3rd Semester Project - Project Specification

Group 2

March 15, 2016

Participants:

Student number	Name	Initials	Studies
201409553	Alex Imhof	AI	E
201205675	Hans Brock Andersen	HBA	E
201407822	Nikolaj Pedersen	NP	E
201409552	Andreas Lüdemann	AL	IKT
20115758	Ole Clausen	OC	IKT
201407641	Christoffer Søby Høj	CSH	IKT
201409551	Daniella Tola	DT	E

Supervisor: Michael Alrøe

Ver.	Date	Initials	Description
0.01	26.02.16	All members	First version
0.02	05.03.16	All members	Corrected after feedback from supervisor

Contents

Chapter 1

Specification

1.1 Glossary

FLEX-VAULT The system as a whole.

Safe Deposit Box (SDB) The internal compartments in the FLEX-VAULT.

Hatch Where the selected safe deposit box is presented to the current user.

Emergency Door Mechanically locked door in the side of the FLEX-VAULT to access the safe deposit boxes in case of failure.

User A user of the system with ID and password.

Admin The administrator and maintainer of the system. Has ID and password. Has the mechanical emergency key.

1.2 System Description

The system is an automatic storage system called FLEX-VAULT. The system consists of a vault which contains safe deposit boxes and mechanics to retrieve the correct safe deposit boxes to the user. The user can use the system to access safe deposit boxes by interacting with a graphical user interface on a display which is mounted on the front of the FLEX-VAULT system.

The graphical user interface can be used to log into the system with a user ID and password. When the user is logged in, the system will display a list of the safe deposit boxes which the user can access. The user can request a safe deposit box, and the system retrieves it. The system will transport the safe deposit box to the hatch at the front of the FLEX-VAULT where the user can retrieve or add items to or from the safe deposit box. When the user is done the user can press a button on the display, and the system will return the safe deposit box. If the user does not press the button, the system will eventually time-out and return the safe deposit box automatically. The system grants the admin access to add new users and configure or delete existing ones. The admin can assign safe deposit boxes to users and even allow multiple users access to the same safe deposit boxes if the need arises.

Figure 1.1: Concept Drawing

1.3 Use Case Diagram

Figure 1.2 shows the Use Case Diagram for the FLEX-VAULT. The primary actors are, as shown in the Use Case Diagram, the User and the Admin.

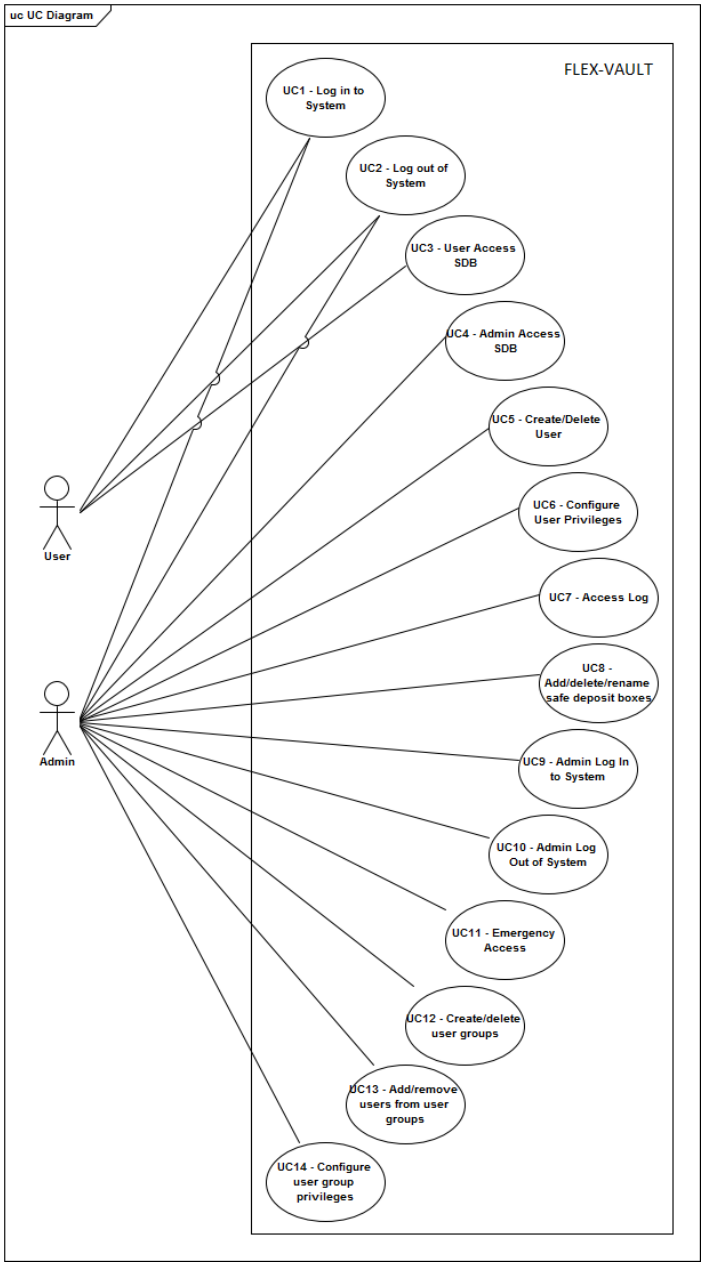

Figure 1.2: Use Case Diagram

1.4 Functional Requirements

The use cases are prioritised according to MosCoW in the following list:

The system

- must
  - Enable user/admin to log in.
  - Enable user/admin to log out.
  - Enable user to retrieve allowed safe deposit box(es).
  - Enable admin to retrieve any safe deposit box.
  - Enable admin to create/delete users.
  - Enable admin to configure user privileges.
  - Enable admin to access a log containing all system activities.
- should
  - Enable admin to add/delete/rename safe deposit boxes.
  - Force admin to use an electronic key and their password to log in.
  - Enable admin to access safe deposit boxes through mechanically locked emergency door.
  - Enable admin to create/delete user groups.
  - Enable admin to add/remove users from user groups.
  - Enable admin to configure group privileges.
- could
  - Enable GUI to display the weight of a safe deposit box while the user or admin are accessing it.
  - Enable admin to access the inside of the system to perform maintenance.
  - Enable user to change their account password.

1.5 Fully Dressed Use Cases

When the Use Cases are referring to a specific GUI page see figure 1.3.
Every action performed in the use cases is logged in the systems activity log (see 1.5).

Use Case 1 - Log In to System

Use Case	Use Case 1 - Log In to System
Goal	For a user or admin to log in to the system.
Initiation	User selects the ID field.
Actors	User or admin
Concurrent occurrences	1
Precondition	No user is logged in to the FLEX-VAULT. System displays the `Login` GUI page .
Post Condition	User or Admin is logged in to the FLEX-VAULT.
Main Scenario	1. User or Admin selects the ID field. 2. System displays the on-screen keyboard under the ID field. 3. User or Admin enters an ID in the ID field and a password in the password field. 3.1. User enters their ID and password and selects *Login*. 3.1.1. System validates the ID and password and logs into User account. **[Exception 1: ID and password do not match]** 3.1.2. System displays the `User Box Access` GUI page . 3.2. Admin enters their Admin-ID and password and selects *Login*. 3.2.1. System validates the Admin ID and password and logs into Admin account. **[Exception 1: ID and password do not match]** 3.2.2. System displays the `Admin Main Menu` GUI page .
Exception	Exception 1: ID and password do not match. 1. System displays the `Login Failed` GUI dialog. 2. User or Admin selects *OK*. 3. Dialog closes and system displays the `Login` GUI page.

Use Case 2 - Log Out of System

Use Case	Use Case 2 - Log Out of System
Goal	For User or Admin to log out of the system.
Initiation	User or Admin selects log out.
Actors	User or Admin.
Concurrent occurrences	1
Precondition	User or Admin is logged in to the system and no dialogs are shown.
Post Condition	User or Admin is logged out of the system.
Main Scenario	1. User or Admin selects *Log out*. [**Exception 1: System displays** `Box Retrieval` **GUI page**] [**Exception 2: System displays** `Add User Privileges` **GUI page**] 2. System displays the `Login` GUI page.
Exception	Exception 1: System displays `Box Retrieval` GUI page. 1. GUI displays Box Retrieval. 2. User/Admin selects *Return*. 3. User/Admin selects Log Out. Exception 2: System displays `Add User Privileges` GUI page. 1. GUI displays Add User Privileges. 2. Admin selects Back. 3. Admin selects Log Out.

Use Case 3 - User Access SDB

Use Case	Use Case 3 - User Access SDB
Goal	To access the content of User's SDB and return it afterwards.
Initiation	User selects the desired SDB on `User Box Access` GUI page.
Actors	User.
Concurrent occurrences	1
Precondition	User is logged in and system displays `User Box Access` GUI page.
Post Condition	SDB is back inside the machine and User can start a new action.
Main Scenario	1. User selects the desired SDB on the `User Box Access` GUI page and selects *Retrieve*. 2. System displays `Box Retrieval` GUI page and retrieves SDB. System enables the *Return* button when SDB is fully retrieved. 3. User waits until SDB is retrieved and opens hatch to take items from SDB or place new ones. 4. User closes hatch and selects *Return*. **[Exception 1: Content too heavy]** 5. System returns SDB and displays `User Box Access` GUI page.
Exception	Exception 1: Content too heavy 1. System registers too much weight and displays the `Weight Warning` GUI dialog. 2. Dialog closes after 4 seconds and system displays the `User Box Access` GUI page. 3. User takes items from SDB or places different ones. Use case continues from point 4.

Use Case 4 - Admin Access SDB

Use Case	Use Case 4 - Admin Access SDB
Goal	To access the content of Admin's SDB and return it afterwards.
Initiation	Admin selects *Safe Deposit Boxes* on `Admin Main Menu` GUI page.
Actors	Admin.
Concurrent occurrences	1
Precondition	Admin is logged in and system displays the `Admin Main Menu` GUI page.
Post Condition	SDB is back inside the FLEX-VAULT. System displays the `Admin Box Access` GUI page.
Main Scenario	1. Admin selects *Safe Deposit Boxes*. 2. Admin selects the desired SDB on the `Admin Box Access` and selects *Retrieve*. 3. System displays `Box Retrieval` GUI page and retrieves SDB. System enables the *Return* button when SDB is fully retrieved. 4. Admin waits until SDB is retrieved and opens hatch to take items from SDB or place new ones. 5. Admin closes hatch and selects *Return*. **[Exception 1: Content too heavy]** 6. System returns SDB and displays `Admin Box Access` GUI page. 7. Admin selects *Back*. 8. System displays `Admin Main Menu` GUI page.
Exception	Exception 1: Content too heavy 1. System registers too much weight and displays the `Weight Warning` GUI dialog. 2. Dialog closes after 4 seconds and system displays the `User Box Access` GUI page. 3. User takes items from SDB or places different ones. Use case continues from point 4.

Use Case 5 - Create/Delete User

Use Case	Use Case 5 - Create/Delete User
Goal	To create/delete user
Initiation	See specific action
Actors	Admin
Concurrent occurrences	1
Precondition	Admin is logged in and system displays the `Admin Main Menu` GUI page
Post Condition	Users are configured as specified by Admin
Main Scenario	1. Admin selects *Users*. 2. System displays the `User Configuration` GUI page 3. Admin now has 2 different options: 3.1. *Create user:* 3.1.1. Admin selects *Create*. 3.1.2. `User Creation` GUI dialog opens with *OK* button disabled. 3.1.3. Admin enters new user ID in the ID field and a password in the password field. 3.1.4. System enables the *OK* button. 3.1.5. Admin selects *OK*. 3.1.6. The created user is saved in the system. 3.1.7. Dialog closes and the newly created user now appears on the users list on `User Configuration` GUI page. 3.2. *Delete user:* 3.2.1. Admin selects a user on the users list and selects *Delete*. 3.2.2. The selected user is removed from the system. **[Exception 1: Admin selects *Cancel*]** 3.2.3. Dialog closes and selected user is removed from the users list. 4. Admin selects *Back*. 5. System displays `Admin Main Menu` GUI page.
Exception	Exception 1: Admin selects Cancel. 1. Admin selects *Cancel*. 2. Dialog closes and system displays the users list without changes.

Use Case 6 - Configure User Privileges

Use Case	Use Case 6 - Configure User Privileges
Goal	To add/delete user privileges or retrieve a box of a specific user.
Initiation	See specific action
Actors	Admin
Concurrent occurrences	1
Precondition	Admin is logged in to the FLEX-VAULT and system displays the `Admin Main Menu` GUI page.
Post Condition	Users are added/deleted as specified by Admin
Main Scenario	1. Admin selects *Users*. 2. System displays the `User Configuration` GUI page. 3. Admin selects a user on the users list and selects *Privileges*. 4. System displays the `User Privileges` GUI page. 5. Admin now has 3 different options: 5.1. *Add privileges to user:* 5.1.1. Admin selects *Add*. 5.1.2. System opens `Add User Privileges` GUI page. 5.1.3. Admin selects a safe deposit box and selects *OK*. **[Exception 1: Admin selects *Cancel*]** 5.1.4. The page closes and the selected safe deposit box appears in the list of safe deposit boxes on the `User Privileges` GUI page. 5.2. *Delete user privilege:* 5.2.1. Admin selects a safe deposit box on the list of safe deposit boxes and selects *delete*. 5.2.2. Selected safe deposit box is removed from privileges list. 5.3. *Retrieve* 5.3.1. Admin selects a safe deposit box on the list of safe deposit boxes and selects *Retrieve*. 5.3.2. System displays `Box Retrieval` GUI page and retrieves SDB. System enables the *Return* button when SDB is fully retrieved. 5.3.3. Admin waits until SDB is retrieved and opens hatch to take items from SDB or place new ones. **[Exception 2: Content too heavy]** 5.3.4. Admin closes hatch and selects *Return*. 5.3.5. System returns SDB and displays the `User Privileges` GUI page. 6. Admin selects *Back*. 7. System displays `User Configuration` GUI page. 8. Admin selects *Back*. 9. System displays `Admin Main Menu` GUI page.

Exceptions	Exception 1: Admin selects *Cancel* 1. Admin selects *Cancel*. 2. System returns to `User Privileges` GUI page without changes. Exception 2: Content too heavy 1. System registers too much weight and displays the `Weight Warning` GUI dialog. 2. Admin takes items from SDB or places different ones. [**Exception 2: Content too heavy**]. 3. Dialog closes and system displays the `User Privileges` GUI page. Use case continues from point 5.3.4.

Use Case 7 - Access Log

Use Case	Use Case 7 - Access Log
Goal	To view the log containing logged system activity.
Initiation	Admin selects *Log* on the `Admin Main Menu` GUI page.
Actors	Admin
Concurrent occurrences	1
Precondition	Admin is logged in to the FLEX-VAULT and the system displays the `Admin Main Menu` GUI page.
Post Condition	Activity Log has been accessed and system shows the `Admin Main Menu` GUI page.
Main Scenario	1. Admin selects *Log*. 2. System displays the `Activity Log` GUI page. 3. Admin selects *Back*. 4. System displays `Admin Main Menu` GUI page.
Exception	None

Use Case 8 - Add/delete/rename safe deposit boxes

To make the system more flexible, the admin should have an option, allowing him to add / delete / rename safe deposit boxes.

Use Case 9 - Admin Log In to System

For the system to be even more secure it could incorporate an electronic key that would be required for an admin login.

Use Case 10 - Admin Log Out of System

In case `Use Case 9 - Admin Log In to System` is implemented there will also be the need of a Use Case for logging the admin out.

Use Case 11 - Emergency Access

In case of emergency there should be a feature that allows the Admin to access the safe deposit boxes that don't involve any electronics in case of a breakdown.

Use Case 12 - Create/delete user groups

It should be possible to create a group, to which only certain users are a part of. Naturally it should also be an option to delete these groups again. The creation and deletion of groups should only be able to be performed by admin users.

Use Case 13 - Add/remove users from user groups

After creating a user group, it should also be possible to Add/remove users from that group.

Use Case 14 - Configure user group privileges

After creating a user group, and adding user to it, admin should be able to specify the privileges of the group, thus managing which boxes are available to which groups.

Nonfunctional requirements

The system

- must
  - be able to handle at least 5 safe deposit boxes.
  - be able to measure the weight of a safe deposit box with a precision of at least ±10 g.
  - reach within ±1 cm of the specified safe deposit box with its head.
  - retrieve the specified safe deposit box within 60 s of the order being issued.
  - handle at least 100 g of mass in the safe deposit boxes.
  - log the current user out after 2 min inactivity.
- should
  - be able to handle at least 20 safe deposit boxes.
  - be able to measure the weight of a safe deposit box with a precision of at least ±1 g.
  - reach within ±2 mm of the specified safe deposit box with its moving fork.
  - retrieve the specified safe deposit box within 15 s of the order being issued.
  - handle at least 400 g of mass in the safe deposit boxes.
  - display information to the user on a dot matrix colour display.
- could
  - interact with the user through a touch sensitive dot matrix colour display.
  - be coloured charcoal black.
- would, but will not
  - be covered in hardened steel to protect against vandalism.

1.6 GUI Layout

Figure 1.3 shows the layout of the system's GUI. The figure shows details of each page in the GUI. The page names in the GUI are referenced to in the fully dressed use cases.

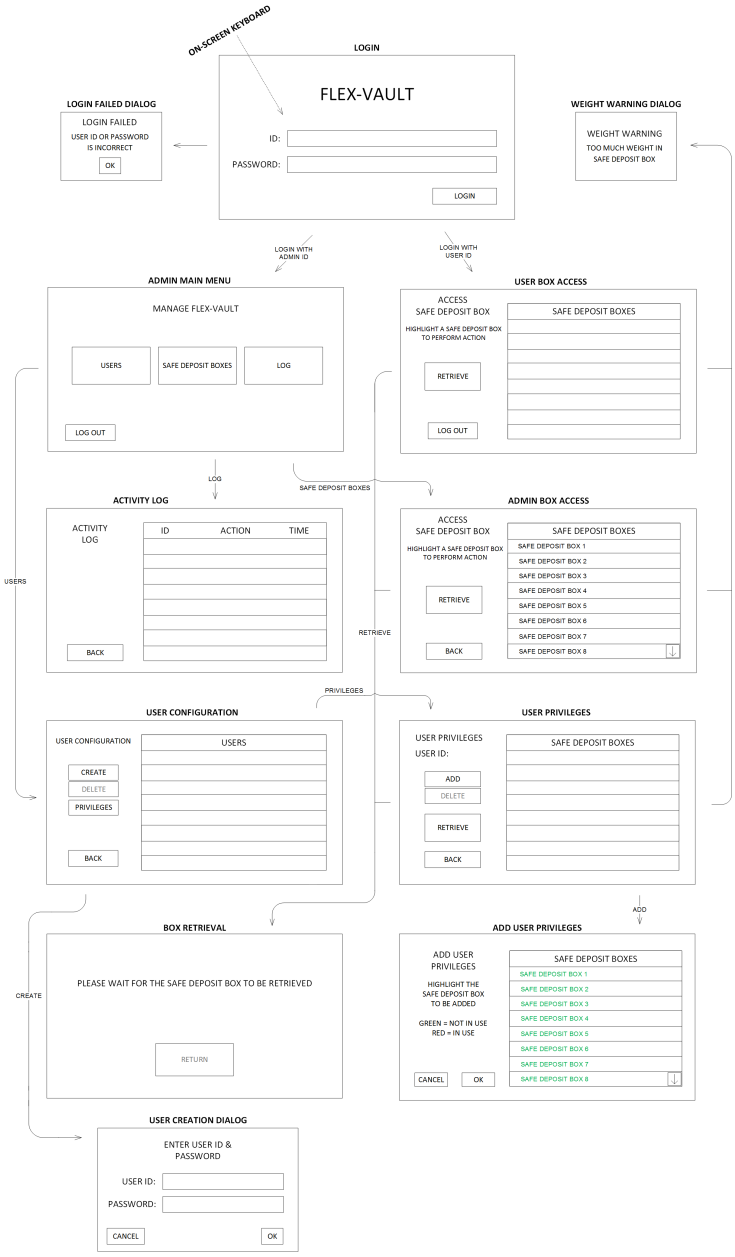

Figure 1.3: Graphical User Interface Layout