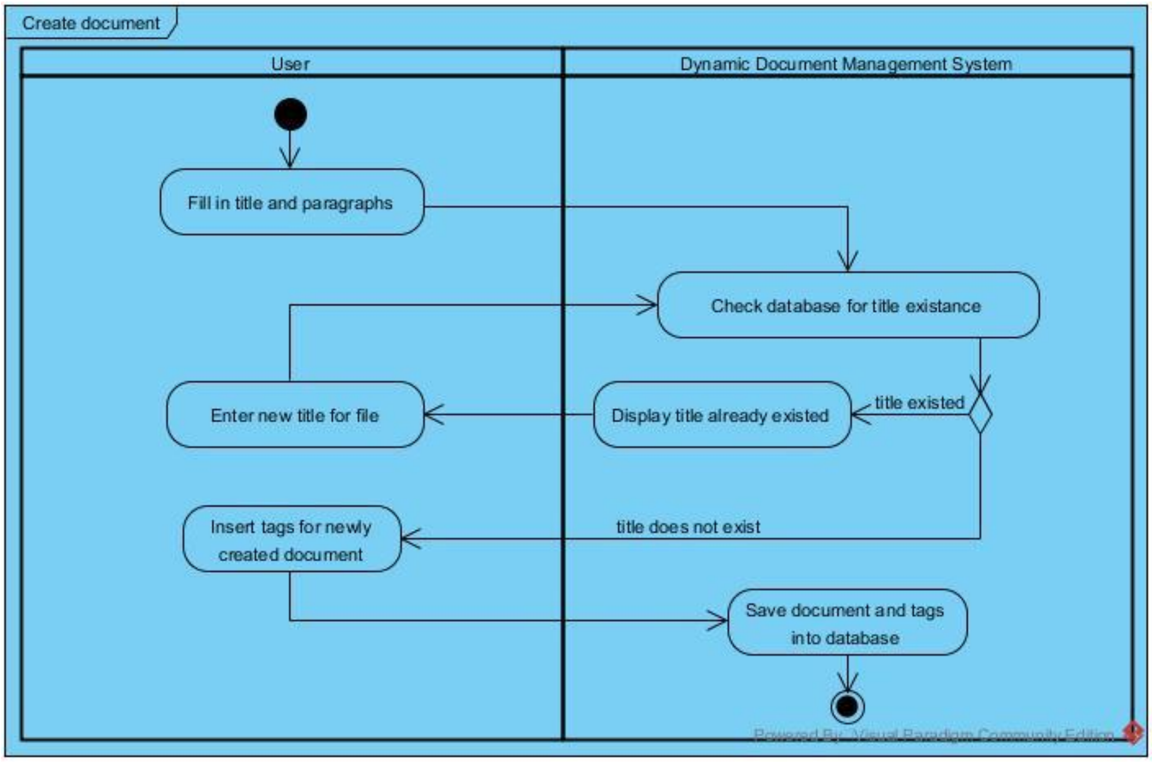

Create document
User
Dynamic Document Management System
Fill in title and paragraphs
Check database for title existance
Enter new title for file
Display title already existed
title existed
Insert tags for newly created document
title does not exist
Save document and tags into database
Powered By: Visual Paradigm Community Edition

Figure 3.3.3: Create document activity diagram

This activity diagram shows what happened when user create document. Firstly, the system will display panel for user to fill in title and paragraphs. Then, the system will check database whether the title already exist or not. If the title existed, system will request user to enter a new title. If title does not exist, system will request user to insert tags for newly created document. After inserting tags, system will store both documents and tags in the database.

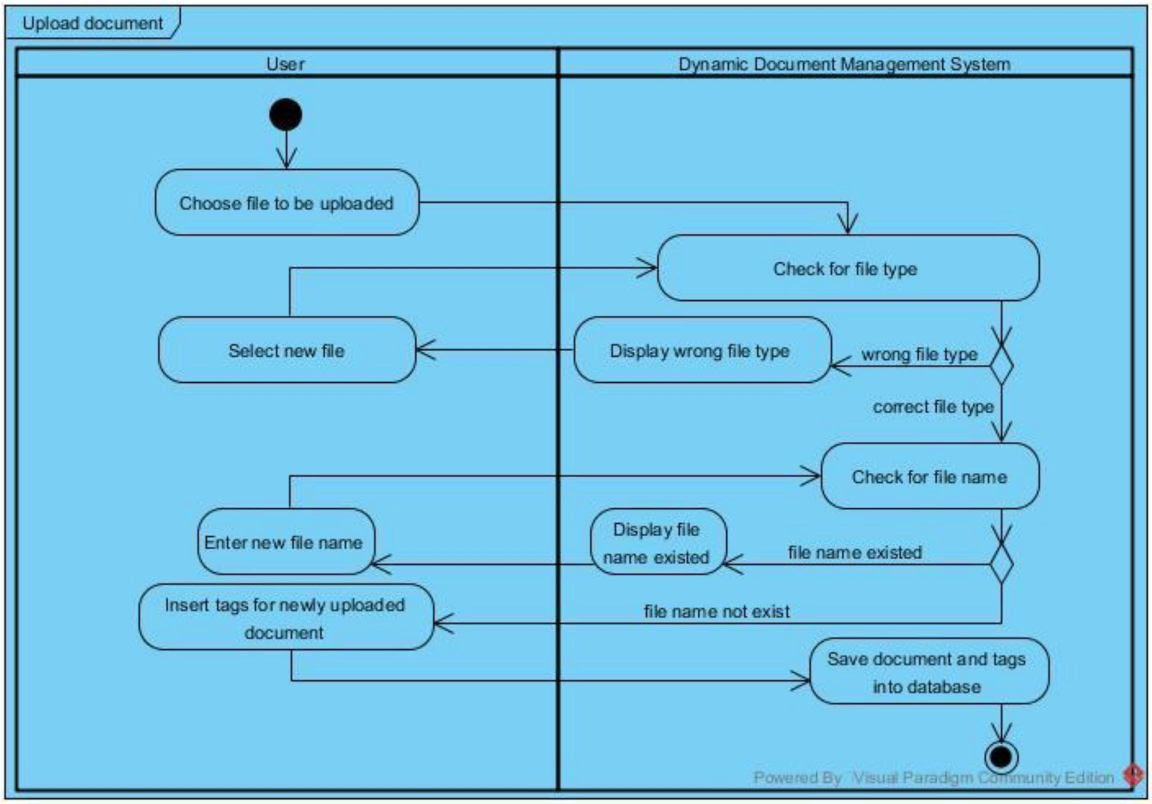

Upload document
User
Dynamic Document Management System
Choose file to be uploaded
Check for file type
Select new file
Display wrong file type
wrong file type
correct file type
Check for file name
Enter new file name
Display file name existed
file name existed
Insert tags for newly uploaded document
file name not exist
Save document and tags into database
Powered By Visual Paradigm Community Edition

Figure 3.3.4: Upload document activity diagram

This activity diagram shows upload document process. After user choose document and pressing the upload button, if the uploaded document file type is wrong, the system will ask user to choose document again. After that, system will check for file name. If file name already existed, system will prompt user to enter a new file name. If title does not exist, system will request user to insert tags for newly created document. After inserting tags, system will store both documents and tags in the database.

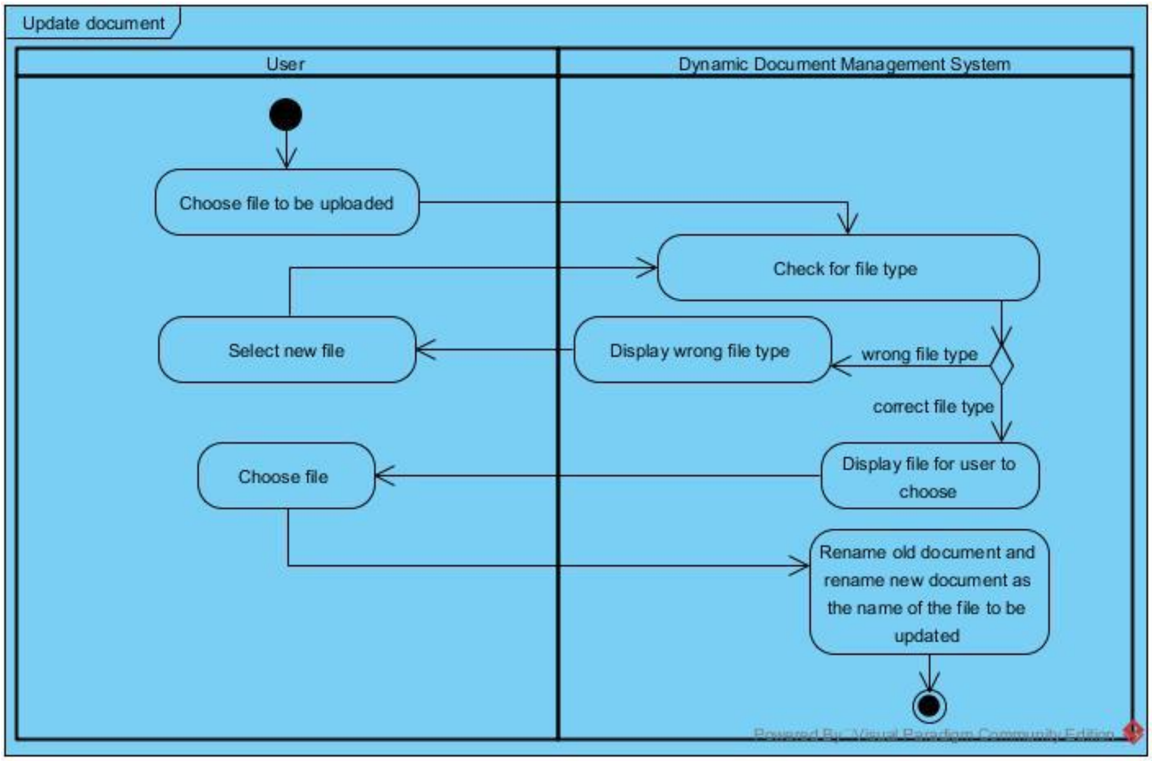

Update document
User
Dynamic Document Management System
Choose file to be uploaded
Check for file type
Select new file
Display wrong file type
wrong file type
correct file type
Choose file
Display file for user to choose
Rename old document and rename new document as the name of the file to be updated
Powered By: Visual Paradigm Community Edition

Figure 3.3.5: Update document activity diagram

This activity diagram shows update document process. After user choose document and pressing the update button, if the uploaded document file type is wrong, the system will ask user to choose document again. After that, system will display a list of all file for user to choose to update. After user chose which file to update, the system will rename the old document to match the archive format and rename the new document as the name of the file to be updated.

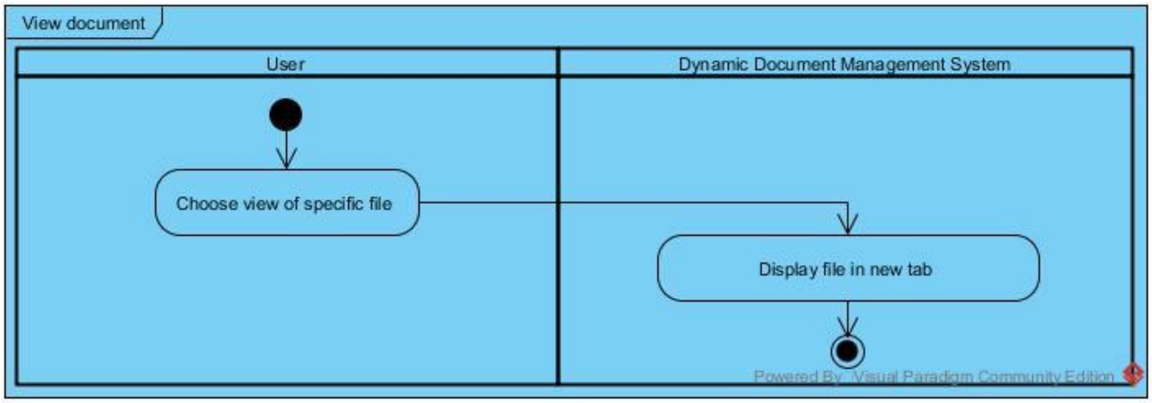

View document
User
Dynamic Document Management System
Choose view of specific file
Display file in new tab
Powered By Visual Paradigm Community Edition

Figure 3.3.6: View document activity diagram

This activity diagram shows the view document process. At the main page, user can see latest version of all documents uploaded and created. User can then press any document's view button to view the document and system will display the document in new tab.

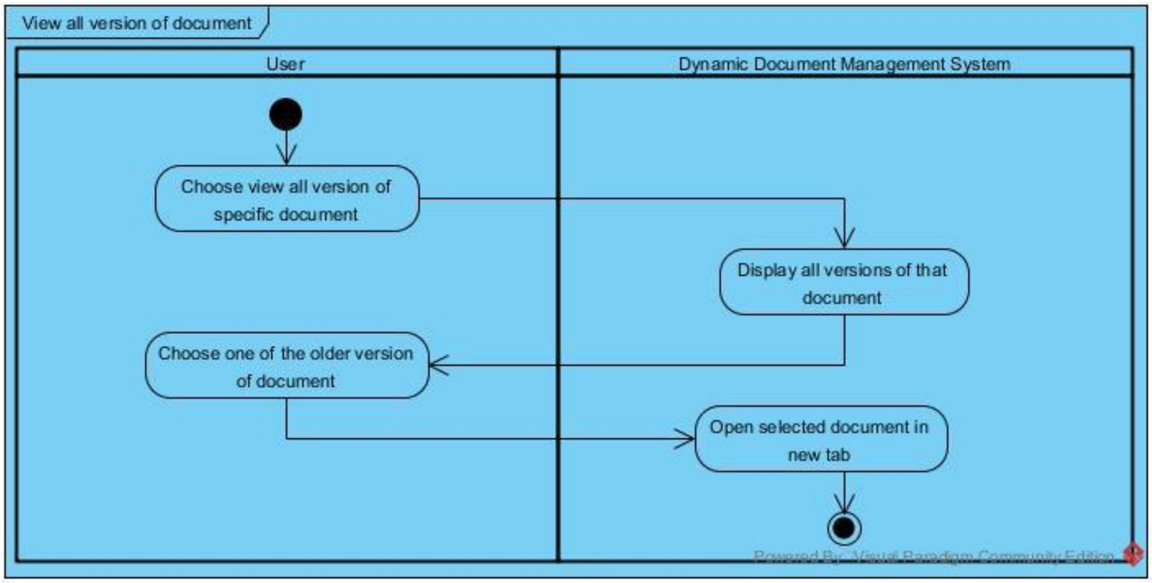

View all version of document
User
Dynamic Document Management System
Choose view all version of specific document
Display all versions of that document
Choose one of the older version of document
Open selected document in new tab
Powered By Visual Paradigm Community Edition

Figure 3.3.7: View all version activity diagram

This activity diagram shows the view all version process. At the main page with all documents, user can choose view all version of specific document and system will display all versions of that document. User can then choose one of the document to view it and system will open selected document in new tab.

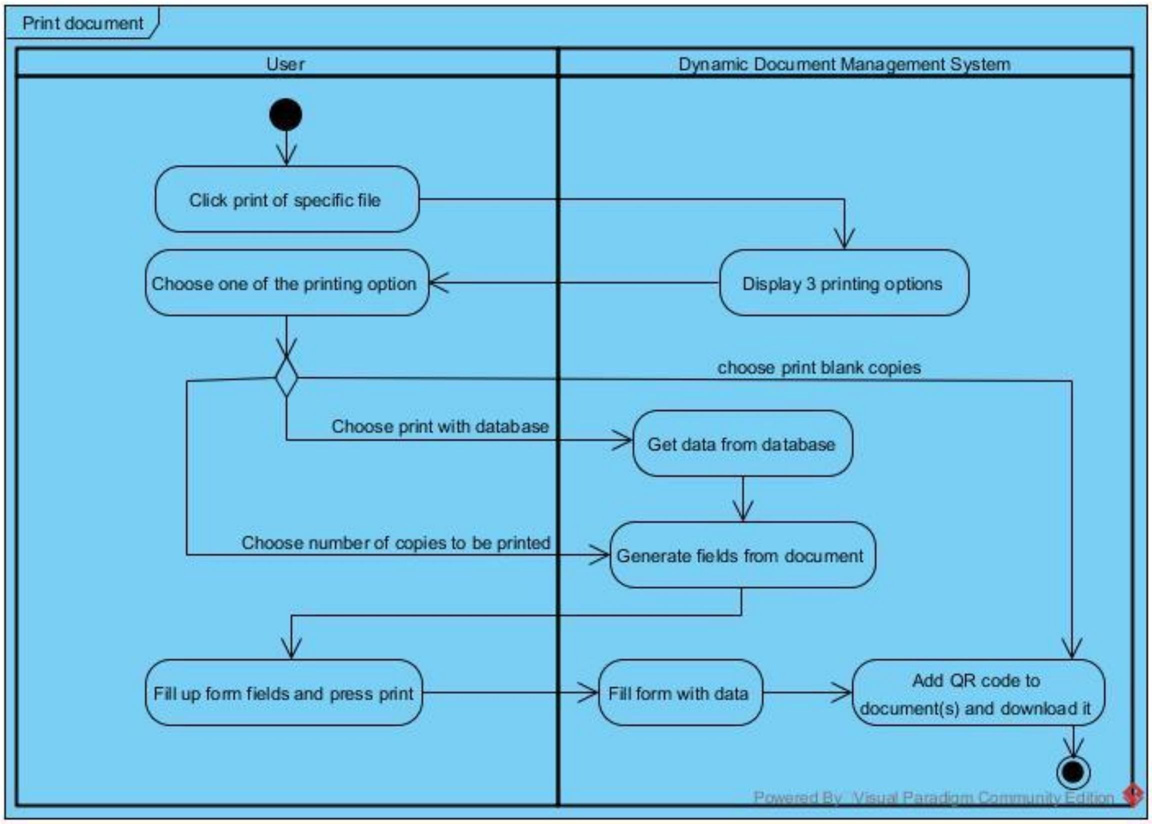

Print document
User
Dynamic Document Management System
Click print of specific file
Display 3 printing options
Choose one of the printing option
choose print blank copies
Choose print with database
Get data from database
Choose number of copies to be printed
Generate fields from document
Fill up form fields and press print
Fill form with data
Add QR code to document(s) and download it
Powered By Visual Paradigm Community Edition

Figure 3.3.8: Print document activity diagram

This activity diagram shows the process of print document. User can click print button on specific document. Then, system will display 3 different printing option for user. If user choose to print blank copies, the system will add QR code to document and then download it. If user choose to print with database, the system will get data from the database, then generate fields from document and then fill up those fields with data inside database. After that, user need to fill up the rest of the fields and press print. The system will then fill form with data inserted by user and database and then add QR code to the document. After filling each document, system will then zip the document together and download it as a whole for user. If user choose to print number of copies, system will generate numbers of document's fields to allow user to fill in and then fill the document with data filled by user. After that, system will add QR code to each document and then zip all document together to download it as a whole.

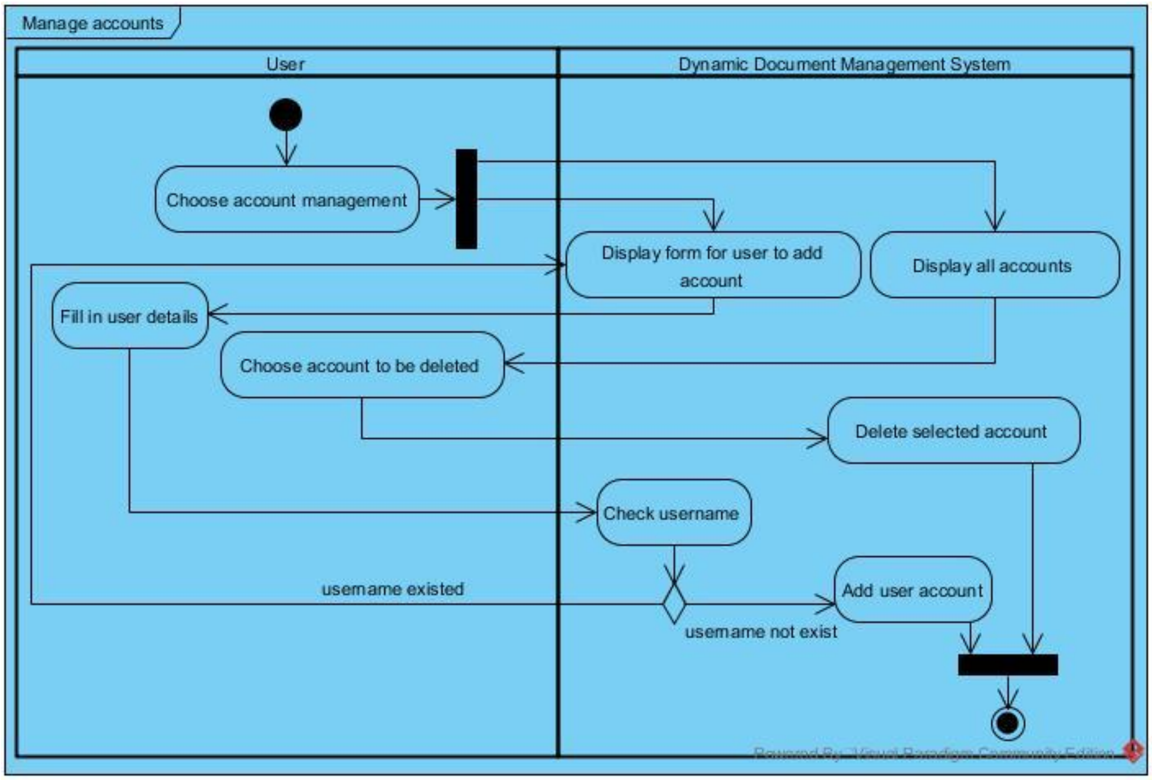

Manage accounts
User
Dynamic Document Management System
Choose account management
Display form for user to add account
Display all accounts
Fill in user details
Choose account to be deleted
Delete selected account
Check username
username existed
Add user account
username not exist
Powered By Visual Paradigm Community Edition

Figure 3.3.9: Manage accounts activity diagram

This activity diagram shows the process of managing account. After user enter the account management page, the system will display fields for user to add accounts as well as all the accounts for user to delete any of them. User can choose delete button of which account to delete it and the system will delete the account from the database. User can also fill in user details to add user. System then will check the database whether username exist of not. If username already existed, system will tell user that user already exist, try a new username. If username does not exist, the system will add the new user to database.

3.4 Entity Relationship Diagram (ERD)

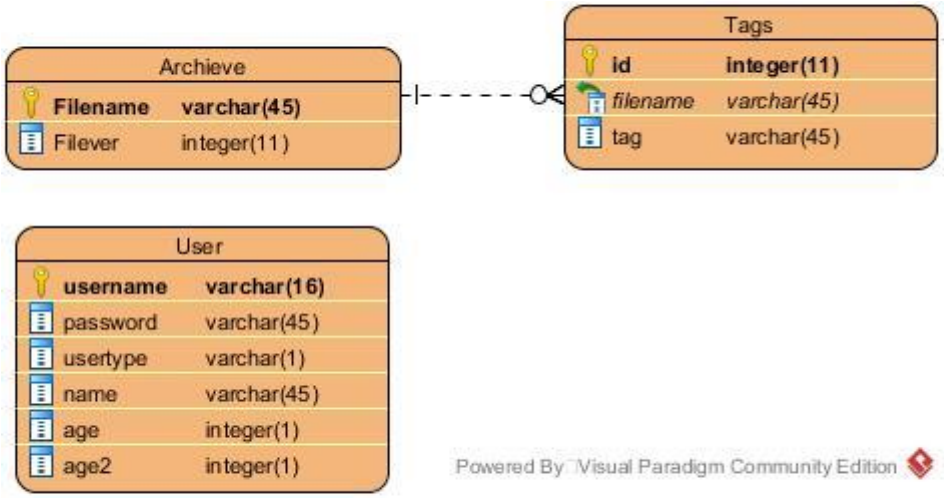


Figure 3.4.1: Entity Relationship Diagram

This diagram shows the relationship between the tables in the database. The tags table and the archive table is link together using a one-to-many relationship where one file name can have multiple different tag. However, the user table is stand alone as it only manages user's login and populating fields when printing.

P/F	Field Name	Data Type	Field Size	Notes
P	Filename	Text	45	File name for each file.
	Filever	Integer	11	Latest file version of each file.

Table 3.4.2: Archieve table data dictionary

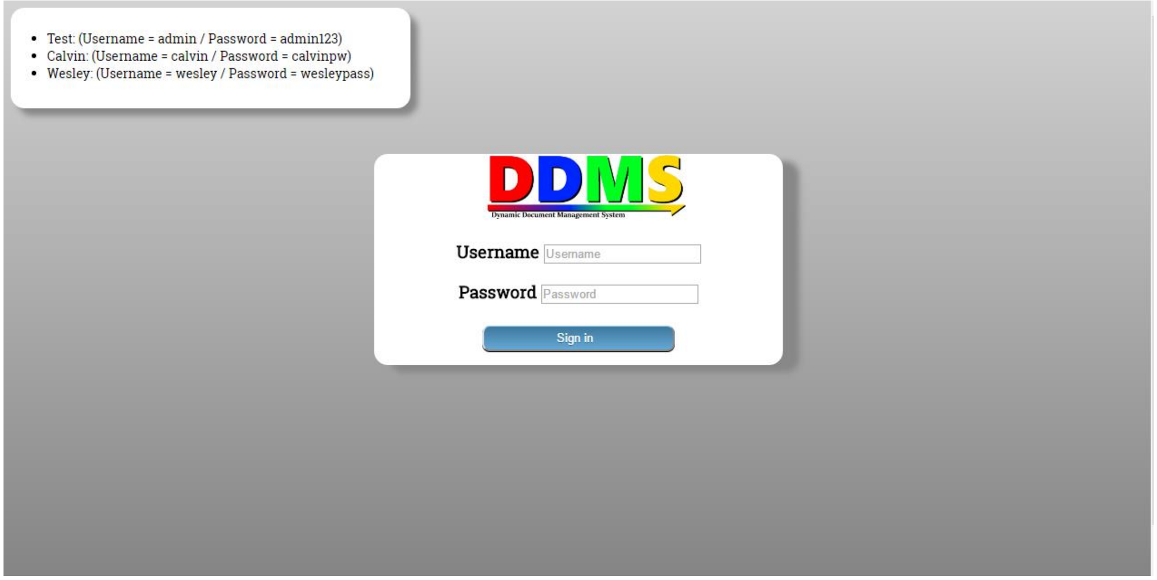
P/F	Field Name	Data Type	Field Size	Notes
P	Id	Integer	11	A unique id to differentiate each tags.
F	Filename	Text	45	File name for each file.
	Tag	Text	45	Tags of each file for filtering.

Table 3.4.3: Tags table data dictionary

P/F	Field Name	Data Type	Field Size	Notes
P	username	Text	16	A unique username for user to use when login.
	password	Text	45	Password for login purpose.
	usertype	Text	1	Tags of each file for filtering.
	Name	Text	45	User’s name.
	age	Integer	1	User’s age 1st integer.
	Age2	Integer	1	User’s age 2nd integer.

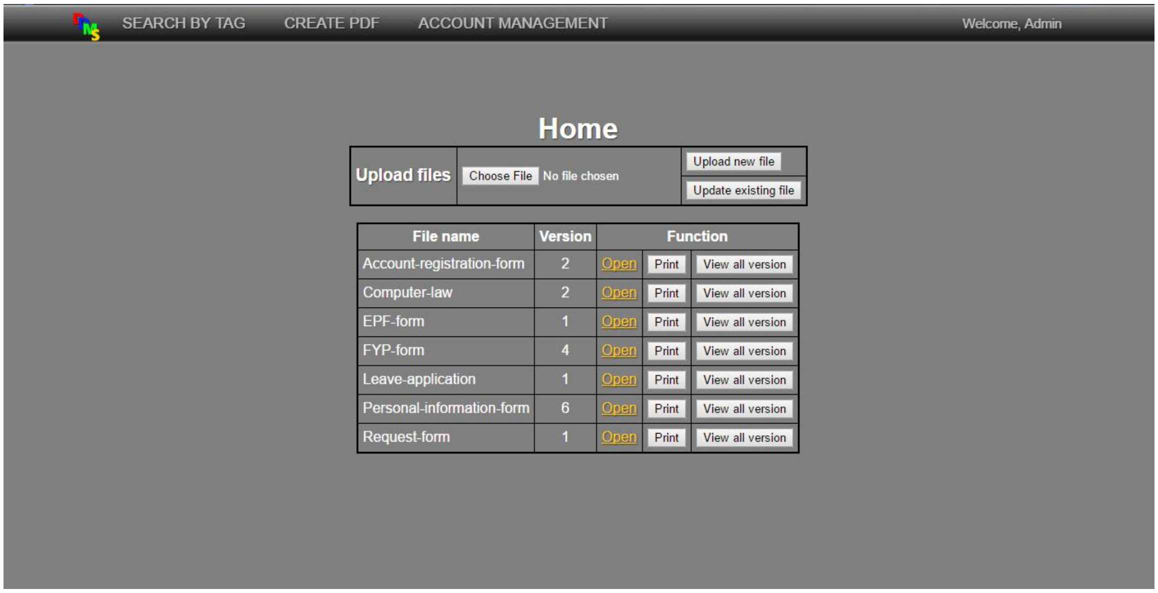
Table 3.4.4: User table data dictionary

3.5 User Interface Design



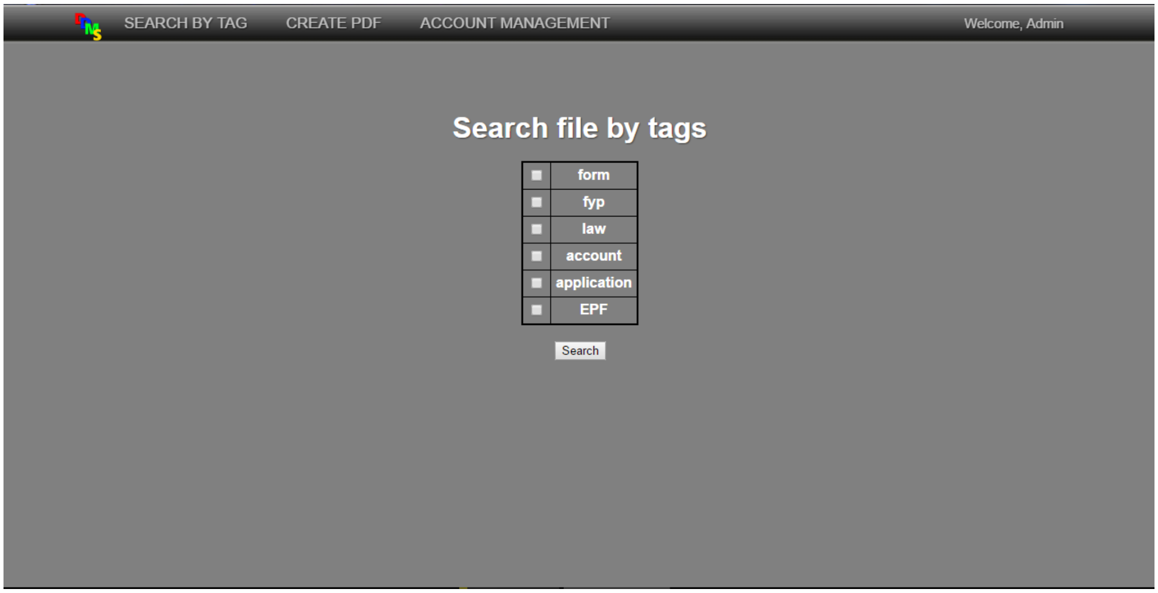
- Test: (Username = admin / Password = admin123)
- Calvin: (Username = calvin / Password = calvinpw)
- Wesley: (Username = wesley / Password = wesleypass)

Figure 3.5.1: Login page user interface design



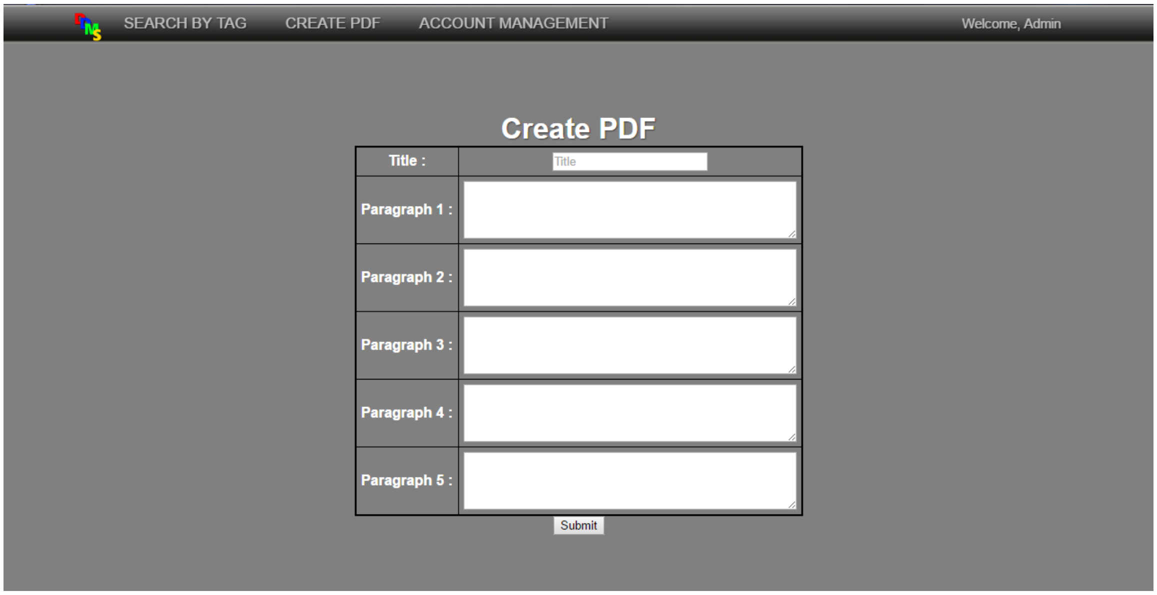
File name	Version	Function		
Account-registration-form	2	Open	Print	View all version
Computer-law	2	Open	Print	View all version
EPF-form	1	Open	Print	View all version
FYP-form	4	Open	Print	View all version
Leave-application	1	Open	Print	View all version
Personal-information-form	6	Open	Print	View all version
Request-form	1	Open	Print	View all version

Figure 3.5.2: Home page user interface design



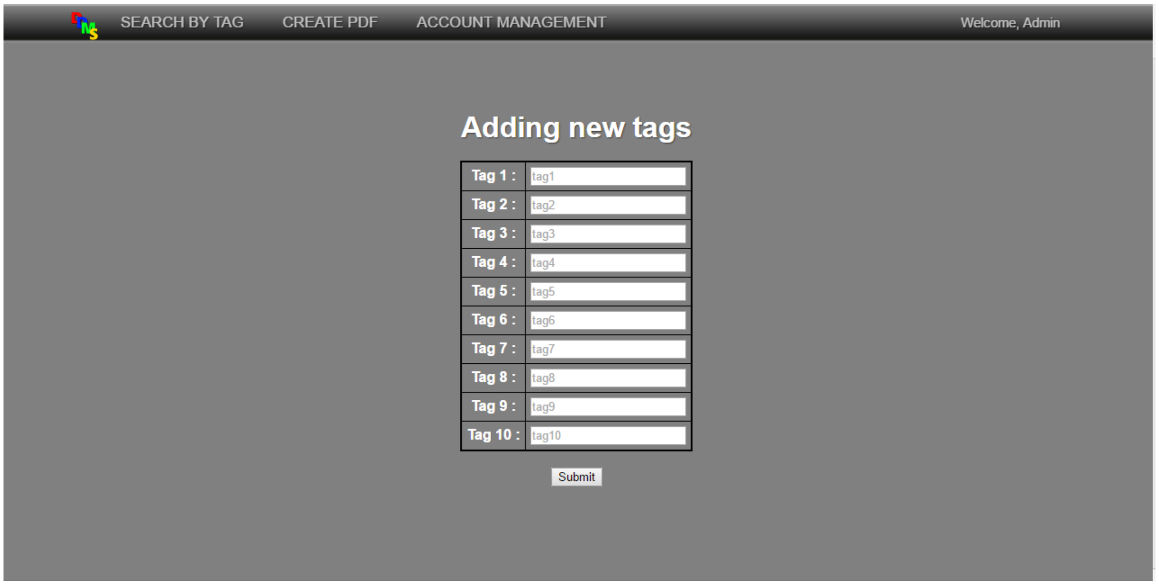
□	form
□	fyp
□	law
□	account
□	application
□	EPF

Figure 3.5.3: Search PDF user interface design



Title :	Title
Paragraph 1 :	
Paragraph 2 :	
Paragraph 3 :	
Paragraph 4 :	
Paragraph 5 :	

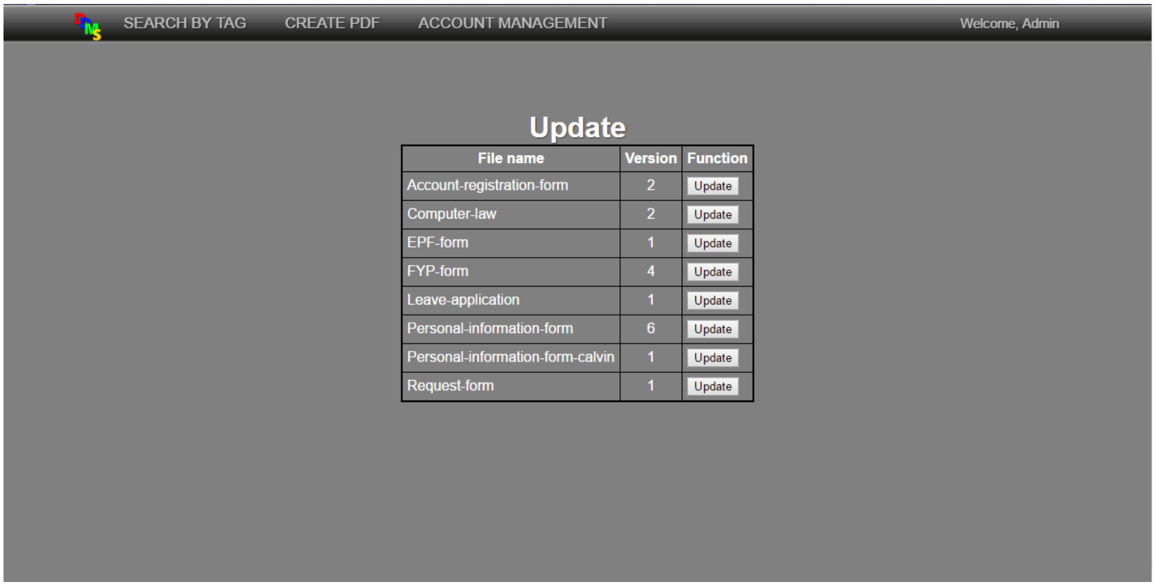
Figure 3.5.4: Create PDF user interface design



Adding new tags

Tag 1 :	tag1
Tag 2 :	tag2
Tag 3 :	tag3
Tag 4 :	tag4
Tag 5 :	tag5
Tag 6 :	tag6
Tag 7 :	tag7
Tag 8 :	tag8
Tag 9 :	tag9
Tag 10 :	tag10

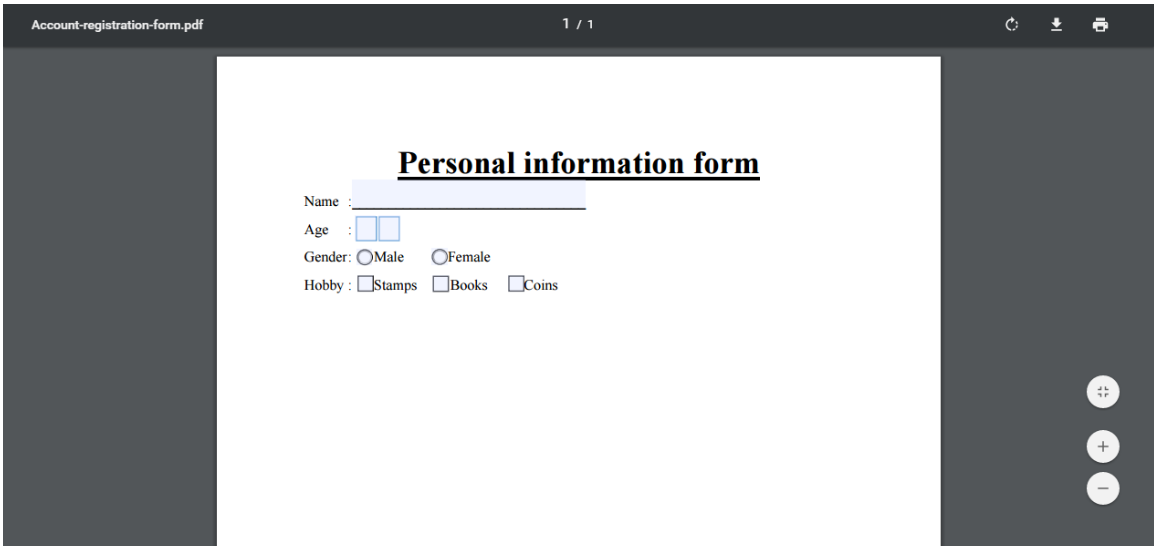
Figure 3.5.5: Add tag user interface design



Update

File name	Version	Function
Account-registration-form	2	Update
Computer-law	2	Update
EPF-form	1	Update
FYP-form	4	Update
Leave-application	1	Update
Personal-information-form	6	Update
Personal-information-form-calvin	1	Update
Request-form	1	Update

Figure 3.5.6: Update document user interface design



Personal information form

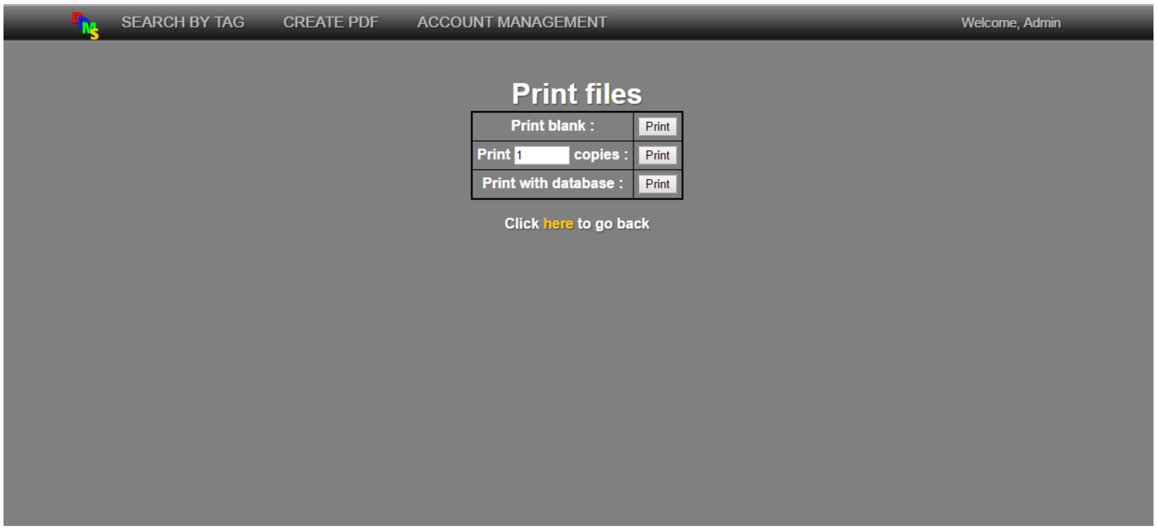
Name :

Age :

Gender: ○Male ○Female

Hobby : □Stamps □Books □Coins

Figure 3.5.7: View document user interface design

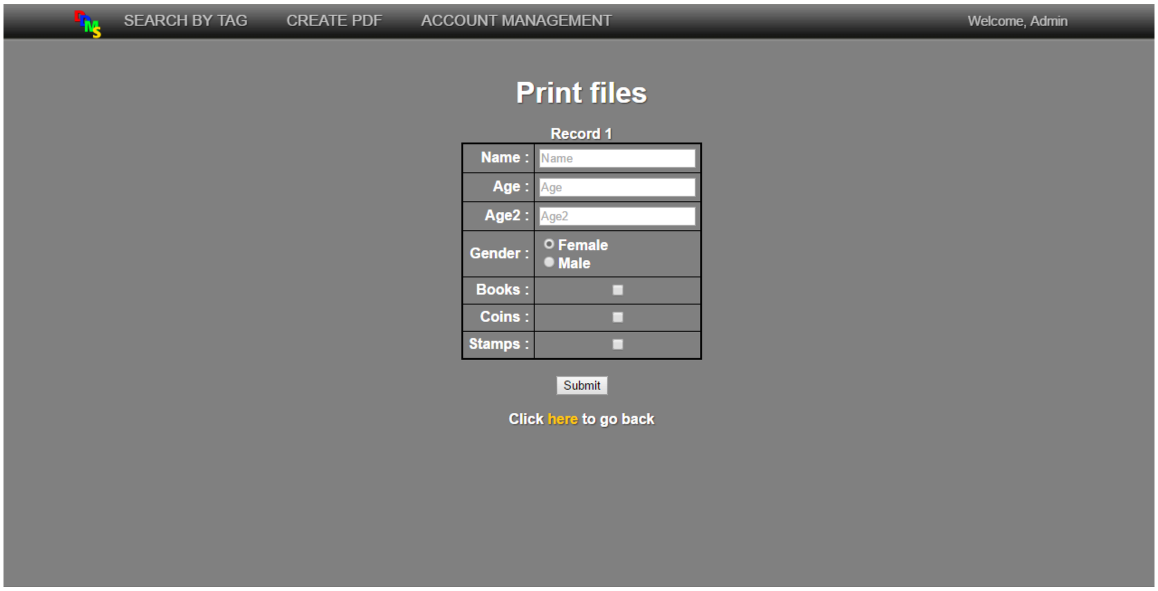


Print files

Print blank :	Print
Print 1 copies :	Print
Print with database :	Print

Click here to go back

Figure 3.5.8: Print document user interface design



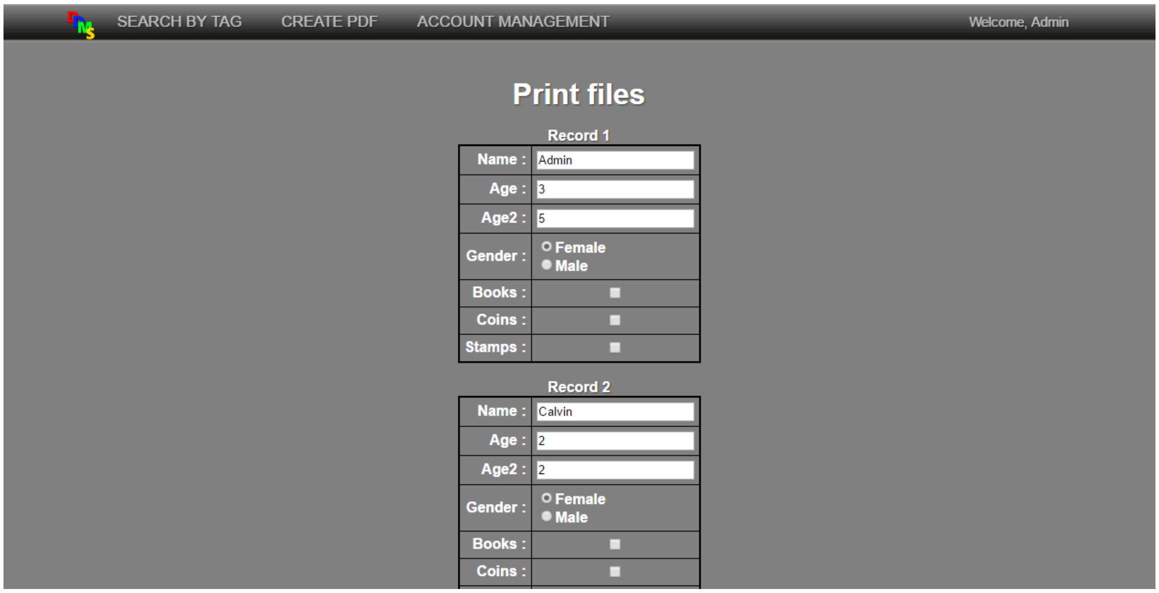
Print files

Record 1

Name :	Name
Age :	Age
Age2 :	Age2
Gender :	○ Female ● Male
Books :	□
Coins :	□
Stamps :	□

Click here to go back

Figure 3.5.9: Document fields user interface design



Print files

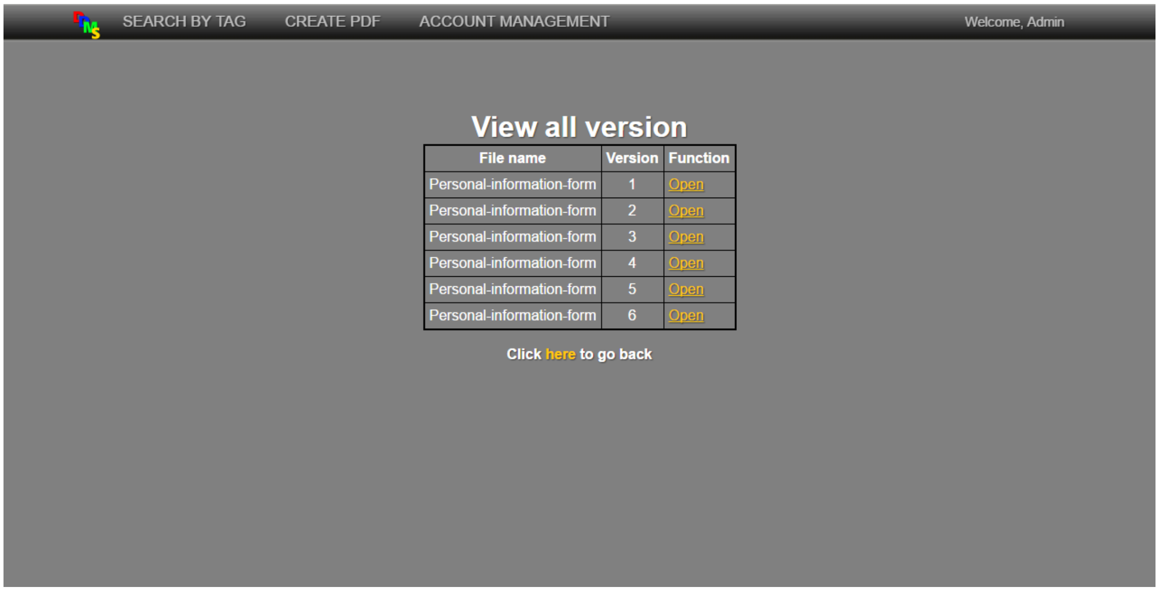
Record 1

Name :	Admin
Age :	3
Age2 :	5
Gender :	○ Female ● Male
Books :	□
Coins :	□
Stamps :	□

Record 2

Name :	Calvin
Age :	2
Age2 :	2
Gender :	○ Female ● Male
Books :	□
Coins :	□

Figure 3.5.10: Document fields with database data user interface design

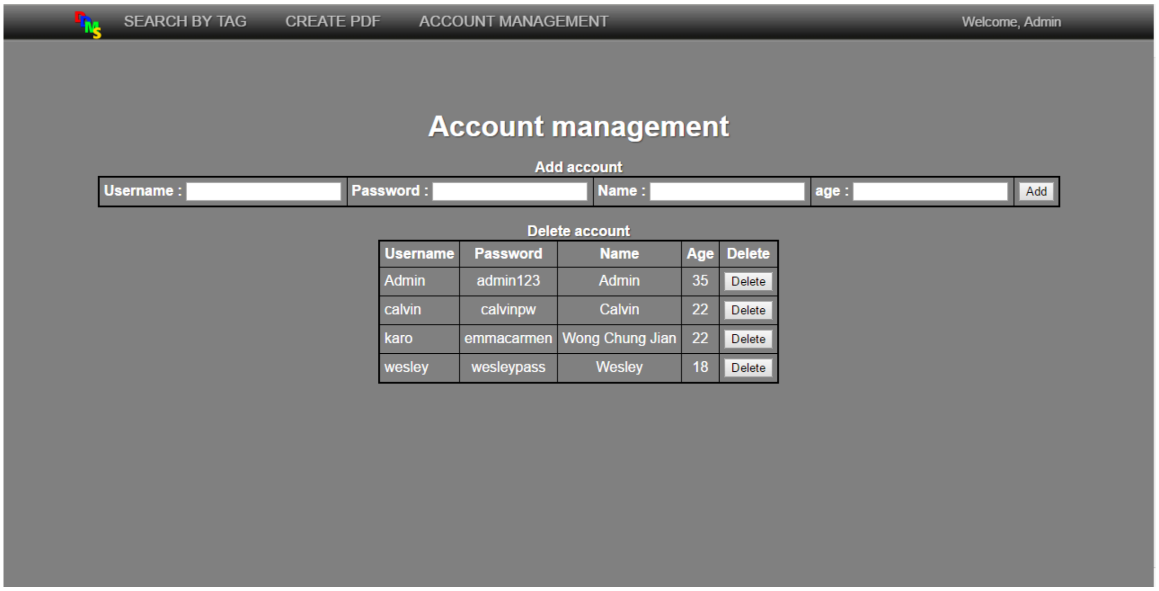


View all version

File name	Version	Function
Personal-information-form	1	Open
Personal-information-form	2	Open
Personal-information-form	3	Open
Personal-information-form	4	Open
Personal-information-form	5	Open
Personal-information-form	6	Open

Click here to go back

Figure 3.5.11: View all version of document user interface design



Account management

Add account

Username :	Password :	Name :	age :	Add

Delete account

Username	Password	Name	Age	Delete
Admin	admin123	Admin	35	Delete
calvin	calvinpw	Calvin	22	Delete
karo	emmacarmen	Wong Chung Jian	22	Delete
wesley	wesleypass	Wesley	18	Delete

Figure 3.5.12: Account management user interface design

3.6 Architecture diagram

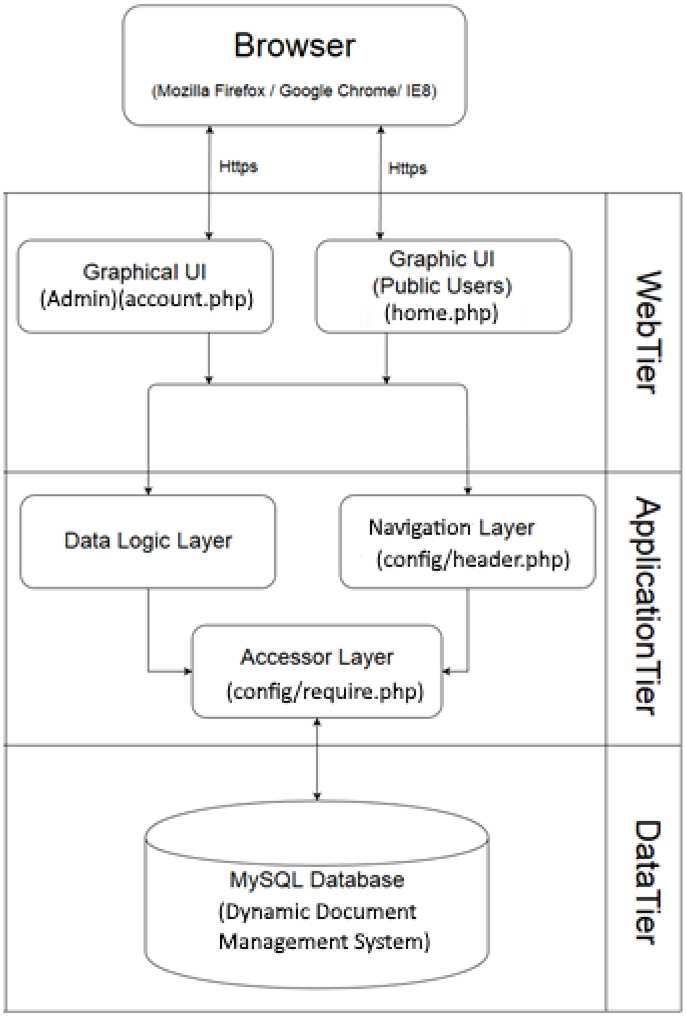


Figure 3.6.1: Architecture diagram

The architecture of dynamic document management system will base on the three-tier architecture which are the web tier (top tier), application tier (middle tier) and data tier (bottom tier). Browser is for the guest and administrator to use the web to login into the system. User access the application via home.php and only admin can access account.php. All the data collected will be processed through the application layer process by server-side processing unit use to access the data tier layer. The function of data tier is to store and retrieve the data and information previously entered by system's users.

Chapter 4: Methods/Technologies involved

4.1 Methods/Technologies involved

For each and every project, there must be a methodology that is used to keep track of the development process so that the project can be finished in time. Different methodology suits for different situation. For example, if given time and large enough cost for developing the system, traditional waterflow methodology can be used in this case to minimize the risk and produce a nice system; if given time is short and budget is low, extreme programming is used as it keeps on developing and editing the errors and bugs found, there are not much time spent on documentation.

4.2 Proposed solutions

The methodology that's been chosen to develop this system is prototyping. This is because prototyping allows user to develop a system that fulfill what client needs more easily. In prototyping, a prototype of the system is first produced for the client to check, in this case, our supervisor will check whether the system is going on the right direction or not. Then, the prototype is either thrown away and develops a new system based on that prototype which is known as throw-away prototyping or re-plan, re-design, and re-implement to produce a new prototype. In this project, normal prototyping is used where the prototype is reused to safe time on programming and implementing.

As same as all the methodology, prototyping has a total of four phases which is planning, analyzing, designing and implementing as shown in Figure 3.2.1. In planning phase, project structure such as project scope and project objectives is discussed with the supervisor Mr. Tan Teik Boon. This phase is to make sure that the direction of this project is going the same as needed. Deliverables of this phase is the project background, problem statements, project objectives and project scope.

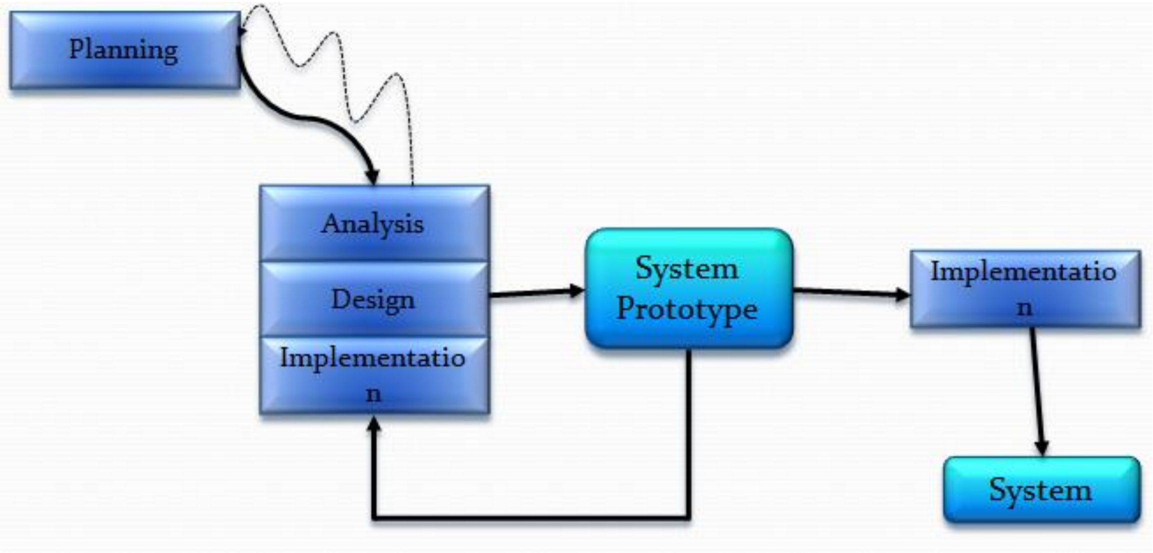


Figure 4.2.1: Prototyping phases

The next phase is analyzing, where literature review is done to decide which technologies or functions to be used when creating system. Besides, similar system is also reviewed to see what the others have done for the similar project. In this phase, methodology and technologies involved is found out to ease the future work when implementing the coding.

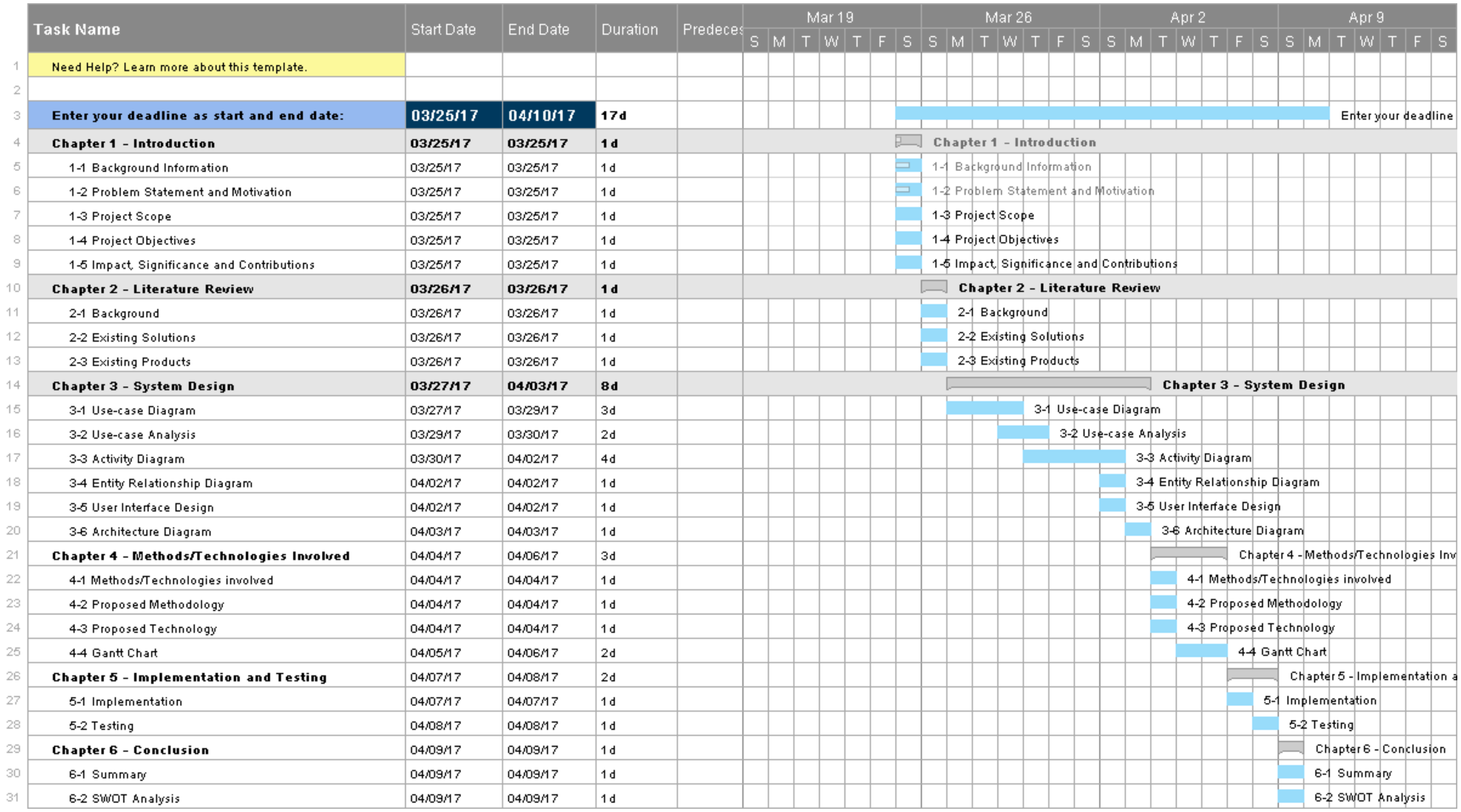
The third phase is design, where all the functions and coding part are. In this phase, the functions that could be used by the system are considered. Prototypes of the system are also produced to be shown and checked by the supervisor so that the direction isn't wrong. If there are any mistakes or in the wrong direction, this project might have to start from the planning phase again to make sure everything is correct. Deliverables of this phase is the prototypes created.

Lastly, the implementation phase which all coding and documentations are correct and the system is implemented. All the prototyping will end here and final version of the system is produced. The deliverables of this phase is the final version of the system and the final report produced to describe everything done on this system.

4.3 Proposed technology

The language that is being used to create this system is PHP language with HTML language and with the help of MySQL as the database to store all the needed data. The reason of choosing this language is stated as in literature review that it has the function to output files into PDF files that ease the process of printing. The symbol that is being used to represent the document's information will be QR Code for its easy to read as the reader is available in almost every platforms and the capability to store many digits of words. Lastly, the choosing of MySQL as database storage use by this project is that it is free to use and able to store lots of data. The main usage of database is to store each file's version for version controlling as well as to retrieve the old version of the file.

4.4 Gantt Chart



	Task Name	Start Date	End Date	Duration	Predeces
1	Need Help? Learn more about this template.				
2					
3	**Enter your deadline as start and end date:**	**03/25/17**	**04/10/17**	**17d**	
4	**Chapter 1 – Introduction**	**03/25/17**	**03/25/17**	**1d**	
5	1-1 Background Information	03/25/17	03/25/17	1d	
6	1-2 Problem Statement and Motivation	03/25/17	03/25/17	1d	
7	1-3 Project Scope	03/25/17	03/25/17	1d	
8	1-4 Project Objectives	03/25/17	03/25/17	1d	
9	1-5 Impact, Significance and Contributions	03/25/17	03/25/17	1d	
10	**Chapter 2 – Literature Review**	**03/26/17**	**03/26/17**	**1d**	
11	2-1 Background	03/26/17	03/26/17	1d	
12	2-2 Existing Solutions	03/26/17	03/26/17	1d	
13	2-3 Existing Products	03/26/17	03/26/17	1d	
14	**Chapter 3 – System Design**	**03/27/17**	**04/03/17**	**8d**	
15	3-1 Use-case Diagram	03/27/17	03/29/17	3d	
16	3-2 Use-case Analysis	03/29/17	03/30/17	2d	
17	3-3 Activity Diagram	03/30/17	04/02/17	4d	
18	3-4 Entity Relationship Diagram	04/02/17	04/02/17	1d	
19	3-5 User Interface Design	04/02/17	04/02/17	1d	
20	3-6 Architecture Diagram	04/03/17	04/03/17	1d	
21	**Chapter 4 – Methods/Technologies Involved**	04/04/17	04/06/17	3d	
22	4-1 Methods/Technologies involved	04/04/17	04/04/17	1d	
23	4-2 Proposed Methodology	04/04/17	04/04/17	1d	
24	4-3 Proposed Technology	04/04/17	04/04/17	1d	
25	4-4 Gantt Chart	04/05/17	04/06/17	2d	
26	**Chapter 5 – Implementation and Testing**	04/07/17	04/08/17	2d	
27	5-1 Implementation	04/07/17	04/07/17	1d	
28	5-2 Testing	04/08/17	04/08/17	1d	
29	**Chapter 6 – Conclusion**	04/09/17	04/09/17	1d	
30	6-1 Summary	04/09/17	04/09/17	1d	
31	6-2 SWOT Analysis	04/09/17	04/09/17	1d	

Figure 4.4.1: Gantt Chart

Chapter 5: Implementation and Testing

5.1 Implementation

To implement this system, a number of software is needed to be installed in order to get the web server up running and accessible. Assuming the user computer is Windows OS, a Homestead Vagrant is needed in order to get a Linux web server.

Firstly, download and install Virtualbox at https://www.virtualbox.org/, Vagrant at https://www.vagrantup.com/, Git Tools at https://git-scm.com/downloads/, and SQL Workbench from https://www.mysql.com/products/workbench/. Then, using Git Bash, run the following commands to get the Virtual Machine instance from GitHub:

- git clone https://github.com/swader/homestead_improved dynamicdms
- cd dynamicdms; mkdir -p Project/public

Then, run notepad as administrator and open C:/Windows/System32/drivers/etc/hosts to add in “192.168.10.10 dynamicdms.app” so that when user type dynamicdms.app at web browser, it will redirect user to 192.168.10.10.

After that, open Homestead.yaml inside the cloned copy of Virtual Machine instance and add in:

```
sites:
  - map: dynamicdms.app
    to: /home/vagrant/Code/dynamicdms
```

Then, go back to Git Bash and run the following commands to get the virtual machine up, enter it using command prompt and then install pdftk on the virtual machine:

- vagrant up
- vagrant ssh
- sudo apt-get install pdftk

Then, copy the whole project into the dynamicdms folder inside the cloned copy of Virtual Machine instance and the system is up and running. To get the database item, use SQL workbench and connect to the following connection, then import the fyp.sql file:

- server / port: 192.168.10.10 / 3306 or 127.0.0.1 / 33060
- user: homestead
- pass: secret

The implementation of this is complete, to get the virtual machine as well as web server up, simply use Git Bash and run these commands:

- cd dynamicdms
- vagrant up

To access the database, simply use SQL workbench and connect to the same connection that is used to import the fyp.sql file.

5.2 Testing

Every system is required to undergo testing phase before it is installed in order to make sure that all the functions of Dynamic Document Management System are able to perform like it was intended. In this project, unit testing and integration testing is used together to test each and every unit as well as how they work together. The aim of this testing is to ensure that the usability, reliability and security of this system has met its target.

Usability is effort that is required to use the system smoothly, such that each function should be able to reach in 3 clicks so that user won’t have to spend time on learning how to use this system. This is important as people that use this system wanted to manage their documents easily. If they have to learn before using the system, it might make managing documents more difficult.

Reliability is that every function should be perform as it was expected without giving unexpected results. This is important as people that use this system will expect the system to work smoothly without error. If maintenance is needed every few months due to unexpected result, people might give up on using this system.

Lastly, security which is securing all the files stored inside this system. This is important as some of the organizations or companies that uses this system will want their document to be as safe as possible as they often deal with private and confidential documents. Therefore, the system should not be able to access without logging in as well as normal user cannot add or delete user accounts.

Test Case#	**Description**	**Expected result**	**Actual result**	**Completed by**
1	Login as admin.	Login successful and has account management on the navigation bar.	Same as expected result.	Calvin
2	Login as normal user.	Login successful and does not has account management on the navigation bar.	Same as expected result.	Calvin
3	Upload a document.	Prompt user to add tag then show newly uploaded document on home page.	Same as expected result.	Calvin
4	Update a document.	Prompt user to choose which document to be updated and the version of that document will be increased on homepage.	Same as expected result.	Calvin
5	Print document with database.	All fields that has data is filled with database data and file downloaded has QR code.	Same as expected result.	Calvin
6	Search document by multiple tags.	Only document related to that multiple tag will be shown to user.	Same as expected result.	Calvin
7	View all version of document.	Show all version of document from 1 to latest version.	Same as expected result.	Calvin
8	Add an account.	Account successfully added to database and is shown on account management.	Same as expected result.	Calvin
9	Delete an account.	Account is deleted from database.	Same as expected result.	Calvin

Table 5.2.1: Test case for positive cases

Test Case#	**Description**	**Expected result**	**Actual result**	**Completed by**
1	Login with wrong password.	Prompts username or password is wrong and does not login.	Same as expected result.	Calvin
2	Access URL directly without login.	Prompts user to login first before accessing the system.	Same as expected result.	Calvin
3	Access account management URL when login as normal user.	Prompts that the page is only for admin.	Same as expected result.	Calvin
4	Upload a document with same file name.	Prompt user to change file name as it already existed in the database.	Same as expected result.	Calvin
5	Create a document with existed title.	Prompt user to change title as it already existed in the database.	Same as expected result.	Calvin
6	Print document with number of copies less than 0.	Prompts number of copies values must be greater or equals to 1.	Same as expected result.	Calvin
7	Search document by all tags	Show that no files associated with the tags as no documents are tagged by all.	Same as expected result.	Calvin
8	Add an account with existing username	Show username already existed, please try a new username.	Same as expected result.	Calvin

Table 5.2.2: Test case for negative cases

Chapter 6: Conclusion

6.1 Summary

This project's aim is to create a system to enable dynamic content for the documents created and to keep track of each document's version. This study has presented a method to create this system which is prototyping, development tools to create this system which is PHP language with HTML language and MySQL for database and a technology to keep track of each version of the documents created using this system which is QR Code. This project's limitation is the lack of mobile device support. Although the system created can be accessed by mobile web browsers, it is still not created for mobile to use this system as smooth as using a mouse and keyboard in computer or laptop. If given time is long enough, future work should contain mobile supports which enable user to manage their documents even they don't have a computer or laptop nearby. The future work of this system is to able to support mobile download and upload as well as getting a license so that the create document function can be more advanced.

6.2 SWOT analysis

Strength

This system allows user to store documents in the web server as well as having a version controlling of each document stored. Additionally, this system also allows user to search document by its tag. Each and every document can be assigned at most of 10 tags and user can search for document that have specific tags. Other than these, this system also allows user to print documents with forms with data in it. When printing, user can choose how many different copies to print and fill them up all at once or fill it with database. Then, 1 print button will print all documents with different set of data filled. The document printed using this system also has a QR code attached, allow easy tracking of the physical document if it get mixed up. Admin of this system has the option to add accounts into database as well as deleting it.

Weakness

This system can only be installed on a Linux web server which is a restriction as there are function calls that only Linux web server can perform. Besides, create document is unable to add form fields to the document created using this system as the function requires license payment. Therefore, those documents with form need to create with Adobe Acrobat.

Opportunity

As more and more different companies and organizations being started on the market, this system provides these company a solution to manage their documents. Also, many companies and organizations always deal with forms, which the function of fill with database will bring a lot of opportunity. With login system, company employee can access the web server even remotely to manage their documents easily.

Threat

User might though there is no free system to help them to manage their system as well as thinking that free system might be not safe to store their documents. Competitor might use reverse engineer the algorithm and apply the same function to their document management system.

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