

WEB STORAGE SYSTEM FOR BUSINESS ORGANIZATION

ระบบจัดเก็บข้อมูลสำหรับองค์กรธุรกิจบนเว็บไซต์



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**A PROJECT SUMMITED IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE DEGREE OF
BACHELOR OFSCIENCE PROGRAME IN INFORMATION TECHNOLOGY
FACULTY OF INFORMATION TECHNOLOGY
KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG**

2/2012

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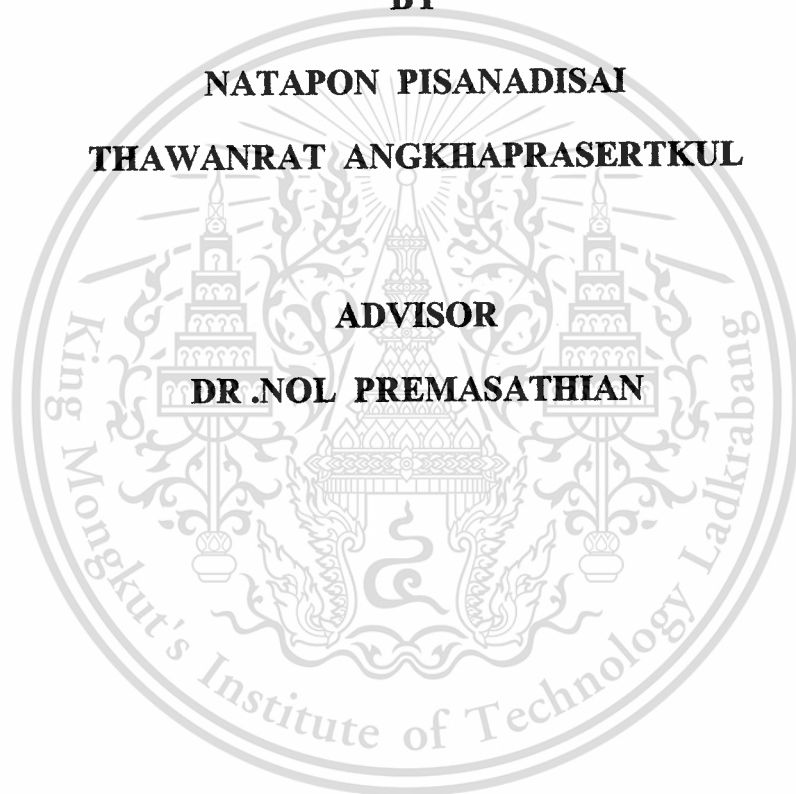
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PROJECT CERTIFICATE

**FACULTY OF INFORMATION TECHNOLOGY, KING
MONGKUT'S INSTITUTE OF TECHNOLOGY
LADKRABANG**

**TITLE : WEB STORAGE SYSTEM FOR BUSINESS
ORGANIZATION**

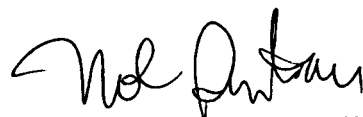
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Degree Bachelor of Science

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Academic Year 2012

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ABSTRACT

Web Storage System for Business Organization is the study of online storage web application and its development. The files are stored as the organization structure or user group. The privileges of accessing the files can be set. Only the authorized users are able to access the files. The advantage of the system is the ability to access files from everywhere through the internet. During the studies, we obtained the knowledge of online storage development, file management as well as new technologies.

ชื่อโครงการ	ระบบจัดเก็บข้อมูลสำหรับองค์กรธุรกิจบนเว็บไซต์	
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บทคัดย่อ

ระบบจัดเก็บข้อมูลสำหรับองค์กรธุรกิจบนเว็บไซต์เป็น โครงการเพื่อการศึกษาการพัฒนา
 เวย์แอปพลิเคชันเพื่อใช้สำหรับการจัดเก็บไฟล์ในองค์กรธุรกิจ เพื่อช่วยแก้ปัญหาในเรื่องของการ
 เข้าถึงข้อมูลและ ช่วยลดค่าใช้จ่ายสำหรับการดูแลรักษาที่เก็บข้อมูล โปรแกรมสามารถกำหนดสิทธิ์ใน
 การเข้าถึงข้อมูลและจัดเก็บไฟล์ตามโครงสร้างขององค์กร จากการศึกษาผู้พัฒนาได้รับความรู้ใน
 การพัฒนาที่เก็บข้อมูลออนไลน์รวมถึงการจัดเก็บไฟล์ให้มีความปลอดภัยในระดับหนึ่ง

ACKNOWLEDGEMENT

This project could not successfully complete without our advisor, Dr.Nol Premasathian, who gave good advice and be guidance of this project since start until successful. He gave appreciate suggestion, checked and corrected the fault of this project. In addition, we are grateful for our teachers of Information Technology who gave knowledge for using in our project.

We would like to specially thank for our friends for their help and encouragement.

Our graduation would not be achieved without our best wish from our parents, who help us for everything and always give us the greatest love, willpower and financial support until the completion of this study.



Natapol Pisanadisai

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CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays, we are in the third wave, the information wave, which allows us to communicate more easily and faster. With the supported infrastructure like high speed internet infrastructure or mobile internet we can transfer a large file through our network. These are changes in our life style, both in education and working.

In the past, if we had to send some files cross the world, normally we sent the files or documents by post. Nowadays we can transfer files through the internet by using emails. Problem still occurs when someone forgets to send an email or the attachment size exceeds the maximum limit.

These problems motivate us to study and develop the online storage as a solution for keeping and managing files efficiently. Advantages of using online storage not only solve the accessibility but also reduce the maintenance cost and effort to manage the company's storage.

1.2 Objectives of the project

This project has main objective to study in webbased storage system. There are objectives follow this

1. To study how to develop a web based storage system
2. To study the development of a web and file management application
3. To develop file transfer system, accessible through the internet
4. To allow easy file transfer

1.3 Scope of the Project

“Web Storage System for Business Organization” is a web application that was developed for collecting and managing files of the organization by accessing the file through the internet.

- Upload and download files with unlimited size
- Manage the privileges the security of files
- Include secure file collection

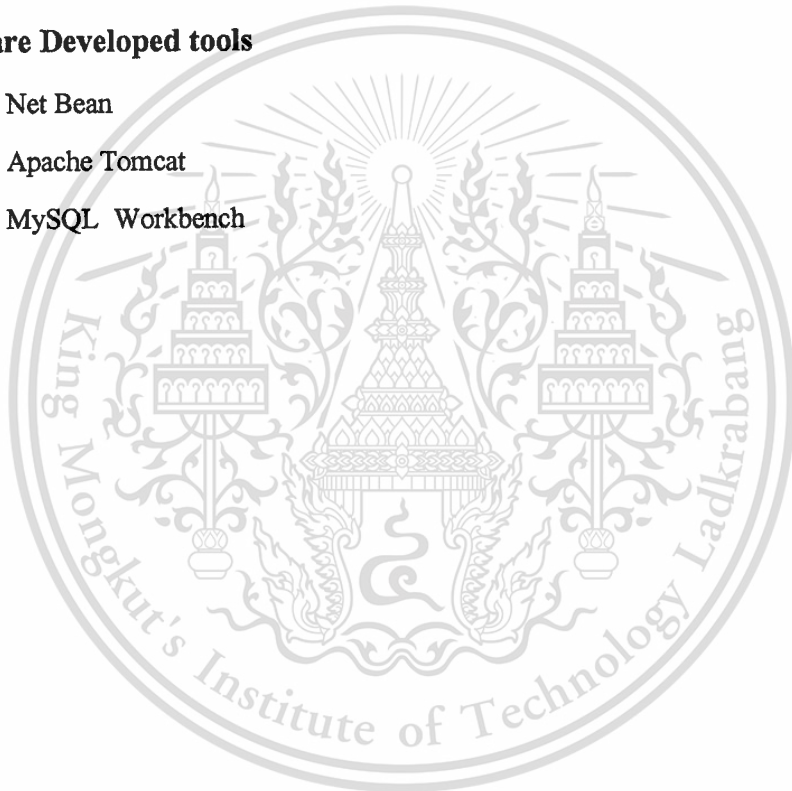
1.4 Expected outcomes

Our expected benefits are

1. The developer will gain the knowledge of web application's development in JSP.
2. The developer will gain the knowledge of file's management and using of MySQL Database.
3. This system can work faster and more efficiently.
4. This system can reduce the cost of an organization for purchasing and maintaining the storage.

1.5 Software Developed tools

1. Net Bean
2. Apache Tomcat
3. MySQL Workbench



CHAPTER 2

LITURATURE REVIEW

This chapter describes the literature review and the technology knowledge used in this project. Technology can be separated functionally according to the three-tier architecture as displayed in figure 2.1. Our system consists of four parts according to their functions.

1. Firstly, “Presentation” works as the interface like sensor and accumulator for listening use’s order and interact with user. Technology included in this part are
 - a. HTML (Hyper Text Markup Language) and CSS (Cascading Style Sheets) facilitate the arrangement of the page layout and the user interface.
 - b. Ajax (Asynchronous Java Script and XML) , Java Script and jQuery take part in displaying content on website.
2. The second part is called “Business Logic”, a unit within the server that accepts input from the interface and processes the information. There are two technologies related to Business Logic.
 - a. JSP (Java Server Page) is integrated into transforms Java code into servlet which can be an HTML document.
 - b. Java Bean is a Java class which can process some certain task of the server.
3. “Data Processing Logic” is the part responsible for the connection to the database. The technology included in this part is JDBC. Data Processing Logic works as a connector between the program and its database.
4. “Database” is used for data storage and retrieve. In this project we use “MySQL” as our database.

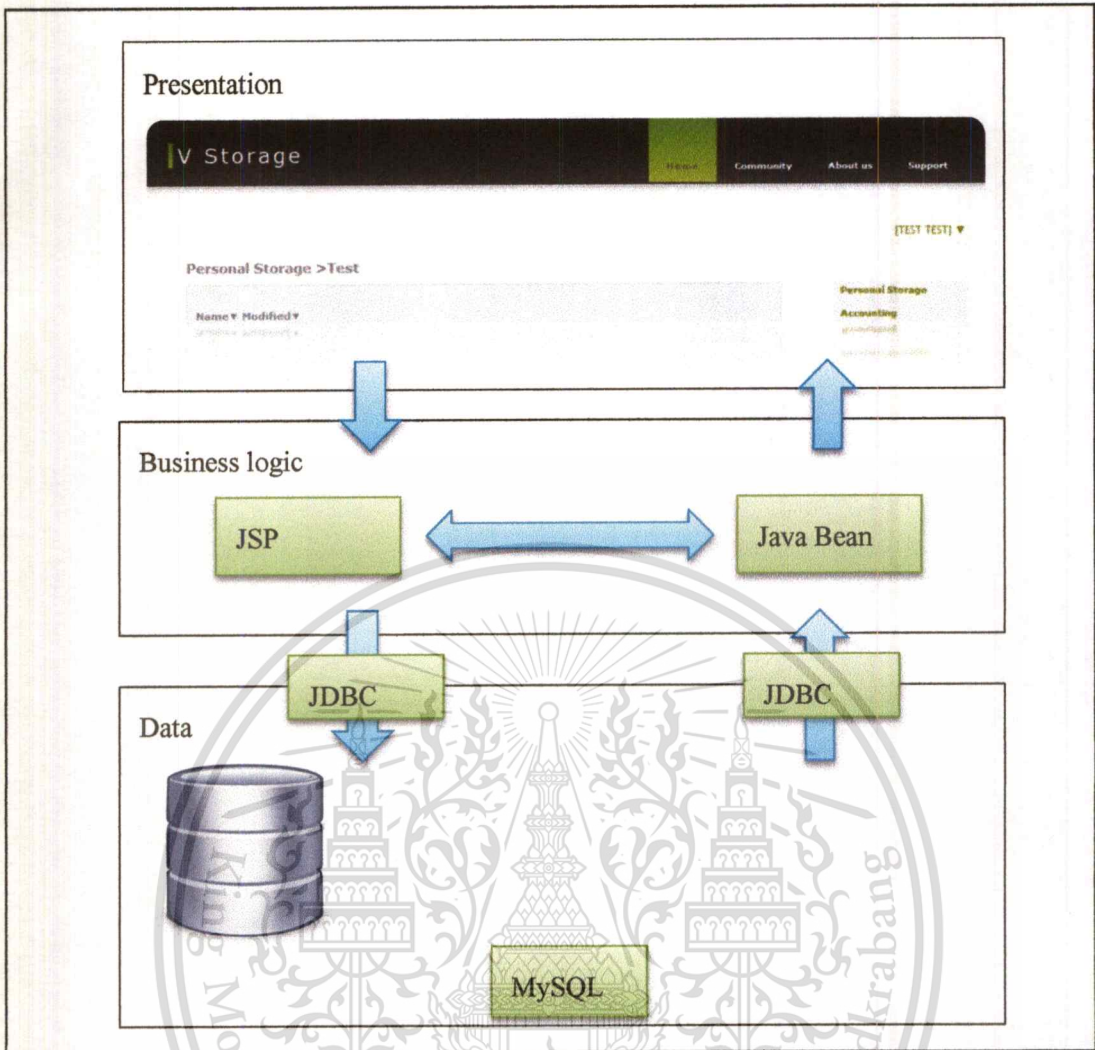


Figure 2.1 Overview work flow of the system

2.1 Three-Tier Architecture

Three-Tier architecture or web-based architecture is an architecture of the system. It divides a system into three tiers or three parts, presentation tier, business logic tier and data tier. Even though each tier has its own independent properties, it also communicates with others and makes this model more efficient. The figure2.2 shows how the three-tier architecture work.

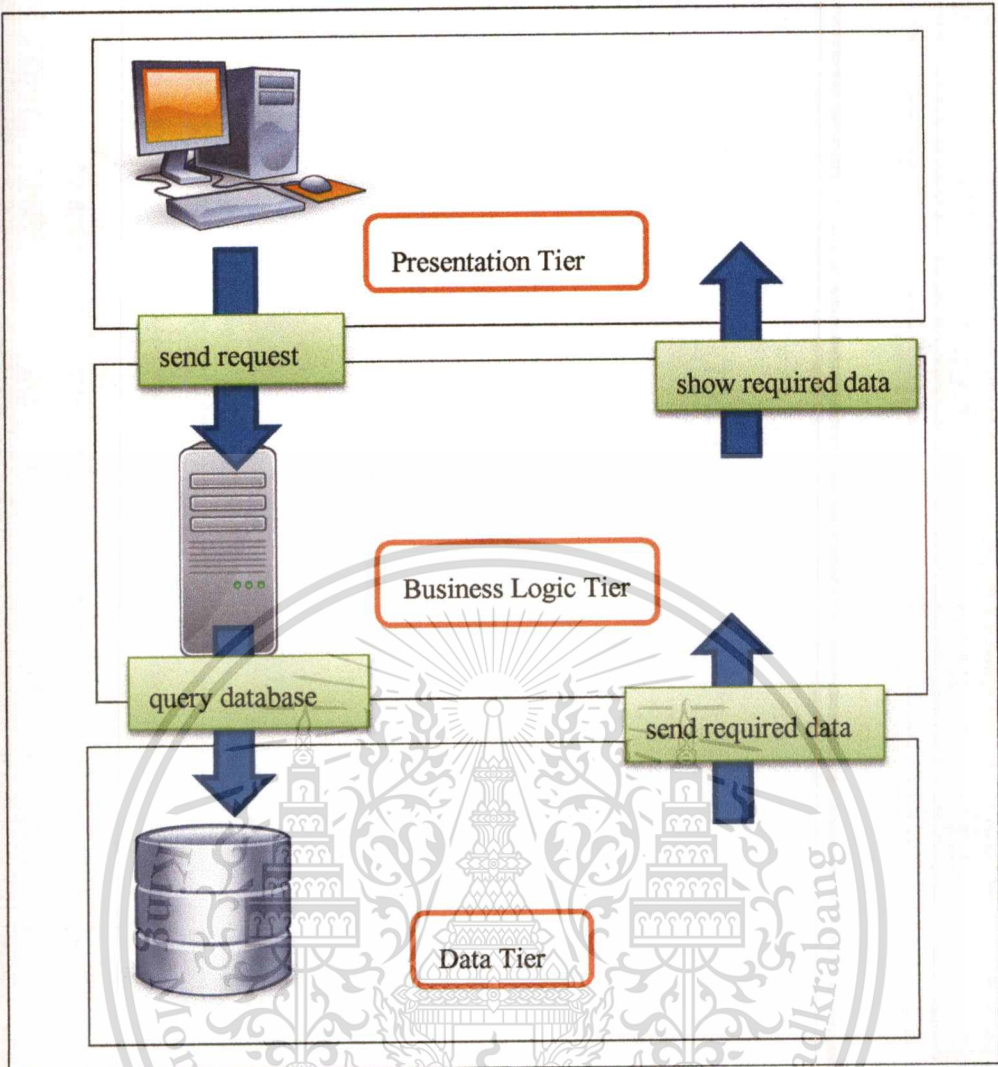


Figure 2.2 Three-Tier Architecture

2.1.1 The components of Three-Tier Architecture

1. Presentation Tier consists of user interface and presentation service.

Presentation Tier controls all data that transferred through this tier which include data from user and data from system or database.

2. Business Logic Tier is the middle tier which is the mechanism and processing of the system.

3. Data Tier is at the bottom of architecture has functions to collect and query data from the central database.

2.2 MVC (Model View Control)

The workflows of this architecture consists of model, control and view. Each function has their own properties and can work by itself. This means that if we change something in some part, it will not affect others. Such as if there is a change in the control part, it will not affect the user interface which in the view part but the processed data may be changed because it was changed in the control part. See further information at references [2]

2.3 Java Server Page (JSP)

Java Server Page (JSP) is a technology for web application development. JSP was used to develop the parts that require connections to the server and data processing. The advantage of using JSP is the ability to use Java API

There are others web application technologies such as ASP (Active Server Page) and PHP (Professional Home Pages). JSP has a better performance in processing and is able to work in any platform.

2.4 Java Bean

Java Bean or Bean is the Java class or JSP Java component, mostly is used for executing some functions and works at server side as same as JSP. The main advantage of using Bean is the reusability because one Bean is used for executing one function. In the next time in the same program or not, developer also can apply Bean to the program which has the same or similar function.

2.5 AJAX (Asynchronous JavaScript and XML)

AJAX is a combined technologies between JavaScript and XML. Functions of AJAX are updated only the partial content of the website and asynchronous communication with the server. The asynchronous communication means that web browser is able to send the requests to server many times but the server will send the response back only once in the one cycle of the communication. In synchronous communication is whenever the web browser send request to the server and the server send the response back to web browser too in one communication. These reduce the server's tasks. For the further information of AJAX, please go to references [4].

2.6 Java Database Connectivity (JDBC)

JDBC or Java Database Connectivity is API (Application Programming Interface) or the Java's library. JDBC is used to make for using in making the connection between program and its database for database management. For further information in JDBC, please go to references [5].



CHAPTER 3

SYSTEM ANALYSIS AND DESIGN

3.1 System Analysis

3.1.1 The Functional Requirements

- The system has a authentication system.
- The system is able to collect the uploaded files.
- The files are able to be downloaded.
- The system is able to create user groups.
- The privileges are able to set.
- The users are able to create their own folder for storing files.

3.1.2 The Non-Functional Requirements

- The system is real-time interactive.
- The system has a security policy or mechanism for data's security.

3.2 Design the system

3.2.1 The components of Use Case Diagram

The components of Use Case Diagram are Register, Recover Password, Verify User, Edit Profile, Upgrade User, Manage Corp, Manage File and Manage Folder as displayed in figure3.1.

3.2.2 Use Case Diagram

The target users of this online storage are normal users who would like to have their own personal storage and the corporate users who would like to have their own corporation online storage. Only the corporate users are able to add user in corporation storage and that they can manage the user group properties. At first, when users registered, they are normal user. After they upgraded their accounts, they are corporate use according to the figure 3.1.

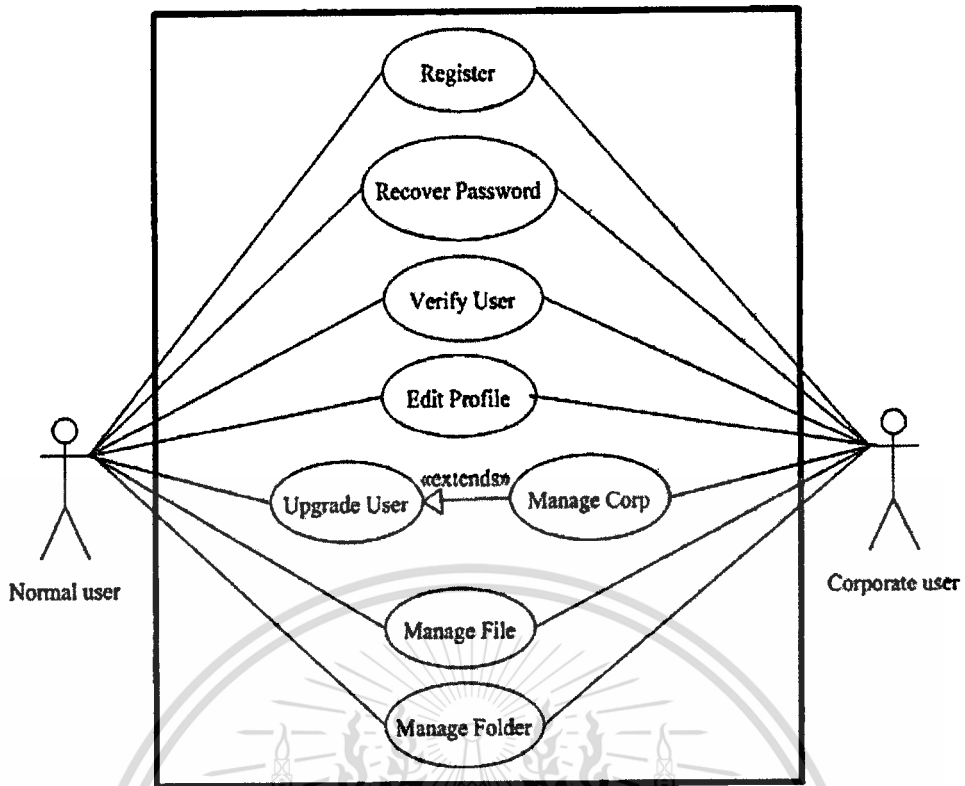


Figure 3.1 Use Case Diagram

3.2.3 Use Case descriptions

Table 3.1 Use Case description of Register

Use Case name :	Register	ID :	01
Actor :	User		
Brief description :	Registration for first user		
Triggering event :	The first time user use the storage		
Related Use Cases :	-		
Flow of events :	<ol style="list-style-type: none"> 1. Insert e-mail, password and other details 2. Press "Create Account" button 3. Store the transaction 		
Sub flows :	-		
Exceptional flows :	1-a. Insert the wrong data, go to step1		
Preconditions :	-		
Post condition :	Display personal storage		

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Table3.2 Use Case description of Recover Password

Use Case name :	Recover Password	ID :	02
Actor :	User		
Brief description :	Recover the forgot password		
Triggering event :	Press the “Forgot the password” button		
Related Use Cases :	-		
Flow of events :	<ol style="list-style-type: none"> 1. Insert e-mail, recovery question and answer 2. Press “submit” button 3. Display the reset password page 4. Insert new password 5. Press “submit” button 6. Store the transaction 		
Sub flows :	-		
Exceptional flows :	1-a. Insert the wrong data, go to step1		
Preconditions :	-		
Post condition :	Display recover password page		

Table 3.3 Use Case description of Verify User

Use Case name :	Verify User	ID :	03
Actor :	User		
Brief description :	Verify user with the user authentication		
Triggering event :	Press "Sign in" or "Sign out" button		
Related Use Cases :	-		
Flow of events :	<ol style="list-style-type: none"> 1. Sign in 2. Sign out 		
Sub flows :	<ol style="list-style-type: none"> 1-a. Insert e-mail, password 1-b. Press "Sign in" button 1-c. Verify user 1-d. Signed in user 2-a. Press "Option" sign 2-b. Press "Sign in" button 2-c. Signed out 		
Exceptional flows :	1-a. Insert the wrong data, go to step1		
Preconditions :	-		
Post condition :	Display personal storage		

Table 3.4 Use Case description of Edit Profile

Use Case name :	Edit Profile	ID :	04
Actor :	User		
Brief description :	Edit personal profile		
Triggering event :	Press "Edit Profile" button		
Related Use Cases :	Verify User		
Flow of events :	<ol style="list-style-type: none"> 1. Press the option sign 2. Press "Edit Profile" button 3. Change the password 4. Leave the Corporation 5. Press "submit" button 6. Store the transaction 		
Sub flows :	<ol style="list-style-type: none"> 3-a. Press "Change password" button 3-b. Insert old password 3-c. Insert two times new password 4-a. Press "Leave corporation" button 4-b. Reconfirm the transaction 		
Exceptional flows :	-		
Preconditions :	Verify User		
Post condition :	Display updated profile		

Table 3.5 Use Case description of Upgrade User

Use Case name :	Upgrade User	ID :	05
Actor :	User		
Brief description :	Upgrade user functions		
Triggering event :	Press “Upgrade user” button		
Related Use Cases :	Verify User, Manage Corp		
Flow of events :	<ol style="list-style-type: none"> 1. Press the option sign 2. Press “Upgrade user” button 3. Press “Let’s try” button 4. Insert corporation 5. Insert department 6. Delete department 7. Store the transaction 		
Sub flows :	<ol style="list-style-type: none"> 4-a. Insert corporation name 5-a. Insert department name 5-b. Press add sign 6-a. Select department 6-b. Press delete sign 		
Exceptional flows :	-		
Preconditions :	Verify User		
Post condition :	Display corporation storage page		

Table 3.6 Use Case description of Manage Corp

Use Case name :	Manage Corp	ID :	06
Actor :	User		
Brief description :	Manage corporation property		
Triggering event :	Press "Manage Corp" button		
Related Use Cases :	Verify User		
Flow of events :	<ol style="list-style-type: none"> 1. Press the option sign 2. Press "Manage Corp" button 3. Add department 4. Delete department 5. Add user to corporation 6. Edit user privilege 7. Edit user department 8. Delete user 9. Store the transaction 		
Sub flows :	<ol style="list-style-type: none"> 3-a. Insert department name 3-b. Press add sign 4-a. Select department 4-b. Press delete sign 5-a. Insert user e-mail 5-b. Insert user privilege 5-c. Insert user department 5-d. Press "add" button 		

Sub flows :	6-a. Select user 6-b. Select user privilege 6-c. Press “submit” button 7-a. Select user 7-b. Select or deselect department 7-c. Press “submit” button 8-a. Select user 8-b. Press “Leave corporation” button 8-c. Press “submit” button
Exceptional flows :	-
Preconditions :	Verify User
Post condition :	Display updated corporation properties

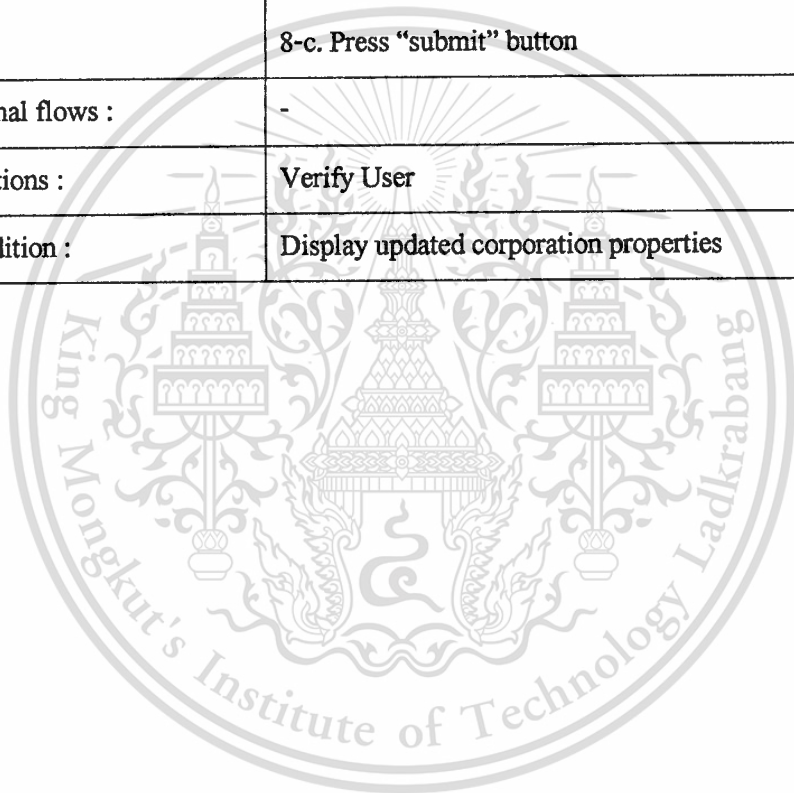


Table 3.7 Use Case description of Manage File

Use Case name :	Manage File	ID :	07
Actor :	User		
Brief description :	Add, delete and download file		
Triggering event :	Press “add”, “delete” or “download” button		
Related Use Cases :	Verify User		
Flow of events :	<ol style="list-style-type: none"> 1. Add or upload file 2. Delete file 3. Download file 4. Store the transaction 		
Sub flows :	<ol style="list-style-type: none"> 1-a. Press “Upload” button 1-b. Select file 1-c. Upload the selected file 2-a. Select file 2-b. Press “Delete” button 2-c. Delete the selected file 3-a. Press at the file name 3-b. Download the selected file 		
Exceptional flows :	<ol style="list-style-type: none"> 1-b. Did not select file, go to step 1-b. 2-b. Did not select file, go to step 2-a. 		
Preconditions :	Go to file page		
Post condition :	Display updated personal storage		

Table 3.8 Use Case description of Manage Folder

Use Case name :	Manage Folder	ID :	08
Actor :	User		
Brief description :	Add, rename and Delete file		
Triggering event :	Press “Add folder” sign / Select file		
Related Use Cases :	Verify User		
Flow of events :	<ol style="list-style-type: none"> 1. Add folder 2. Rename folder 3. Delete folder 4. Store the transaction 		
Sub flows :	<ol style="list-style-type: none"> 1-a. Press “Add folder” sign 1-b. Insert folder name 1-c. Display added folder 2-a. Select folder 2-b. Insert new folder name 2-c. Display new folder name 3-a. Select folder 3-b. Press “Delete” sign 3-c. No display of deleted file 		
Exceptional flows :	<ol style="list-style-type: none"> 1-b. Did not select file, go to step 1-b. 2-b. Did not select file, go to step 2-a. 		
Preconditions :	Verify User		
Post condition :	Display updated personal storage		

3.3 Database Design

3.3.1 Entity Relationship Diagram (ER-Diagram)

The Entity Relationship diagram of the program was designed as shown in the figure 3.2.

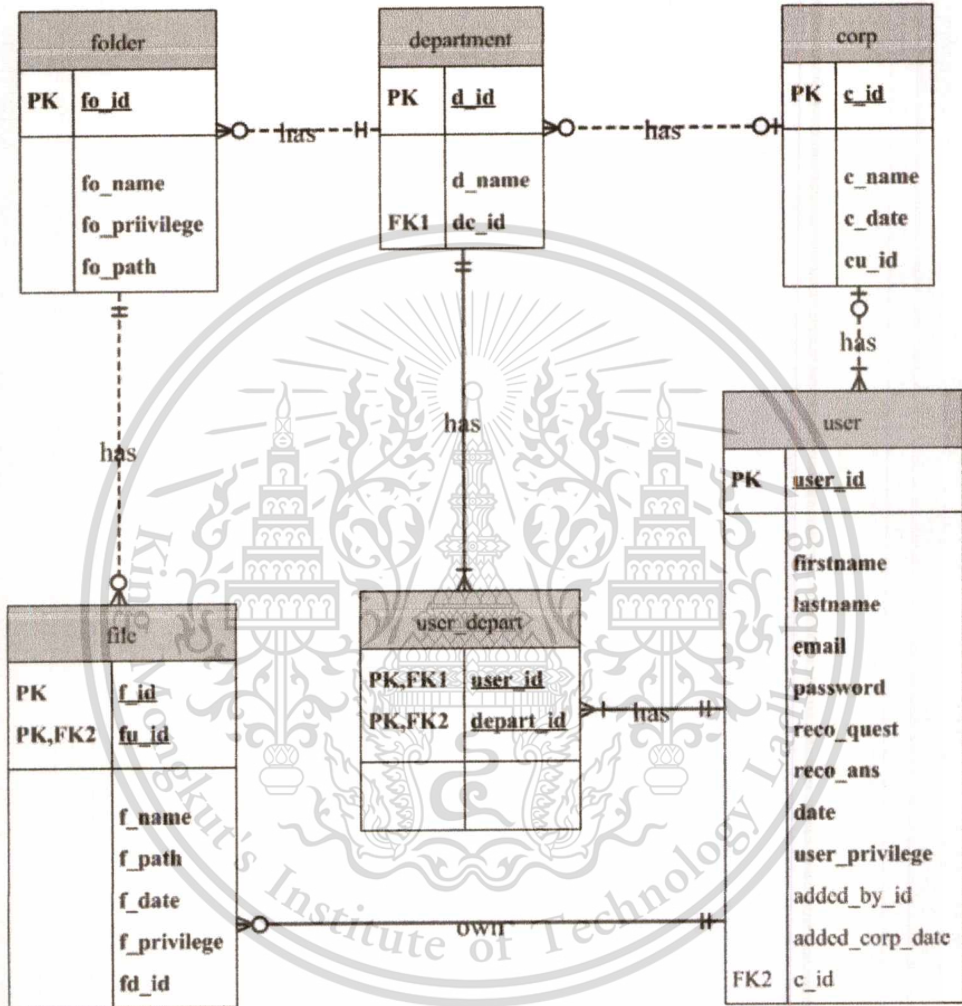


Figure 3.2 Entity Relationship Diagram

3.3.2 Data dictionaries

Table 3.7 All table in database

Table name	Brief description
file	Collect files
folder	Collect folder data
user	Collect all data about the user data
corp	Collect corporation data
department	Collect each department data
user_depart	Collect user id and department id

Table 3.8 Description of file table

Attribute Name	Description	type	Length	Key	FK Referenced table
f_id	File ID	Integer	11	PK	
f_name	File name	VarChar	50		
f_path	Path	VarChar	100		
f_date	Uploaded date	Timestamp			
f_privilege	File privilege	Integer	11		
fu_id	User ID	Interger	11	FK	user
fd_id	Department ID	Interger	11		

Table 3.9 Description of folder table

Attribute Name	Description	Type	Length	Key	FK Referenced table
fo_id	Folder ID	Integer	11	PK	
fo_name	Folder name	VarChar	50		
fo_privilege	Folder privilege	Integer	1		
fo_path	Path	VarChar	50		

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Table 3.10 Description of corp table

Attribute Name	Description	Type	Length	Key	FK Referenced table
c_id	Corporation ID	Integer	11	PK	
c_name	Corporation name	VarChar	50		
c_date	Created date	Timestamp			
cu_id	Added by user id	Integer	11		

Table 3.11 Description of user table

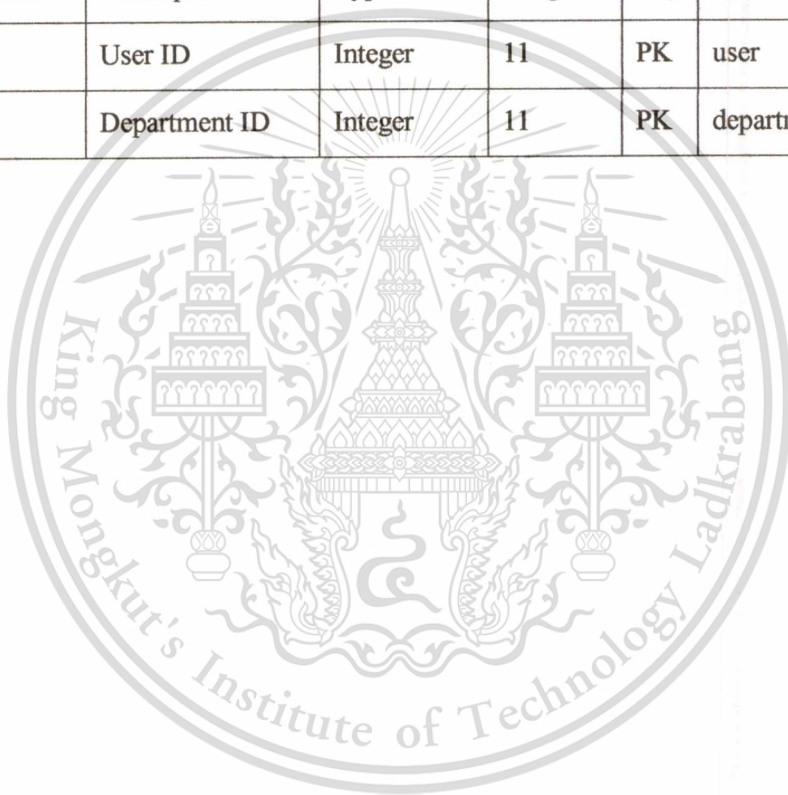
Attribute Name	Description	Type	Length	Key	FK Referenced table
user_id	User ID	Integer	11	PK	
firstname	User first name	VarChar	50		
lastname	User last name	VarChar	50		
email	User email	VarChar	50		
password	User password	VarChar	50		
reco_quest	Recovery question	VarChar	50		
reco_ans	Recover password	VarChar	50		
date	Registered date	Timestamp			
user_privilege	User privilege	Integer	1		
added_by_id	Added by user ID	Integer	11		
added_corp_date	Added date	Timestamp			
corp_id	Corporation ID	Integer	11	FK	corp

Table 3.12 Description of department table

Attribute Name	Description	Type	Length	Key	FK Referenced table
d_id	Department ID	Integer	11	PK	
d_name	Department name	VarChar	50		
dc_id	Corporation ID	Integer	1	FK	corp

Table 3.13 Description of user_depart table

Attribute Name	Description	Type	Length	Key	FK Referenced table
user_id	User ID	Integer	11	PK	user
deaprt_id	Department ID	Integer	11	PK	department



CHAPTER 4

FINDING / PROTOTYPE

4.1 System Description

Web Storage System for Business Organization is a web based online storage. Its main functions are uploading and downloading files through the internet. The target users of this online storage are normal users who would like to have their own personal online storage and the corporate users who want to have their own corporation's online storage. The differences between normal users and corporate users are that the corporate users are able to add user groups in corporation storage and that they can also manage the user group properties. Each user has his personal storage and is able to manage it.

4.2 Program's structure

The figure 4.1 display the program structure. Only the corporate users are able to use the Create corp and Manage corporation.

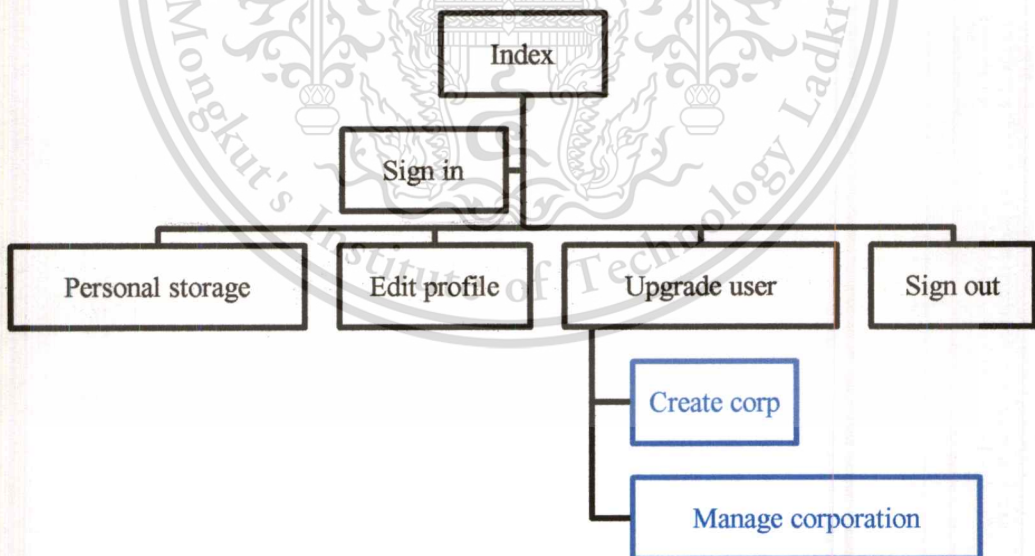


Figure 4.1 Program's structure

4.3 User interface

4.3.1 Index



Figure 4.2 Index page

4.3.2 Registration



Figure 4.3 Register and personal storage page

Steps of registration

1. Insert user data as displayed in figure 4.2
2. Press “Register” button
3. Display personal storage as displayed in figure 4.3

4.3.3 Sign in

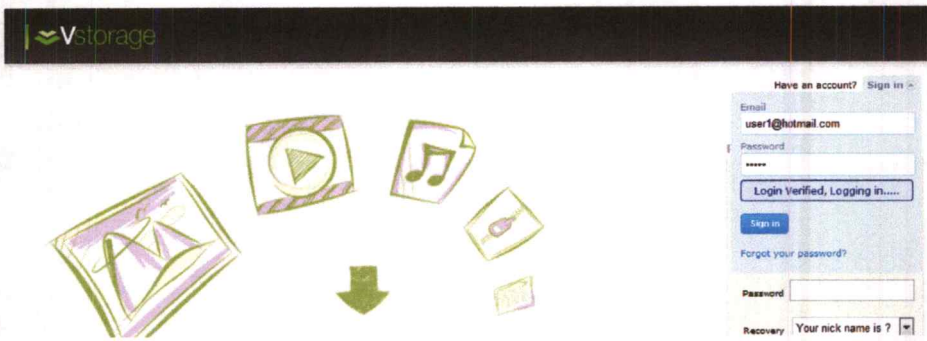


Figure 4.4 Sign in page

Steps of sign in

1. Insert registered email and password as displayed in figure 4.4
2. Press “Sign in” button
3. Display personal storage as displayed in figure 4.3

4.3.4 Forgot password

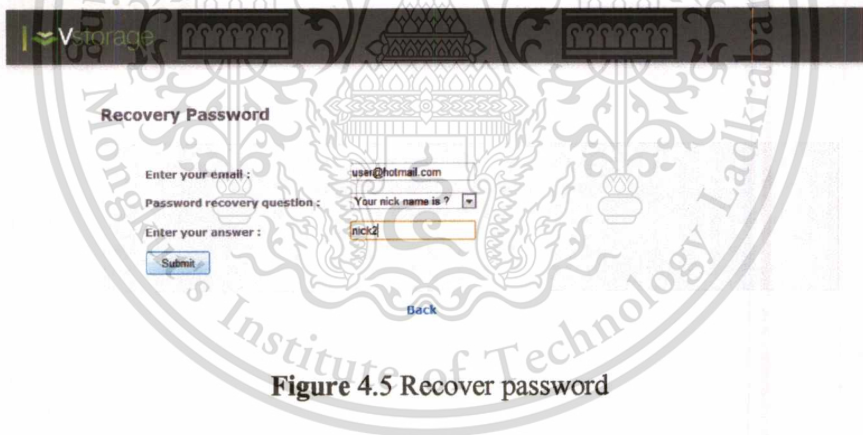


Figure 4.5 Recover password

Steps of recovery password

1. Press “Forgot your password?” button as displayed in figure 4.4
2. Insert the right information as displayed in figure 4.5
3. Insert the new password and sign in

4.3.5 Adding folder

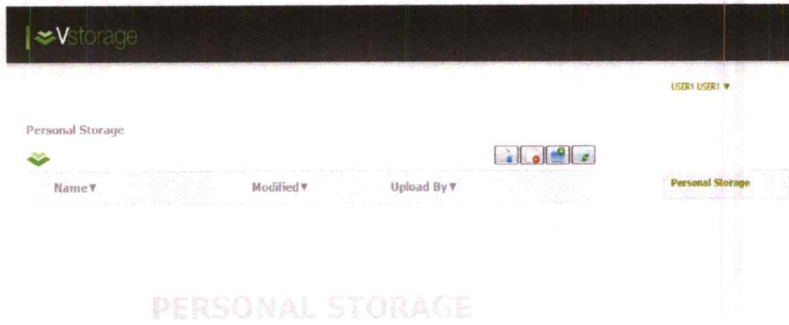


Figure 4.6 Personal storage page

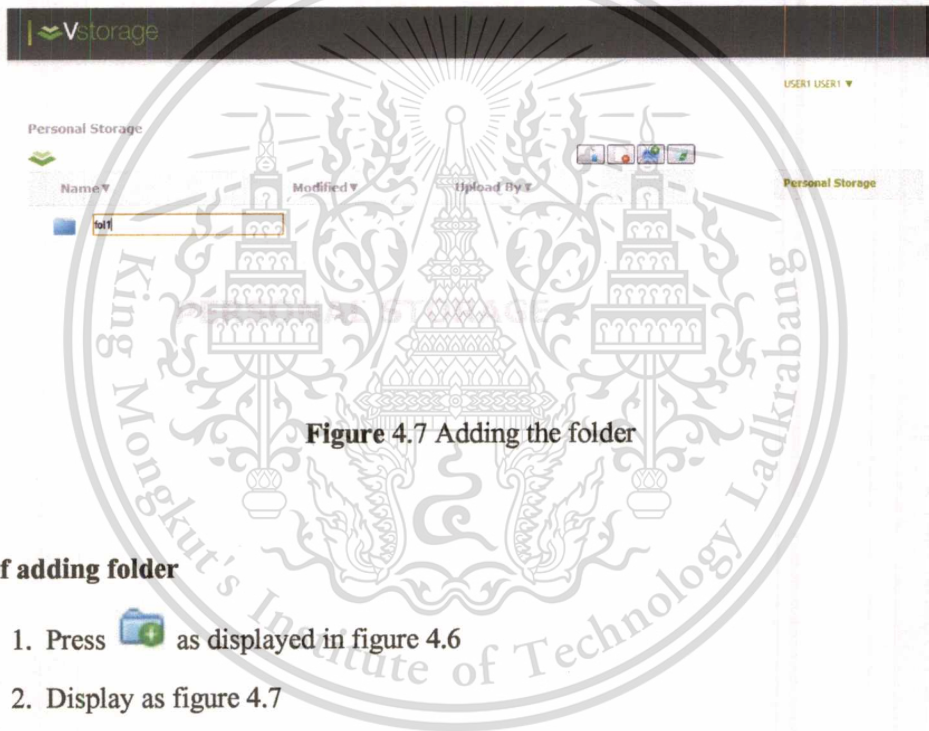



Figure 4.7 Adding the folder

Steps of adding folder

1. Press  as displayed in figure 4.6
2. Display as figure 4.7
3. Insert folder name
4. Press enter

4.3.6 Adding file

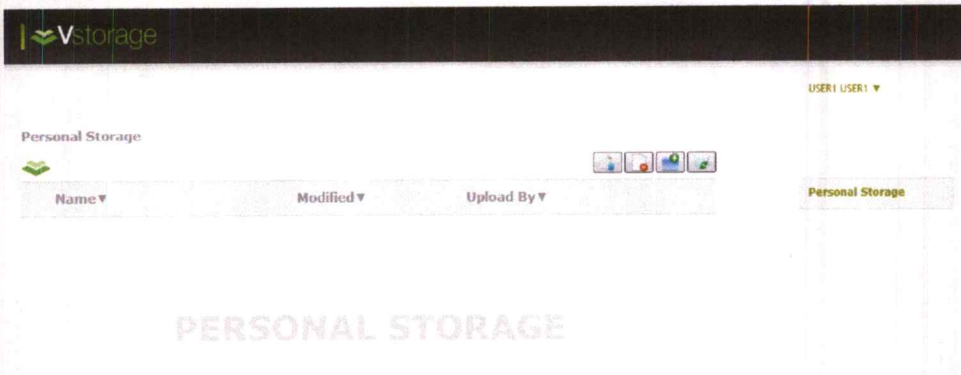


Figure 4.8 Adding file

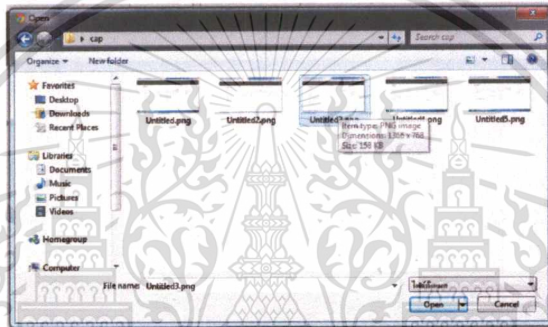


Figure 4.9 Basic uploading

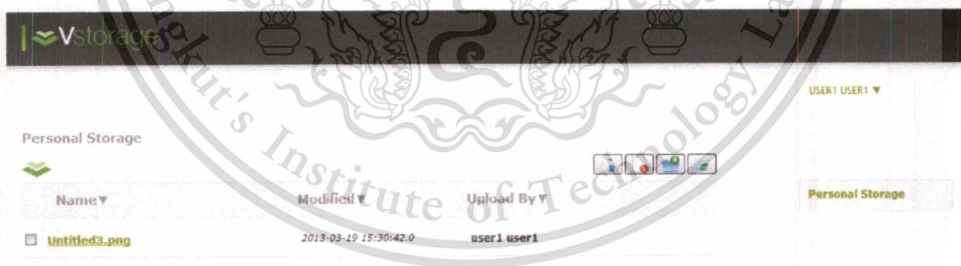



Figure 4.10 Display uploaded file

Steps of adding file


1. Press 
2. Select the required file by manual upload as displayed in figure 4.9
3. Display personal storage with uploaded file as displayed in figure 4.10

4.3.7 Delete file



Figure 4.11 Deleting file

Steps of deleting file

1. Press  as displayed in figure 4.11
2. Select required file to delete
3. Display personal storage without the deleted file

4.3.8 Restore file

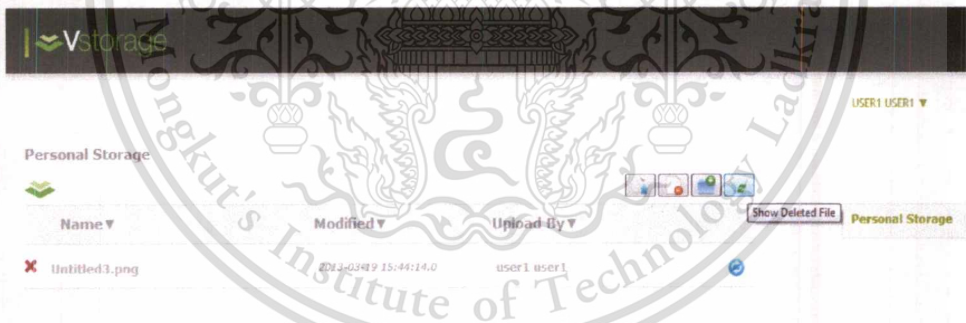


Figure 4.12 Display deleted file

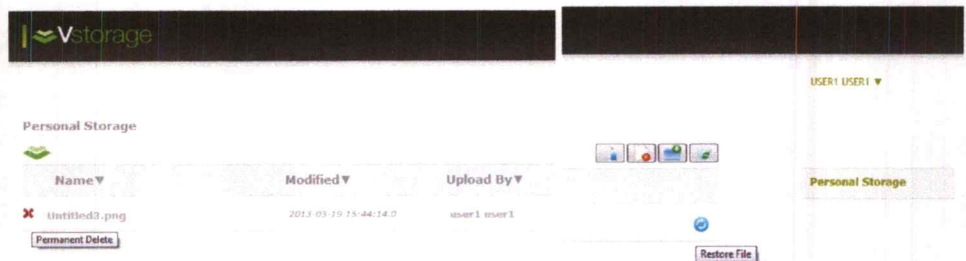

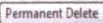



Figure 4.13 Display permanent delete or restore file

Steps of restore file

1. Press  as displayed in figure 4.12
2. Select  to delete permanently as displayed in figure 4.13
3. Select  to restore file as displayed in figure 4.13
4. Display personal storage without the deleted file

4.3.9 Upgrading user

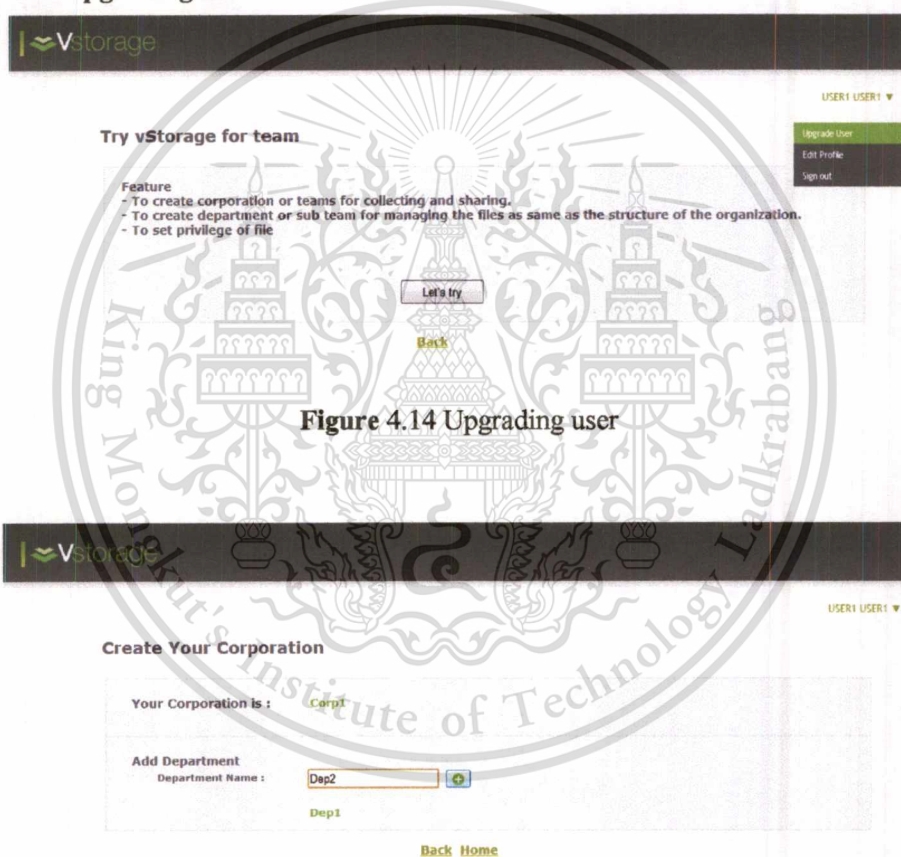


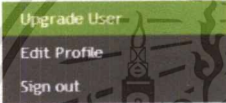
Figure 4.14 Upgrading user

Figure 4.15 Create corporation and department page



Figure 4.16 Display finished creating corporation

Instruction for upgrading user

1. Press USER1 USER1 ▼
2. Select 
3. The system display is as figure 4.14
4. After read upgrade user detail, press "Let's try it!"
5. The system display is as figure 4.15
6. Insert corporation name and add department or user group as displayed in figure 4.15
7. The system display is as figure 4.16

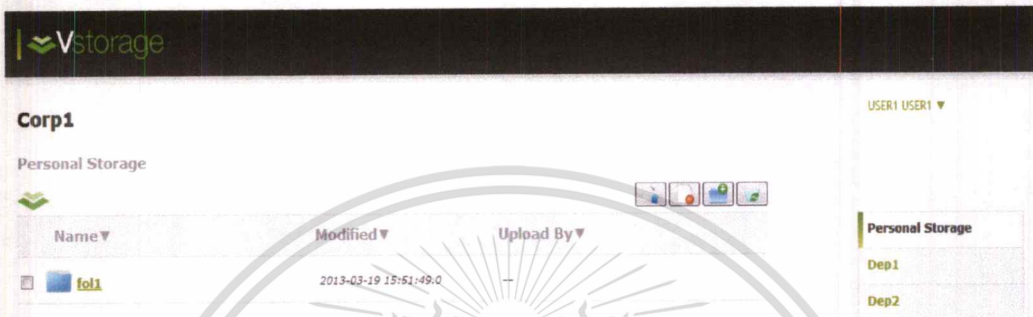
4.3.10 Setting file and folder privilege

There are three levels of privilege. Users, folders and files are able to set privileges. There are three privilege levels, low, medium and high.

Only the high level privilege users are able to set the user privilege. The low level users are not able to set any privilege to file and folder. The medium level users are able to set only the low and medium level of files and folder.

Table 4.1 Privilege setting policy

Level of setter	File	Folder	user
Low	No	No	No
Medium	Yes (low and medium)	Yes (low and medium)	No
High	Yes (all levels)	Yes (all levels)	Yes (all levels)

**Figure 4.17** Example of finished upgrade user**Figure 4.18** Set file privilege

Steps of setting privilege to files or folders

1. Set privilege as displayed in figure 4.17
2. Display the updated privilege as displayed in figure 4.18

4.3.11 Manage Corp

Manage Corp is able to manage departments or user groups and users in corporation.

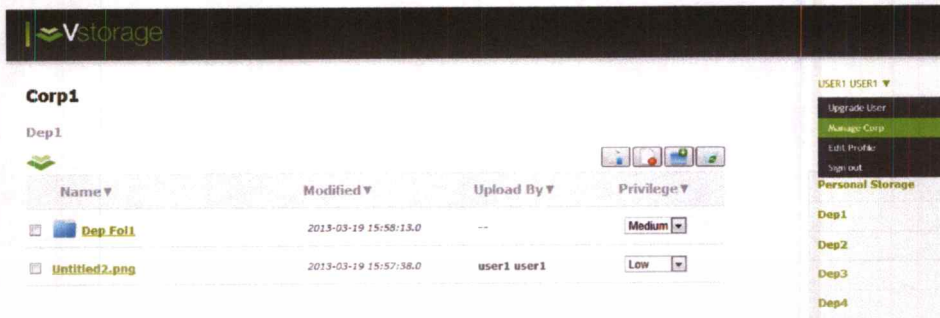


Figure 4.19 Managing corporation

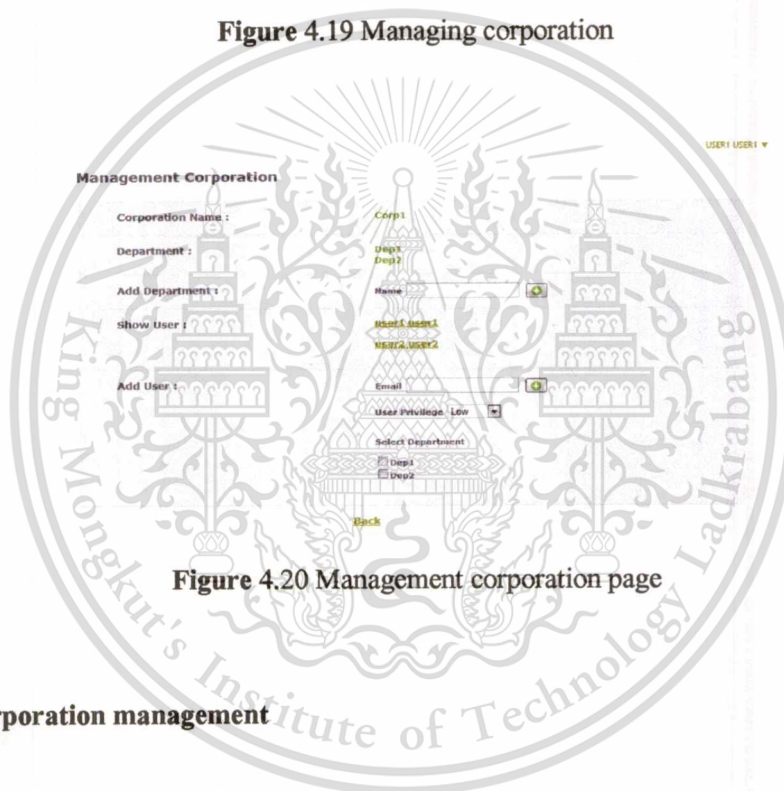



Figure 4.20 Management corporation page

Steps of corporation management

1. Press [TESTER TESTER] ▼
2. Select **Manage Corp** as displayed in figure 4.19
3. Display as figure 4.20

Steps of adding departments

1. Insert department name as displayed in figure 4.20
2. Press 
3. Added department display in department list

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Figure 4.21 Adding users into user group or department

Steps of adding user

1. Insert user email
2. Select user privilege and user department
3. Press 
4. Added user display in show user as figure 4.21

Figure 4.22 Viewing user detail

Steps of viewing user detail

1. Press user name at show user as figure 4.21
2. Display user detail as figure 4.22

4.3.12 Edit Profile

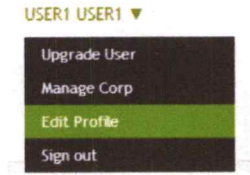


Figure 4.23 Editing personal profile

USER2 USER2 ▼

Your Profile

Name :	user2 user2
Email :	user@hotmail.com
Change Password :	Old Password <input type="text"/> New Password <input type="text"/> Re-new Password <input type="text"/> <input type="button" value="Change"/>
Corporation :	Corp1 <input type="button" value="Leave Corporation"/>
Privilege :	Low
Department :	Dept1 Dept3 Dept4 <input type="button" value="Back"/>

Figure 4.24 Personal profile page

Steps of editing profile

1. Press [TESTER TESTER] ▼
2. Select
3. Display as figure 4.24
4. Change password
 - 4.1 Insert the old password
 - 4.2 Insert the new password
 - 4.3 Insert the new password again
 - 4.4 Press "Submit" button

4.3.13 Sign out

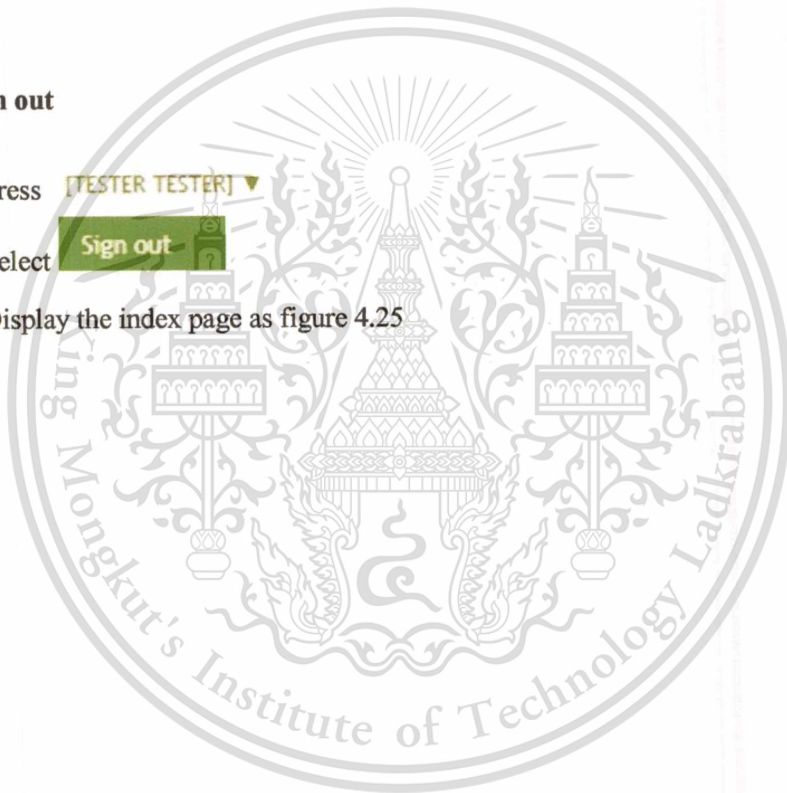
The screenshot shows the Vstorage interface. At the top left, there is a logo for 'Vstorage'. Below it, the text 'Corp1' is displayed. Under 'Corp1', there is a sub-section 'Dep1' with a folder icon. To the right of this section is a user menu for 'USER1 USER1' with options: 'Apply My Theme', 'Manage Group', 'Edit Profile', and 'Sign out'. The 'Sign out' option is highlighted in green. Below the user menu is a 'Personal Storage' section with a list of departments: 'Dep1', 'Dep2', 'Dep3', and 'Dep4'. The main part of the interface is a table with the following columns: 'Name', 'Modified', 'Upload By', and 'Privilege'. The table contains three rows of data:

Name	Modified	Upload By	Privilege
Dep.Fol1	2013-03-19 15:58:13.0	--	Medium
Dep.fol2	2013-03-19 16:16:25.0	--	High
Untitled2.png	2013-03-19 15:57:38.0	user1 user1	Low

Figure 4.25 Sign out

Steps of sign out

1. Press [TESTER TESTER] ▼
2. Select Sign out
3. Display the index page as figure 4.25



CHAPTER 5

CONCLUSION

5.1 Conclusion

This program is able to provide online storage service to users. The files are stored in organized structure according to the user group. The privileges of accessing the files can be set. Only the authorized users are able to access the files. During the studies, the developers obtained the knowledge of development of online storage, file management and new technologies.

5.2 Limitations and problems

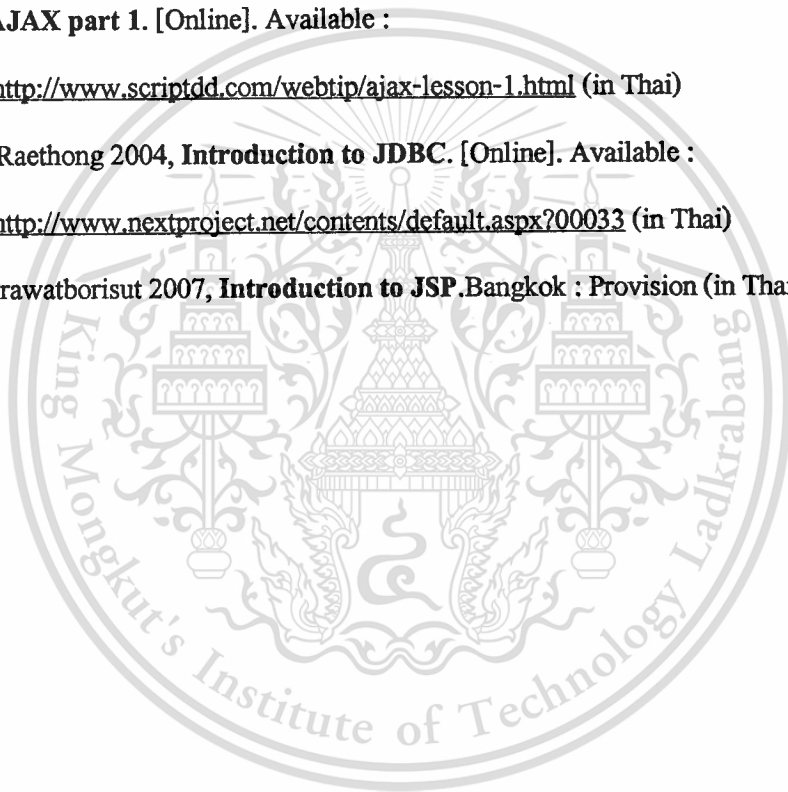
1. The online storage server should has a high performance
2. The Apache Tomcat did not has a stable service during running the program.

5.3 Suggested future works

1. Improve the stability and the speed of the system
2. Stability and speed of the program
3. Alert system for important files upload
4. Implement as the cloud storage
5. Quota setting
6. Limitation of file sizes

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