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| **CSC380: Software Engineering - Homework #1** |
| **Library System Application** |
| This document summarizes the customer requirement statement, system requirements with priorities, and user stories for the system requirements with size estimates for the library system application. Team members: Joshua Reiss Alex Lawrence |

**2/15/2018**

# Breakdown of Contributions

All team members contributed equally to this report and the code submitted for the library system application.

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# Glossary of Terms

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| **Term** | **Definition** |
| Account | Storage for the user information for the system. |
| Administrator | A user which has privileges to customize, alter and update all facets of the library system. |
| Check in/out | Borrow and return book from the library. |
| Contact us | Contact information for the developers of the library system application. |
| Event | Information on activities held at library or in the community. |
| Login | Main screen of the library system to sign in to the system. |
| Password | Password set by user used to login to the system. |
| Profile | Information for users, account information, fee due. |
| Registration | User information entered to establish new account. |
| Requirement | Established needs of customer for the system development. |
| User Id | Unique value to identify users of the system. |
| User Story | A description of a software feature from an end-user perspective. |
| View Book | Search library for available books. |
| Work Log | Library staff daily assignments and status. |

# Customer Requirement Statement

Librarieshave gone through a period where usage was profoundly lowered for several reasons.One of the main reasons is the lack of the ability to access library information from home or office.This issue applies to the average user as well as researchers. To perform research on a topic,it typically takes multiple trips to the library which results in a waste oftime for both the researcher and the librarians.Often when going to the librarya reader or researcher finds out the item is not available, needs to be obtained from another library, or is available in electronic form. Many patrons of libraries have started using other means to obtain reading material. To combat the risk of libraries closing, they started offering additional services. Most libraries have started offering free WI-FI, technology workshops, small business centers and 24/7 virtual access to e-Books, digital materials, career and job resources, and high school certification courses. These services have helped returned library usage to its previous levels. To increase library usage and prevent any future decreases there is a need for a library system application. The library system application should be a program that can be installed on any computer.To develop the system both a GUI and system section are necessary. To properly create the library system application requirements, design, code, and testing is required for both sections. The library system application must offer functionality for clients, employees, employers, and administrators of the library. This applicationshould allow a patron to perform library related activities from their desired location and only required infrequent trips to the library at scheduled times. The activities should include:

1. Login capability for library staff and patrons
   1. Allows secure login
   2. Allows user to register online
   3. Provide ability to reset password
   4. Provide ability to retrieve forgotten user id
2. Check in/out capability
   1. check in/out option
   2. Allows user to reserve available book
   3. Provides notification when book is returned and available
3. View Books capability
   1. Search academic publications such as journals, books or articles.
   2. Search only child friendly books
   3. Search teenage books
   4. Search by genre
4. Profile capability
   1. Displays user registration information
   2. Delete user account
   3. Provide reminders of when an item needs to be returned
   4. Provide reminders of overdue book fee totals
5. Event display capability
   1. Displays library events
   2. Displays community events
6. Work Logcapability
   1. Staff daily assignments
   2. Staff assignment status
7. Admin Pagecapability
   1. Provides staff the ability to add/delete books in the system
   2. Provides staff the ability to set overdue book fee
   3. Search user accounts.
8. Contact Us information capability
   1. Contact email address
   2. Contact phone number
9. Update application
10. Refresh current Library system application data

# Library System Requirements

This following list of requirements has been derived fromthe consumer'srequirement statement for the library system. Each requirement contains "shall" to indicated it is required functionality to implement the system.Each requirement has an identifier in the form of LS-x, as well as a priority weight from 1 to 5. A higher priority weight indicates the corresponding requirement is more essential to the success of the project, and more critical to fulfilling the customer’s needs.

## Functional Requirements

| **Req ID** | **PW** | **Requirement Text** |
| --- | --- | --- |
| Login Requirements | | |
|  | 5 | The system login screen shall provide a registration option for new users. |
|  | 5 | The system shall store the user information in the account database. |
|  | 3 | The systemshall validatethe user login information and return a status. |
|  | 5 | The system shall display the main library system interface after user information validation returns success. |
| 1. T | 1 | The system login screen shall display an error message after user information validation returns failure. |
|  | 2 | The system login screen shall provide a reset password option for all existing accounts. |
|  | 3 | The system loginscreen shall provide a forgot user id option for all existing accounts to retrieve their user id. |
|  | 1 | The system login screen shall provide an exit option to close the library system. |
|  | 1 | The system login screen shall provide a cancel option to clear out the user id and password entries. |
| Forgot User ID Requirements | | |
|  | 4 | The system shall verify if the email andLibrary Number link to an account and return the user id. |
|  | 4 | The system forgot user screen shall display the return user idfor the provided email. |
|  | 3 | The system forgot user screen shall provide the option to return to the login screen. |
| Reset Password Requirements | | |
|  | 4 | The system reset password screen shall accept a user id. |
|  | 4 | The system reset password screen shall accept a user’s Library Number. |
|  | 4 | The system reset password screen shall accept a new password. |
|  | 3 | The system reset password screen shall require confirmation of the new password entered. |
|  | 3 | The system reset password screen shall provide a submit and return to login option. |
|  | 3 | The account database shall be searched for a link to theuser id and library number. |
|  | 4 | If the user id and library number are linked to an account then the inputted password shall be changed |
| Registration Requirements | | |
|  | 3 | The system registration screen shall accept the user's first name. |
|  | 2 | The system registration screen shall accept the user's last name. |
|  | 2 | The system registration screen shall accept the user's address. |
|  | 2 | The system registration screen shall accept the user's city. |
|  | 2 | The system registration screen shall accept the user's state. |
|  | 2 | The system registration screen shall accept the user's zip code in integer format. |
|  | 3 | The system registration screen shall accept the user's email address. |
|  | 2 | The system registration screen shall accept the user's phone number in integer format. |
|  | 4 | The system registration screen shall accept the user's username. |
|  | 4 | The system registration screen shall accept the user's password. |
|  | 5 | The system registration screen shall require confirmation of the new password entered. |
|  | 4 | The system registration screen shall provide a submit and return to login option. |
|  | 5 | The submit and return to login option creates an account with the accepted user information and returns to the login screen. |
| Main Interface Requirements | | |
|  | 3 | The system main interface screen shall provide a profile option. |
|  | 3 | The system main interface screen shall provide a view books option. |
|  | 4 | The system main interface screen shall provide a check in/out option viewable by employees and employers. |
|  | 4 | The system main interface shall provide a work log option viewable by employees and employers. |
|  | 4 | The system main interface shall provide an admin page option viewable by administrators. |
|  | 3 | The system main interface shall provide an event log option. |
|  | 3 | The system main interface shall provide a contact us option. |
|  | 5 | The system main interface shall be visible to all users. |
|  | 4 | The system main interface shall an option to update the current library system application data. |
| Profile Requirements | | |
|  | 4 | The system the profile screen shall display the user registration information. |
|  | 2 | The system the profile screen shall display a user’s status. |
|  | 3 | The system the profile screen shall display a user’s Library Number. |
|  | 3 | The system the profile screen shall provide a delete account option. |
|  | 5 | The system the profile screen shall be visible to all users. |
|  | 4 | The system shall provide reminders of when an item needs to be returned. |
|  | 4 | The system shall provide reminders of overdue book fee totals. |
| View Books Requirements | | |
|  | 4 | The system view books screen shall display all books in the Library. |
|  | 5 | The system view books screen shall display the books availability. |
|  | 3 | The system view books screen shall display the book's Title. |
|  | 3 | The system view books screen shall display the book's Author. |
|  | 3 | The system view books screen shall display the book's Year. |
|  | 3 | The system view books screen shall display the book's CRN. |
|  | 3 | The system view books screen shall display the book's Condition. |
|  | 3 | The system view books screen shall display the book's expected due date. |
|  | 4 | The system view books screen shall provide a search bar. |
|  | 3 | The system view books screen shall provide a search by genre bar. |
|  | 2 | The system view books screen shall provide a filter for all and any in the genre bar. |
|  | 5 | The system view books screen shall be visible to all users. |
| Check in/out Requirements | | |
|  | 5 | The system check in/out screen shall accept a CRN Number. |
|  | 3 | The system check in/out screen shall accept a user's library number. |
|  | 5 | The system check in/out screen shall accept check in or out action. |
|  | 3 | The system shall prevent a check out to a user with outstanding fees. |
|  | 4 | The system shall calculate any overdue fee necessary and add to the user account. |
|  | 3 | The system check in/out screen shall have a damage report on returned book. |
| Work Log Requirements | | |
|  | 5 | The system work log screen shall display staff daily assignments. |
|  | 3 | The system work log screen shall accept and display staff daily assignment status. |
|  | 3 | The system shall allow employer to delete completed work logs. |
|  | 3 | The system shall sort the work log by status, completed/uncompleted. |
|  | 4 | The system shall sort the log by priority based on uncompleted task's due date. |
| Admin Page Requirements | | |
|  | 3 | The system admin page screen shall provide a search accounts option. |
|  | 3 | The system admin page screen shall provide an add/delete book option. |
|  | 3 | The system admin page screen shall provide a set constants option. |
|  | 5 | The system admin page screen shall only be visible to employers. |
| Admin Search Page Requirements | | |
|  | 4 | The system admin search screen shall provide a search bar for user's name and library number. |
|  | 3 | The system admin search screen shall display the list of people with their name and library number if searched by user’s names. |
|  | 3 | The system admin search screen shall display the users profile if searched by library number. |
|  | 3 | The system admin search screen shall provide the employer to add comments under the account. |
|  | 4 | The system admin search screen shall provide the employer ban/delete the account. |
|  | 4 | The system admin search screen shall provide the employer change the status of the account. |
|  | 5 | The system admin search screen shall only be visible to employers. |
| Admin Add/Delete Page Requirements | | |
|  | 5 | The system admin add/delete screen shall provide an add/delete book option. |
|  | 3 | The system admin add/delete screen shall allow employers to input a book's Title. |
|  | 3 | The system admin add/delete screen shall allow employers to input a book's Author. |
|  | 3 | The system admin add/delete screen shall allow employers to input a book's Year. |
|  | 3 | The system admin add/delete screen shall allow employers to input a book's CRN Number. |
|  | 3 | The system admin add/delete screen shall allow employers to input a books CRN Number to delete a book. |
|  | 5 | The system shall only be visible to employers. |
|  | 4 | The systemshall allow employers to add comments, fees, or authority level to the profile or delete/edit it. |
|  | 3 | The system shall allow employers to search all accounts by name or library number |
| Admin Set Fee Requirements | | |
|  | 4 | The system Admin Fee screen shall allow employers to input a damage fee. |
|  | 4 | The system Admin Fee screen shall allow employers to input a late fee. |
|  | 3 | The system Admin Fee screen shall allow employers to input the time a book may be kept. |
|  | 3 | The system Admin Fee screen shall allow employers to input a checkout size |
|  | 4 | The system Admin Fee screen shall allow employers to input different types of damages fee. |
|  | 5 | The system Admin Fee screen shall only be visible to employers. |
| Events Requirements | | |
|  | 3 | The system events screen shall display upcoming events sorted by date. |
|  | 4 | The system events screen shall display the events date, title, and description. |
|  | 5 | The system events screen shall have an add/edit option only visible to employees and employers. |
|  | 5 | The system events screen shall be visible to all users. |
|  | 4 | The systems events screen add/edit option shall allow employees and employers to add a new event or edit any current events posted. |
| Contact Us Requirements | | |
|  | 2 | The system contact us screen shall display the creators email. |
|  | 2 | The system contact us screen shall display the creators phone number. |
|  | 2 | The system contact us screen shall display the creators company name. |
|  | 4 | The system contact us screen shall be visible to all users. |
|  | 2 | The system shall print any additional information entered by the admin for this screen. |

## Non-Functional Requirement

| **REQ ID** | **PW** | **Requirement Text** |
| --- | --- | --- |
|  | 5 | The interface of the system should be friendly to user. |
|  | 5 | Each user must have a separate login |
|  | 3 | The system code shall have a maximum code complexity of ten. |
|  | 2 | The system code shall have maximum of 120 characters per line. |
|  | 3 | The system code shall contain adequate comments that clearly demonstrate the function of the code. |
|  | 2 | The system code shall contain concise comments. |
|  | 3 | The system code shall be written with indentation to convey program structure and increase the readability of the code. |
|  | 3 | The system code shall contain variable declarations that demonstrate the function of the variable which they store. |
|  | 4 | High level design shall be completed for the system. |
|  | 5 | Users shall be not allowed to access the accounts of other users. |
|  | 4 | System shall be divided into several independent sections, toallow ease of modifications. |
|  | 3 | System shall provide the user with informative status messages. |
|  | 2 | The System's internal code shall link with the visual code efficiently, and effectively. |
|  | 5 | The system shall be backed up to avoid data lose. |

## On-ScreenRequirement

| **REQ ID** | **PW** | **Requirement Text** |
| --- | --- | --- |
|  | 1 | The system shall provide an exit button to allow the user to exit the application |
|  | 2 | The system shall allow user to logout at any time during the session |
|  | 3 | The system should allow user to navigate to home page of the app whenever needed |
|  | 4 | The system shall display library system application data. |
|  | 5 | The system shall display real time data availability. |

# User Stories System Requirements

This following list of user stories has been derived from the consumer's requirement statement for the library system. Each user story describes the actor's role as implemented in the system. Each user story has an identifier in the form of US-x, as well as a point value from 1 to 5. A higher point value indicates the corresponding user story is more essential to the success of the project, and more critical to fulfilling the customer’s needs.

| **User Story ID** | **User Story Text** | **Points** |
| --- | --- | --- |
| Login User Story | | |
|  | As a user, I can view the login screen. | 5 |
|  | As a user, I can enter my account information. | 4 |
|  | As a user, I can click on a register button if I do not have an account. | 4 |
|  | As a user, I can login in with the information I typed in. | 5 |
|  | As a user, I can clear out the information I typed in. | 2 |
|  | As a user, I can click on the reset password button if I do not remember my password. | 4 |
|  | As a user I can exit the Application screen. | 2 |
| Forgot User ID User Story | | |
|  | As a user, I can view the Forgotten User Id screen. | 5 |
|  | As a user, I can enter my email and retrieve my user Id | 4 |
|  | As a user, I can return to the Login | 5 |
| Reset Password User Story | | |
|  | As a user, I can view the Reset Password screen. | 5 |
|  | As a user, I can enter my User Id, Library Number, a new password and re-enter that new password. | 4 |
|  | As a user I can submit my entered information and return to the login screen. | 5 |
| Registration User Story | | |
|  | As a user, I can view the Registration screen. | 5 |
|  | As a user, I can enter all my information with a unique User Id and email. | 5 |
|  | As a user I can submit my information and return to the login screen. | 4 |
| Main Interface User Story | | |
|  | As a user, I can view the Library System screen. | 5 |
|  | As a user, I can click on the profile button, view books button, events button and contact us button. | 4 |
|  | As an employee, I can click on the check in/out button, and the work log button. | 4 |
|  | As an employer, I can click on the admin page button. | 4 |
| Profile User Story | | |
|  | As a user, I can view my account information and can delete my account. | 5 |
| View Books User Story | | |
|  | As an employee, I can view the view books screen. | 5 |
|  | As a user, I can view all the books in the Library. | 5 |
|  | As a user, I can view a book: availability, title, author, year, CRN, condition, expected due date a search bar, and a search by genre bar. | 3 |
| Check in/out User Story | | |
|  | As an employee, I can view the Check in/out screen. | 5 |
|  | As an employee I can enter a CRN of a book, a user’s Library Number. | 3 |
|  | As an employee, I can select if a book if being taken out or put back in. | 3 |
|  | As an employee, I can select if there is any damage and how much to the returning book. | 2 |
| Work Log User Story | | |
|  | As an employee, I can view the work log screen. | 5 |
|  | As an employee, I can view all the work that that needs to be done and if its completed. | 5 |
|  | As an employee, I can input who started the work. | 3 |
|  | As an employee, I can input when the work was done. | 3 |
|  | As an employee, I can input who completed the work. | 2 |
| Admin Page User Story | | |
|  | As an employer, I can view the admin page screen. | 5 |
|  | As an employer, I can select the add/delete book button, set constants button, or the search page button. | 4 |
| Admin Search Page User Story | | |
|  | As an employer, I can view the Admin search screen | 5 |
|  | As an employer, I can use a search bar for user’s names and library numbers. | 4 |
|  | As an employer, I can view the list of people with their name and library number if searched by user’s names. | 3 |
|  | As an employer, I can view the users profile if searched by library number. | 4 |
|  | As an employer, I can add comments under the account. | 3 |
|  | As an employer, I can ban/delete the account. | 2 |
|  | As an employer, I can change the status of the account. | 1 |
| Admin Add/Delete Page User Story | | |
|  | As an employer, I can view the Admin add/delete screen | 5 |
|  | As an employer, I can add/delete a book. | 3 |
|  | As an employer, I can input a book's Title. | 3 |
|  | As an employer, I can input a book's Author. | 3 |
|  | As an employer, I can input a book's Year. | 3 |
|  | As an employer, I can input a book's CRN Number. | 4 |
|  | As an employer, I can input a books CRN Number to delete a book. | 4 |
| Admin Set Fee User Story | | |
|  | As an employer, I can view the Admin set fee screen | 5 |
|  | As an employer, I can input a damage fee. | 3 |
|  | As an employer, I can to input a late fee. | 3 |
|  | As an employer, I can input the time a book may be kept. | 2 |
|  | As an employer, I can input a checkout size | 3 |
|  | As an employer, I can input different types of damages fee. | 4 |
| Events GUI User Story | | |
|  | As a user, I can view the events screen | 5 |
|  | As a user, I can view all upcoming events with a date, title, and description. | 4 |
|  | As an employee, I can view the add/edit option. | 5 |
|  | As an employee, I can use the add/edit option will allow me to add a new event or edit any current events posted. | 4 |
| Contact Us User Story | | |
|  | As a user, I can view the contact us screen | 2 |
|  | As a user, I can view the creators email, phone number, and company name. | 1 |

# Use Cases

## Preface

Users will be granted access to the functionality of the site as soon as they have created an account. They will have the ability to retrieve their user id if forgotten, reset current password, and login to the system. Once logged in the user will have access to the library systems main interface. The main interface provides the capability to view user profiles, view all the libraries books, view all current events, utilize the contact us option,and log out.Each section in the library system has extensive list of functionalities. Each section in the Library System will be described with an individualuse case.

## Use Case Casual Descriptions

**UC-1**

Login allows a registered user to access the system.This case should give the user the option to login using their account credentials. After selecting the login option the system verifies the information in the database. Upon successful query the system displays the Main Interface page. Upon a failure to query the system displays an error message username and/or password did not match account database.

Derived from: US-1, US-2, US-4, US-5, US-7

**UC-2**

Forgot User Id allows a registered user to retrieve their user id. This use case should give the userthe option to retrieve their user id. After selecting the option, the user is prompted for their email address. The system verifies the database with the email address for the corresponding user id. Upon a successful query the system displays the user id. Upon a failure query the system displays an error message no corresponding user id was found.

Derived from: US-8, US-9, US-10

**UC-3**

Reset Password allows a registered user to reset their password. This use case should give the user the option to reset their password. After selecting the option, the user is promoted for their User Id, Library Number, a new password and re-enter that new password. After selecting the submit option the system verifies information entered in the database. Upon successful query the system confirms the new password for the user. Upon failure query the system displays and error message incorrect user id and/or Library number associated with given email address or mismatched password.

Derived From: US-6, US-11, US-12, US-13

**UC-4**

Registration allows anunregistered user to create an account. This use case should give the user the option to create an account. After selecting the option, the user is promoted for all their information. After selecting the submit option the system verifies the information entered in the database. Upon a successful query the system creates an account for the user. Upon a failure query the system displays and error message invalid information entered or username is already taken.

Derived From: US-3, US-14, US-15, US-16

## Fully-Dressed Use Cases

Having an account within the database is necessary for the user to access the functionality within the system. The user can select the register option from the login screen to create an account. From the registration screen the user enters the necessary information to create an account. Some of the information requires user confirmation, e.g. password. The system will confirm the information meets the validation requirements and then creates the user’s account. Once the user account is created, the login screen is displayed. After the user loginsthey will have access to the library systems main interface. The user will remain logged into the system until the exit option is selected.

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| --- |
| **Use Case UC-1 Login** |
| Related Requirements: US-1, US-2, US-4, US-5, US-7  Initiating Actor: User  Actor’s Goal: Retrieve User Id  Participating Actors: User, Database  Pre-conditions: User must be registered and know their username and password.  Post conditions: The Database displays the Main Interface |
| **Flow of Events for Main Success Scenario** |
| → 1. User enters login credentials  → 2. User selects login option  ← 3. System verifies the user’s information against the database  ← 4. System confirms user id information  ← 5. System displays Main Interface |
| **Flow of Events for Alternate Scenarios** |
| → 1. User enters login credentials  → 2. User selects login option  ← 3. System verifies theuser's information against thedatabase  ← 4. System displays error, invalid username and/or password |

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| --- |
| **Use Case UC-2Forgot User Id** |
| Related Requirements: US-7, US-8, US-9  Initiating Actor: User  Actor’s Goal: Retrieve User Id  Participating Actors: User, Database  Pre-conditions: User must be registered and know the email address used for registration  Postconditions: The Database retrieves and displays the user id |
| **Flow of Events for Main Success Scenario** |
| → 1. User clicks the forgot user id option  → 2. User enters email address for user id retrieval  ← 3. System checks database for user's email address  ← 4. System retrieves and displays user id info |
| **Flow of Events for Alternate Scenarios** |
| → 1. User clicks the forgot user id option.  → 2. User enters email address for user id retrieval  ← 3. System checks database for user's email address  ← 4. System displays error no user id associated with email address entered |

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| --- |
| **Use Case UC-3 Reset Password** |
| Related Requirements: US-6, US-11, US-12, US-13  Initiating Actor: User  Actor’s Goal: Retrieve User Id  Participating Actors: User, Database  Pre-conditions: User must select the reset password option  Post conditions: The Database displays the reset password screen |
| **Flow of Events for Main Success Scenario** |
| → 1. User clicks the reset password option  → 2. User enters User Id, Library Number, a new password and re-enter that new password  → 3. User selects the submit option  ← 4. System checks database for user's entered information  ← 5. System confirms user’s new password |
| **Flow of Events for Alternate Scenarios** |
| → 1. User clicks the reset password option  → 2. User enters User Id, Library Number, a new password and re-enter that new password  → 3. User selects the submit option  ← 4. System checks database for user's entered information  ← 5. System displays error no user id and/or Library number associated with given email address or mismatched password |

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| **Use Case UC-4 Registration** |
| Related Requirements: US-3,US-14, US-15, US-16  Initiating Actor: User  Actor’s Goal: Retrieve User Id  Participating Actors: User, Database  Pre-conditions: User must select the registration option  Post conditions: The Database displays the registration screen |
| **Flow of Events for Main Success Scenario** |
| → 1. User clicks the registration option  → 2. User enters all his information  → 3. User selects confirm option  ← 4. System stores users entered information  ← 5. System confirms information and creates an account for the user  ← 5. System displays the login screen |
| **Flow of Events for Alternate Scenarios** |
| → 1. User clicks the registration option  → 2. User enters all his information  ← 3. User selects confirm option  ← 4. System attempts to store users entered information  ← 5. System displays error invalid registration information entered or username is already taken. |

## Traceability Matrix

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Requirements | Priority Weight | UC-1 |  | UC-2 | | UC-3 | UC-4 |  |
|  | 5 | X |  | |  |  |  |  |
|  | 4 | X |  | |  |  |  |  |
|  | 4 | X |  | |  |  |  |  |
|  | 5 |  |  | |  | X |  |  |
|  | 2 | X |  | |  |  |  |  |
|  | 4 | X |  | |  |  |  |  |
|  | 2 | X |  | |  |  |  |  |
|  | 5 |  | X | |  |  |  |  |
|  | 4 |  | X | |  |  |  |  |
|  | 5 |  | X | |  |  |  |  |
|  | 5 |  |  |  | | X |  |  |
|  | 4 |  |  |  | | X |  |  |
|  | 5 |  |  |  | | X |  |  |
|  | 5 |  |  |  | |  | X |  |
|  | 5 |  |  |  | |  | X |  |
|  | 4 |  |  |  | |  | X |  |

**Figure 1. The traceability matrix for the given use cases.**

**Traceability Matrix**

The traceability matrix presented in Figure 1 is based on only the full dressed use cases above and thus is only a partial representation of the complete project.