Software Design Description

Used Book System

Marya Belanger

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

1 INTRODUCTION

1.1 Design Overview

This document is intended to provide information that will be used in the software development process to explain how the software should be implemented and built. In the Software Design Document (SDD) there are graphical representations of the project, including a use case diagram, class diagram, and the interfaces of the system.

2 SYSTEM ARCHITECTURAL DESIGNS

2.1 Chosen System Architecture

The class diagram was chosen for the Used Book System (UBS). It provides a structural view of the system. It represents the basics of Object-Oriented systems, identifies what classes exist, how they interrelate and how they interact, and captures the static structure of Object-Oriented systems – how systems are structured rather than how they behave. It makes the system easy to maintain and modify.

2.2 System Interface Description

(I) The student interface:

The user should be a student at Yanbu University College (YUC). The user should see the list of available books when he/she opens the web app, the search bar where he/she can search for a book by course code, course title or book title, login or register, and the basket where he/she can access saved books on the left side (see Figure 1).

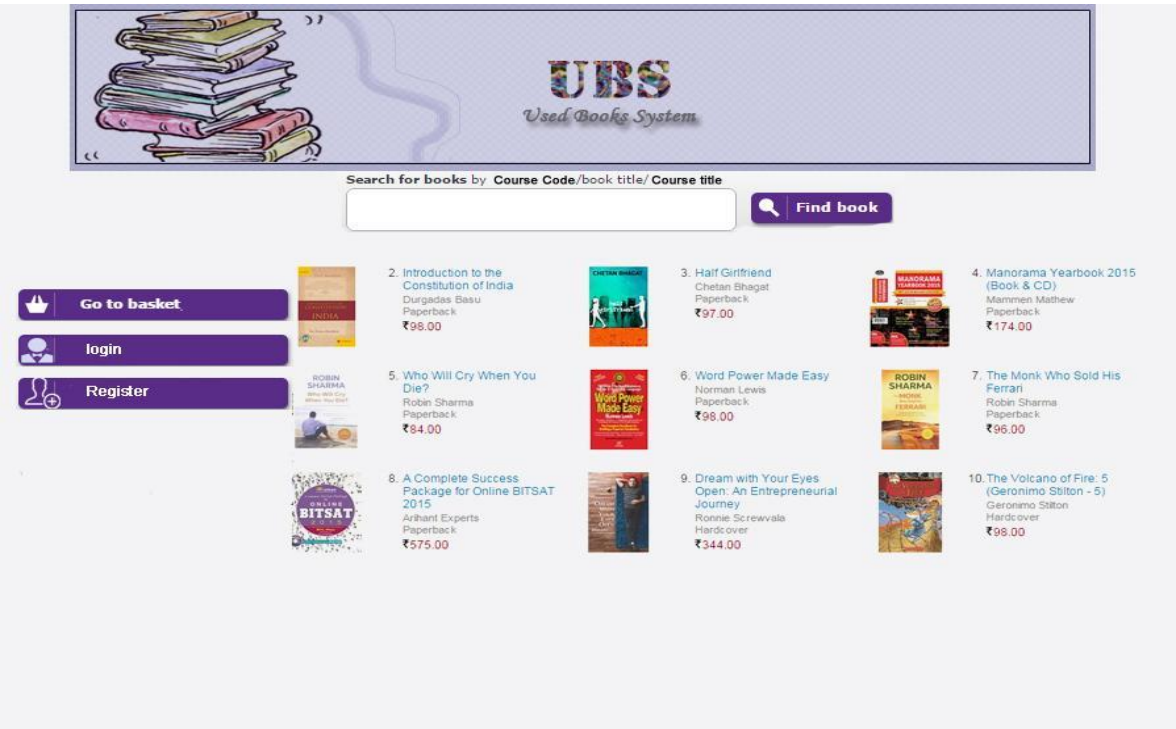

Figure 1: The home page

The student should enter his/her ID (provided by YUC) and password on the login page in order to see his/her basket or to reserve a book (see Figure 2).

Figure 2: Student login

If the student is not registered, he/she must register to the system to reserve the desired books (see Figure 3).

Figure 3: Student registration

Every user should have a basket where he/she can edit or confirm his/her reservation (see Figure 4).

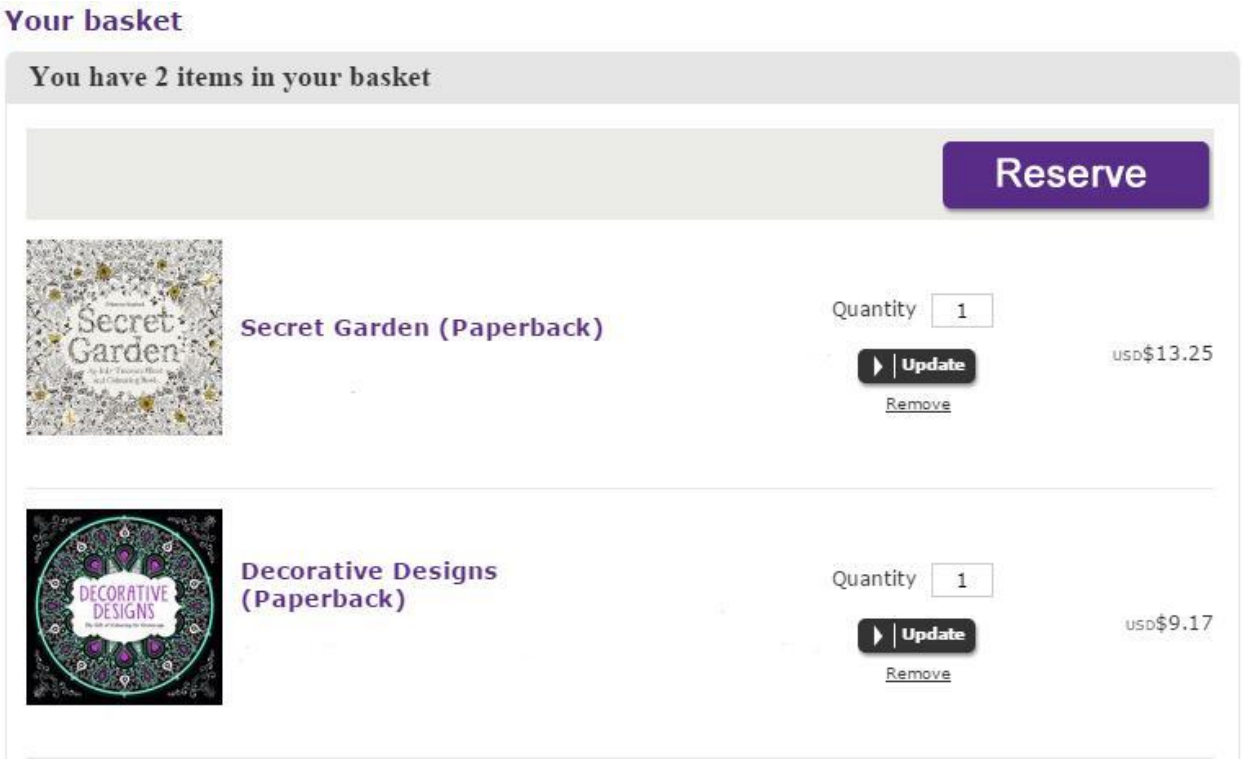

Figure 4: Student basket

(II) The Clerk Interface:

The clerk will login from the left side of the main page by entering his/her ID number (see Figure 1). He/she can then view reservations, add a new book to the system, delete a book from the system and update a book's details (see Figure 5).

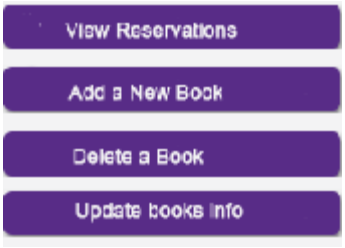

Figure 5: Clerk operations

To delete or update, the clerk will search for the book with the same interface as a user search (see Figure 6).

Figure 6: Clerk operations (deleting and updating interface)

By clicking delete, no further actions are required. Updating will show the clerk a page to re-enter the book details (see Figure 7).

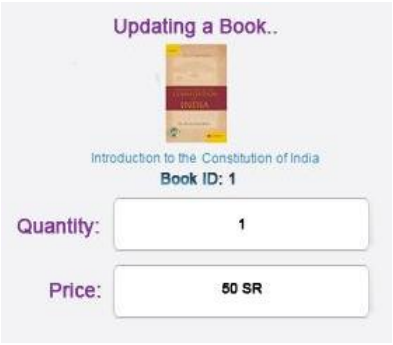

Figure 7: Clerk operations (updating a book)

To add a book, a new page similar to the update will prompt the user to enter the book's information (see Figure 8).

Figure 8: Clerk operations (adding a new book)

If the clerk chooses view reservations, a table will show him all the reserved books with the associated student info (see Figure 9).

Reservations:

Book Title	Resurved by
Digital Logic	11120000
Database Fundamentals	11120001
Communication Skills	11120002

Figure 9: Clerk operations (view reservations)

3 DETAILED DESCRIPTIONS OF COMPONENTS

3.1 Class Diagram

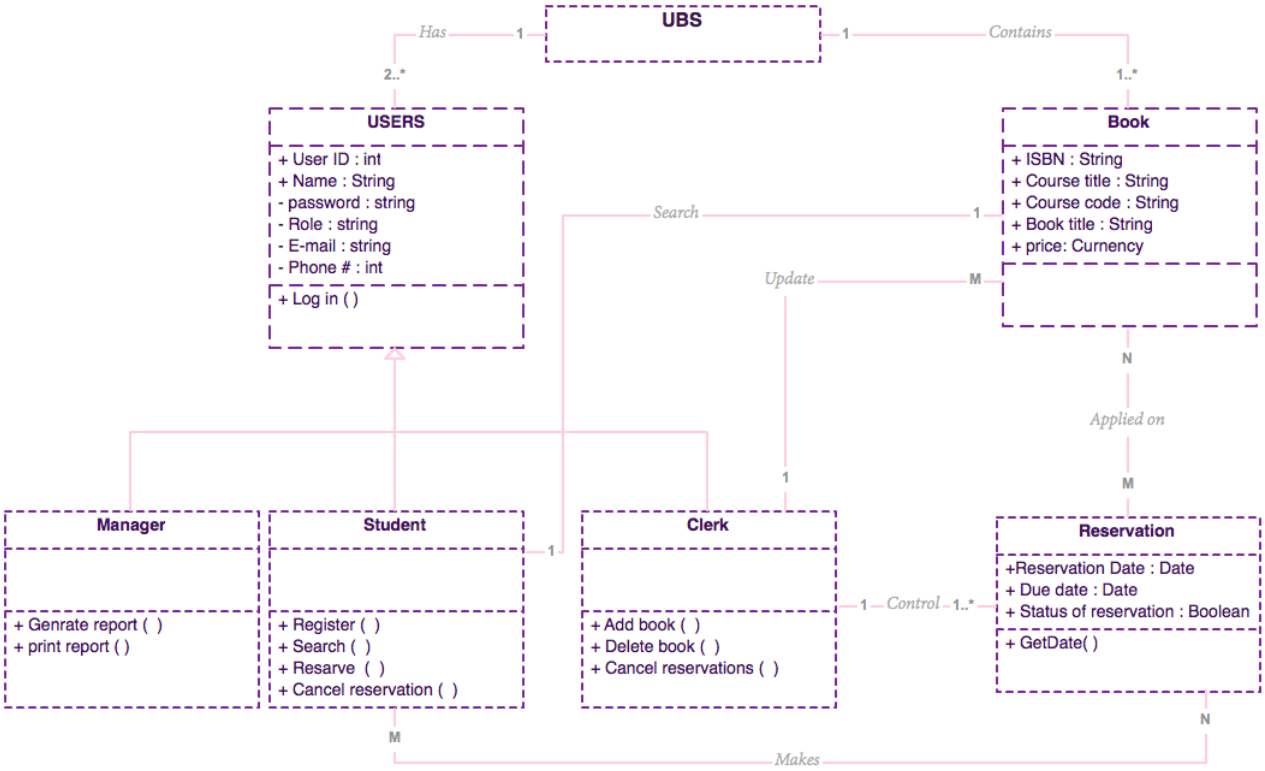

Figure 10: Class diagram

Class Diagram Description		
Class name	**Attributes**	**Relationship**
Users	user ID, name, password, role, email and phone #.	Generalization relationship: - users include student, manager and clerk
Manager	user ID, name, password, role, email and phone #.	
Clerk	user ID, name, password, role, email and phone #.	Association relationship (Control): - one clerk shall be able to control one to many reservations. Association relationship (Update):

		- one clerk shall be able to update many update.
Student	user ID, name, password, role, email and phone #.	Association relationship (Make): - many students can make many reservations. Association relationship (Search): - one student shall be able to search for one book.
Reservation	Reservation Date, Due date, Status of reservation	Association relationship (Applied on): - Many reservations can be applied on many books. Association relationship (Control): - Many reservations are controlled by one clerk.
Book	ISBN, course title, course code, book title and price.	Association relationship (Update): - Many books can be updated by one clerk. Association relationship (Search): - One book can be searched by one student.

Table 1: Class diagram description

3.2 Dynamic Behavior of Components

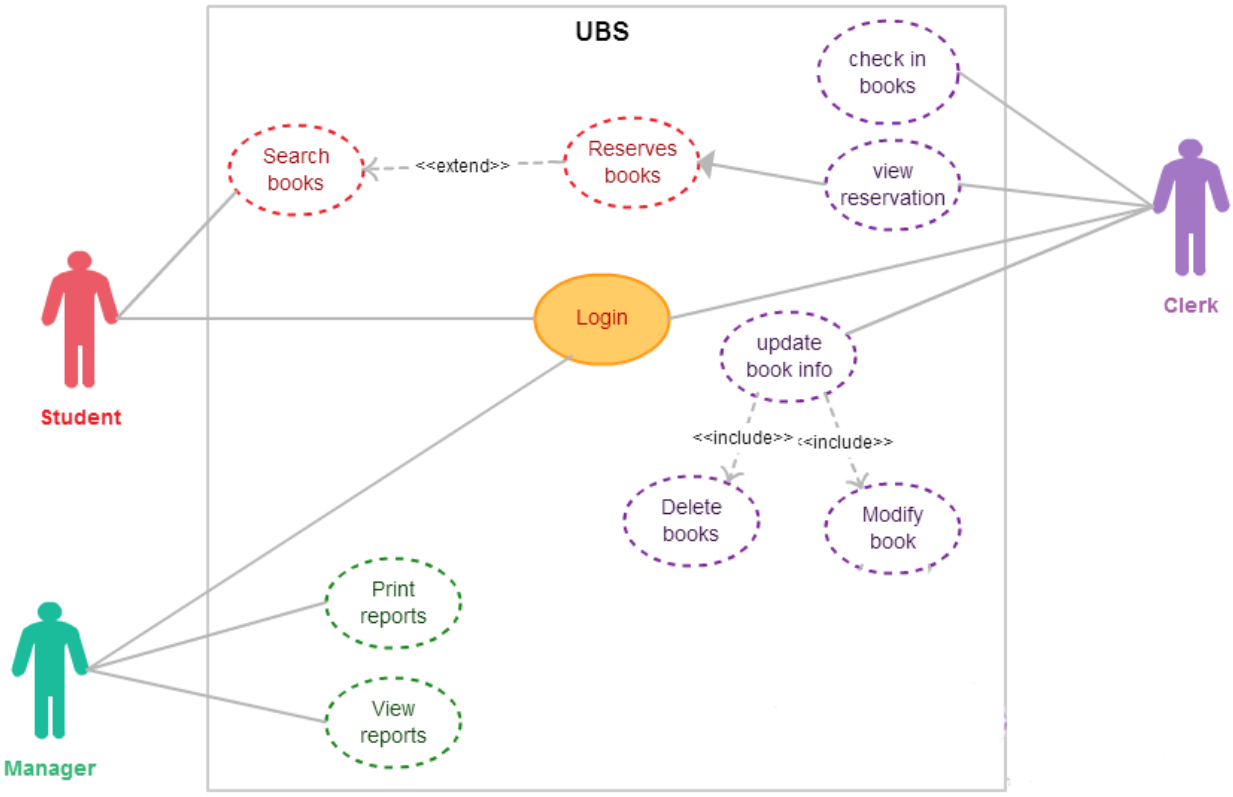

Figure 11: Use case table

Use Case Table			
Srl no.	**Actor(s)**	**Use Case Name**	**Goal & Rules**
1	Student	Search books	Logged in students or any other students at YUC shall be able to search for books by book title, course title, or course code to know the bookstore collection.
2		Reserve books	After searching for the required books, only logged in students shall be able to reserve books for 2 days and go to the library to pay for them. After this period of time the reservation will be cancelled.
3	Clerk	Check in books	The clerk shall be responsible to add/check in any new books in the system database to allow the students to choose from a variety of books.

4		View reservation	Once a logged in student reserves a book, the reservation info will appear to the clerk as a table containing the book title with the student ID.
5		Update book info	The clerk shall be able to update books in two situations. First, once a book is no longer available in the bookstore he/she shall delete the book from the system. Second, if the quantity or price of the book changes, the clerk shall be able to update the book info by modifying the quantity or price.
6	Manager	View reports	The manager shall be able to view reports of the system showing the system activities in a specific period of time such as how many books are reserved or cancelled, how many books are in the system, how much money has been earned.
7		Print reports	The manager shall be able to print those reports.
8	Students, Clerk, and Manager	Login	The clerk and manager must login to manage the software and their operations. Students must login if they want to make a reservation, otherwise they can just search for books as visitors.

Table 2: Use case diagram description

4 DATABASE DESIGN

4.1 Database Description

Relation Name	Class attributes	Description
Book_course	ISBN	The International Standard Book Number
	Book_Title	Book's name
	Author_name	Writer's Name
	Book_cover	Picture of the first page of the book
	Course_code	A combination of letters and numbers that is

		entered to enroll any course
	Course_title	Course's Name
Books	Book_ID	Book's identification Number
	ISBN	[see above]
	Quantity	Number of books available
	Price	The price of the book
	Description	Include the quality and the number of edition for each book
Reservation	Book_ID	[see above]
	User_ID	User's identification Number
	Reservation_Date	Start from the moment of booking the book (includes time)
	Statues_of _Reservation	Clarify whether the book is still reserved or not
	Due_Date	Deadline for purchasing the book, including time and date
Users	User_ID	User's identification Number
	User_Name	[optional]
	Password	Password to protect the account
	Role	Clarify whether the user is student, clerk or manager
	Phone_number	[optional]
	Email_Address	[optional]

Table 3: Database tables description

4.2 Normalization

First normalization:

Books {Book_ID, Quality, price,description, ISBN, Book_cover,Course_title, Course_Code,Book_title}
Users {User_ID, Name,password,Role, Email,Phone#}
Reservation{Book_ID,User_ID,Date,Status of reservation,Due date}

Second and third normalization:

Books {Book_ID, ISBN ,quality ,price ,description }
Book_Course {ISBN,Book_cover,course_title,course_code,Book_title}
Users {User_ID, Name,password,Role, Email,Phone#}
Reservation{Book_ID,User_ID,Date,Status of reservation,Due date}

5 USER INTERFACE DESIGN

5.1 Description of the User Interface

5.1.1 Screen Images

Home Page:

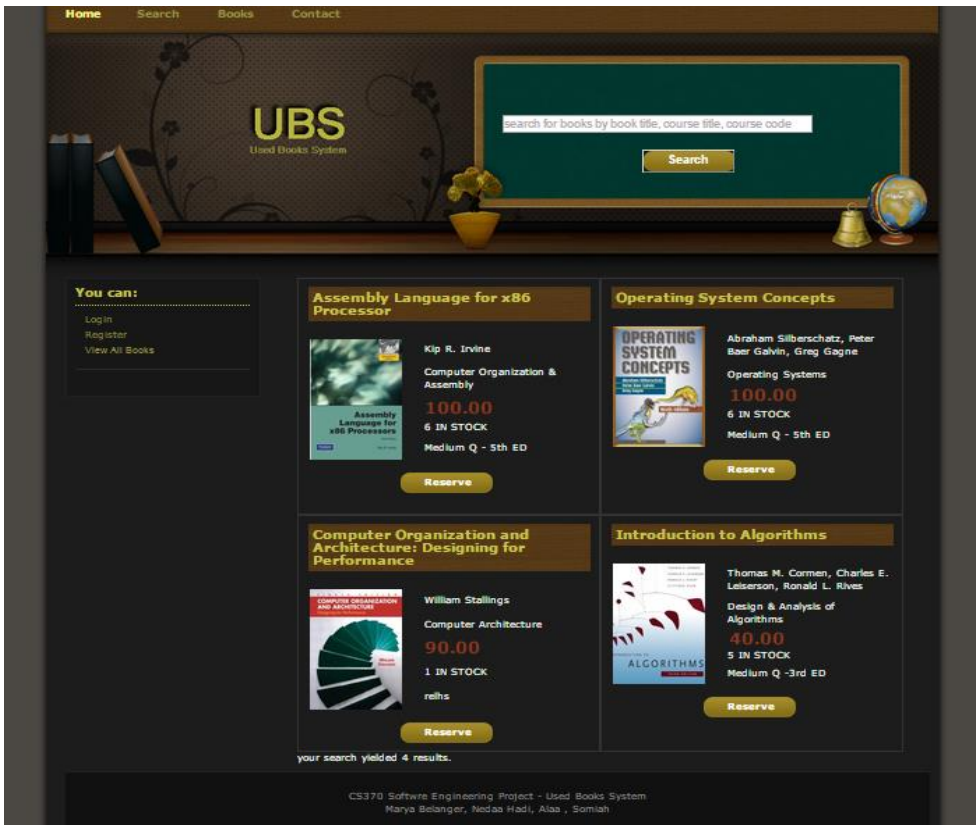

Figure 12: The home page (alternate design)

The home page contains 3 main things. First, the search bar in which the user can search by book title, course title, or course code. Second, the list on the left side in which the user can login, register, or view all books available in the web app. Third, the books. Each time the user refreshes the page, the books will be changed randomly. As shown in figure 12, each book is displayed with its information; book name, book cover, author, course title, price, number of copies, quality and edition number.

Search Operation:

1. **Search by course code:**

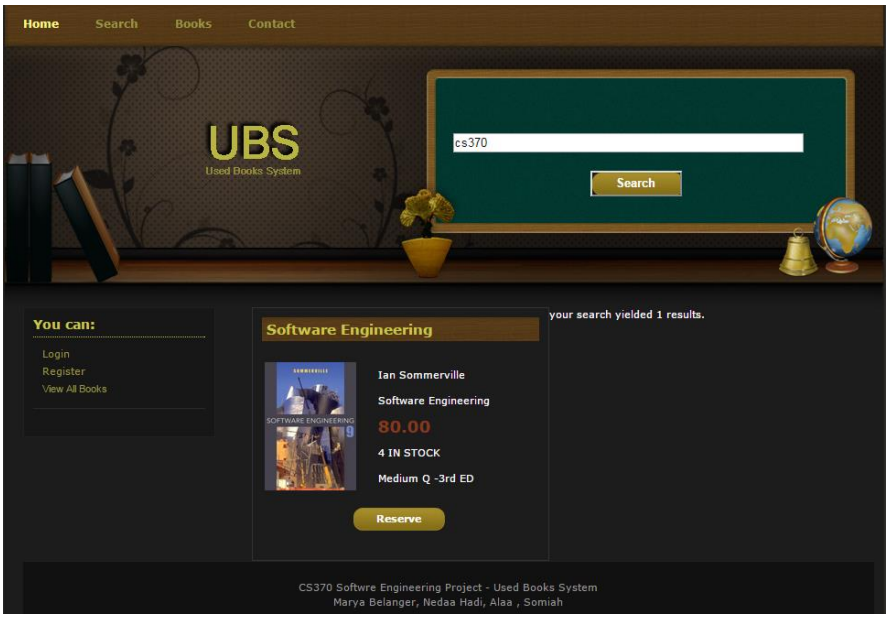

Figure 13: Search by course code

This figure shows the result of searching by course code. As an example, cs370 was entered and the book associated with this course was shown (Software Engineering).

2. **Search by course title:**

Figure 14: Search by course title

This figure shows the result of searching by course title. As an example, Artificial Intelligence was entered and the book associated to this course was shown (Artificial Intelligence).

3. Search by book title:

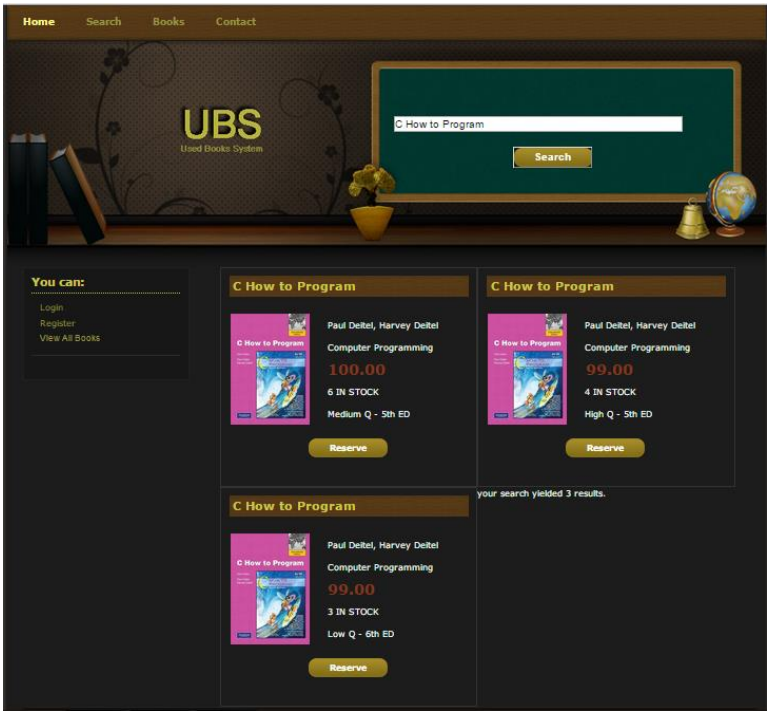

Figure 15: Search by book title

This figure shows the result of searching by book title. As an example, C How To Program was entered and the copies associated to this book were shown.

4. **Search by level:**

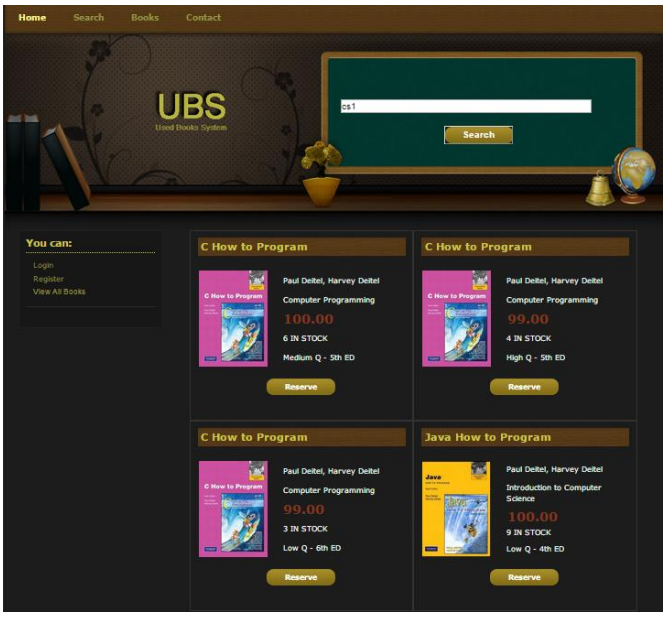

Figure 16: Search by level

This figure shows the result of searching by level. For instance, cs1 was entered and it represents the first level of Computer Science major which is “Freshman”. The result is all books related to the freshman level.

5. **Search by keyword:**

The below figure shows the result of searching by a word. For instance, computer was entered. The result is all books which have the word “computer” in their information; book title or course title.

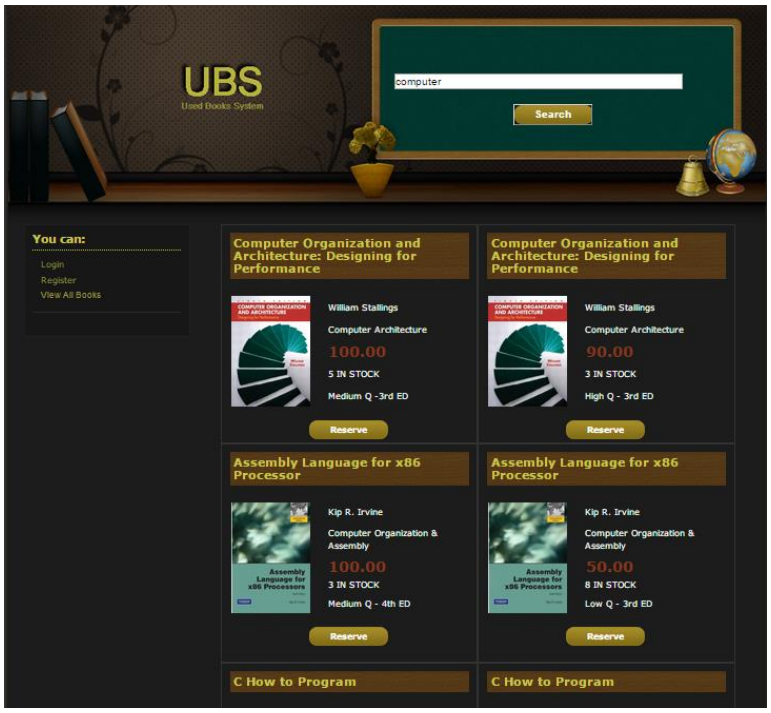

Figure 17: Search by any word

Register Operation:

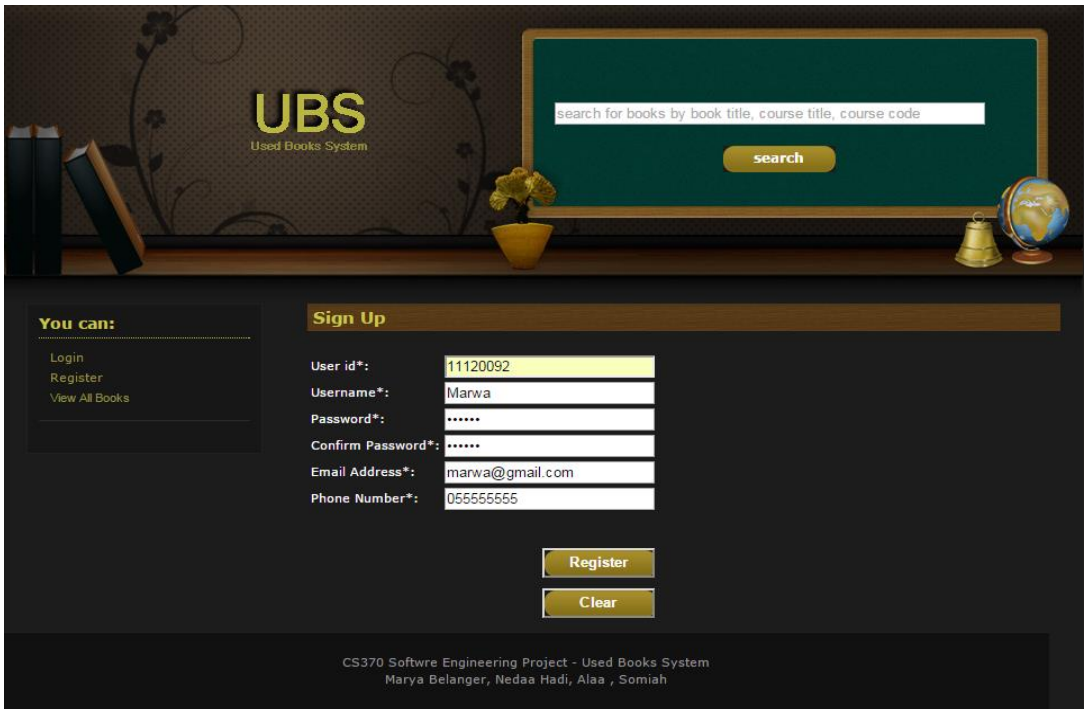

Figure 18: Registration operatio

Figure 18 shows the registration page. The student has to fill in this information; user ID, username, password (6 or more characters), email address, and phone number. He/she also has to confirm his/her password.

Figure 19: Main page for logged-in student

Once a student registered, he/she will be redirected to the main page.

Login Operation:

Student or clerk logging in uses the same interface. The user has to enter his/her ID and password to login. The system will redirect the user to his/her main page according to his/her role.

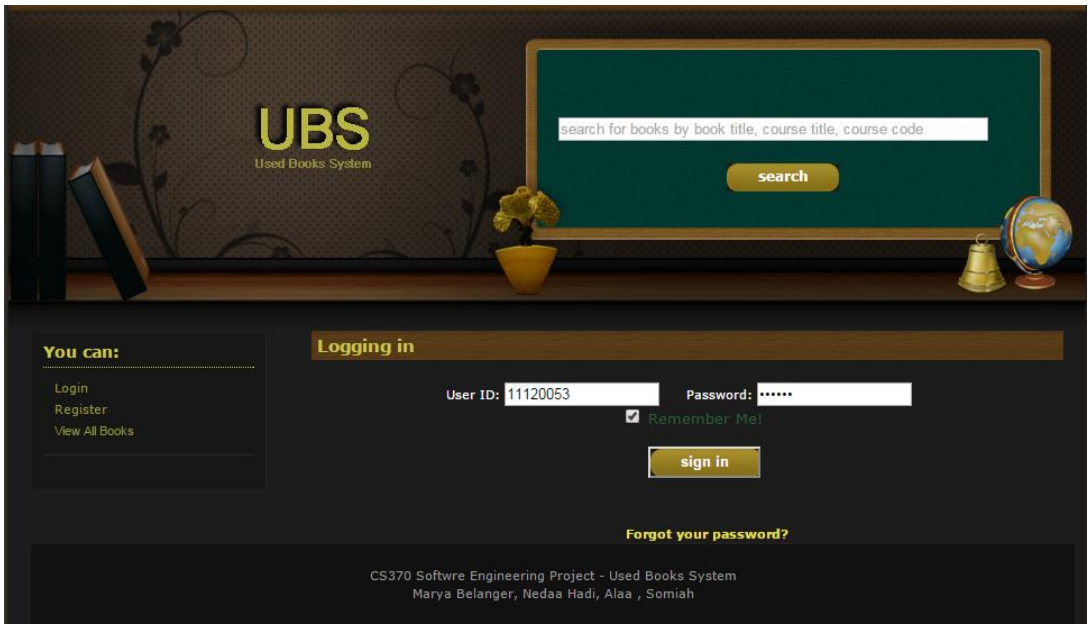

Figure 20: Logging in

1. **Students Logging in:**

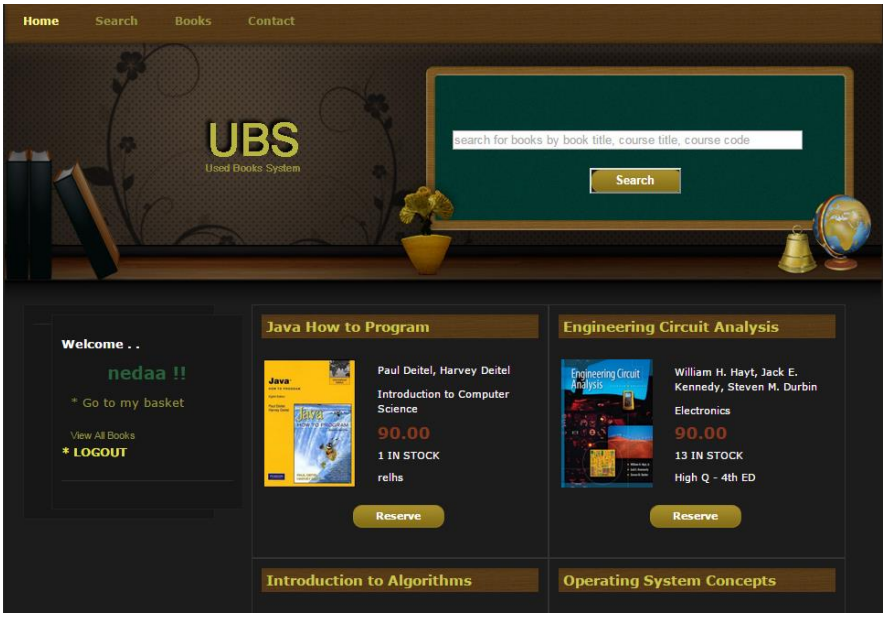

Figure 21: Student main page

2. **Clerk Logging in:**

Figure 22: Clerk main page

3. Recovering the password:

If the user forgot his/her password, he/she can recover it by clicking on the "Forgot your password?" button.

Figure 23: (1) Recovering password

The first step to recover the password is to enter the email address and press "next".

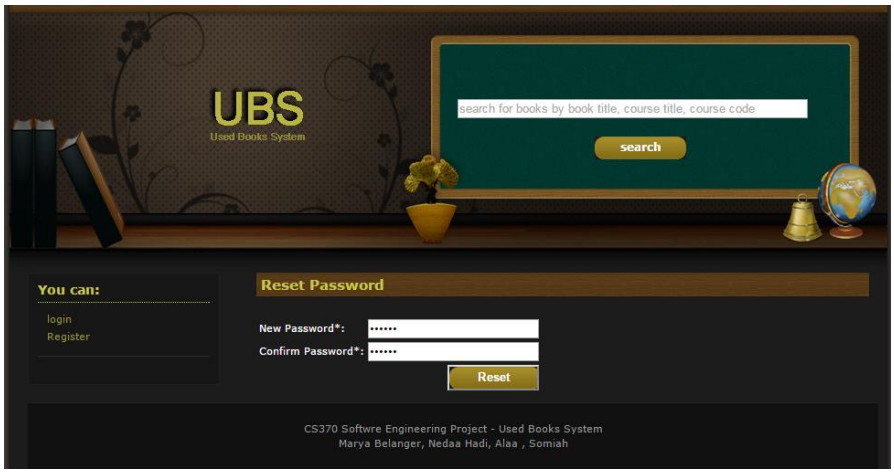

Figure 24: (2) Recovering password

After pressing next, the user has to enter and confirm the new password and press “reset”.

Check In books Operation:

After logging in, the clerk can add books by clicking on the “Add a new book” button, figure 22.

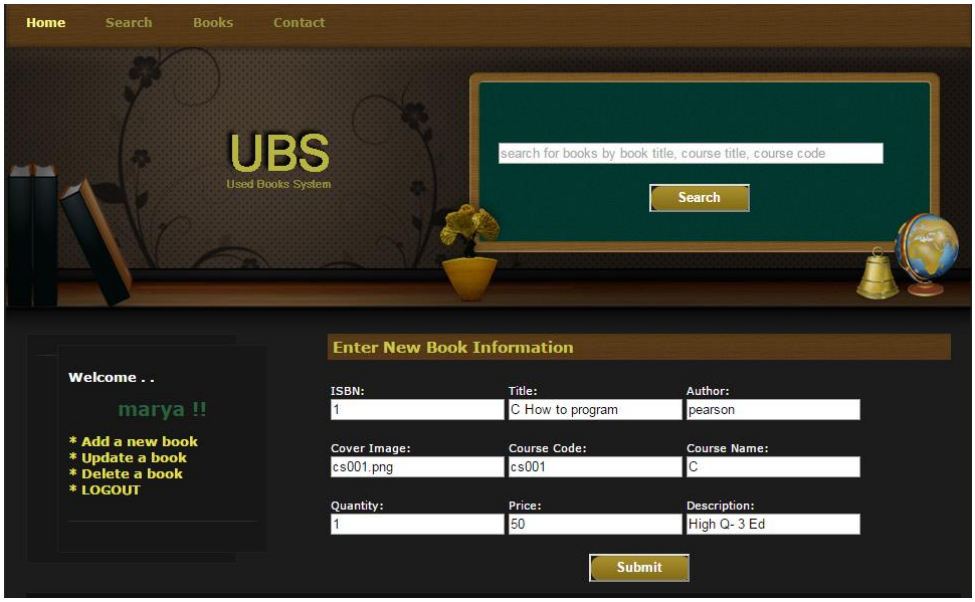

Figure 25: (1) Adding a new book

The clerk has to fill in the information associated to the book.

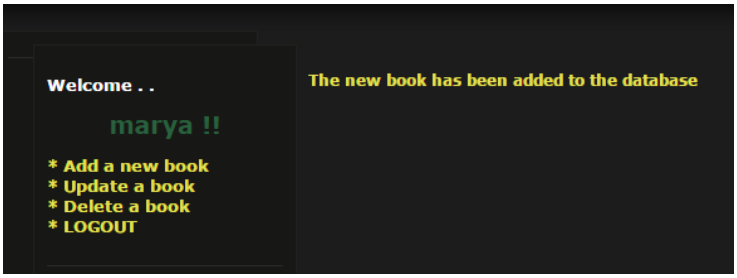

Figure 26: (2) Adding a new book

5.1.2 Objects and Actions

5.1.2.1 Database Tables

USER_ID	USER_NAME	PASSWORD	ROLE	EMAIL	PHONE NO
0	nada	00c66aaf5f2c3f49946f15c1ad2ea0d3	clerk	kk@gmail.com	14246
1	marya	ea1a94a42af2d08e1d8e65223698d78c	clerk	marya@gmail.co	100000000
11120053	nedaa	00c66aaf5f2c3f49946f15c1ad2ea0d3	student	nedaahadi94@gmail.com	0

Figure 27: Users table

ISBN	BOOK_TITLE	AUTHOR_NAME	BOOK_COVER	COURSE_CODE	Course_title
1	Data Structures & Algorithms in Java	Robert Lafore	cs204.jpg	CS204	Data Structures
2	Assembly Language for x86 Processor	Kip R. Irvine	cs203.jpg	CS203	Computer Organization & Assembly
3	C How to Program	Paul Deitel, Harvey Deitel	cs101.jpg	CS101	Computer Programming
4	Java How to Program	Paul Deitel, Harvey Deitel	cs102.jpg	CS102	Introduction to Computer Science
5	Digital Design	M. Morris Mano, Michael D. Ciletti	cs201.jpg	CS201	Digital Logic
6	Discrete Mathematics and its Application	Kenneth H. Rosen	cs202.jpg	CS202	Discrete Mathematics
9	Computer Organization and Architecture: Designing for Performance	William Stallings	cs301.jpg	CS301	Computer Architecture
10	Introduction to Algorithms	Thomas M. Cormen, Charles E. Leiserson, Ronald L. Rives	cs302.jpg	CS302	Design & Analysis of Algorithms
11	Database Systems	Ramez Elmasri, Shamkant B. Navathe	cs310.jpg	CS310	Database Systems
12	Artificial Intelligence	Stuart Russel, Peter Norvig	cs330.jpg	CS330	Artificial Intelligence
13	Concepts of Programming Languages	Robert W. Sebesta	cs360.jpg	CS360	Programming Languages
14	Software Engineering	Ian Sommerville	cs370.jpg	CS370	Software Engineering
15	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	cs480.jpg	CS480	Operating Systems
16	Engineering Circuit Analysis	William H. Hayt, Jack E. Kennedy, Steven	cse251.jpg	CSE251	Electronics

Figure 28: Book_course table

BOOK_ID	ISBN	QUANTITY	PRICE	DESCRIPTION
1006	15	7	$189.00	Low Q - 2ND ED
1007	16	9	$376.00	Medium Q -5th ED
1008	6	20	$300.00	High Q - 3rd ED
10001	1	3	$250.00	High Q - 5th ED
10002	2	3	$300.00	Medium Q - 4th ED
10003	2	8	$250.00	Low Q - 3rd ED
10004	11	5	$400.00	Medium Q -3rd ED
10005	14	4	$280.00	Medium Q -3rd ED
10007	5	7	$400.00	High Q - 2nd ED
10010	13	3	$388.00	High Q - 5th ED
10012	1	2	$200.00	Medium Q- 2nd ED
10029	3	6	$200.00	Medium Q - 5th ED
10040	10	3	$230.00	Medium Q -7th ED
10042	9	5	$200.00	Medium Q -3rd ED
10043	4	9	$100.00	Low Q - 4th ED
10044	9	3	$290.00	High Q - 3rd ED
10054	10	4	$300.00	High Q - 5th ED
10089	6	13	$490.00	High Q - 4th ED
10090	12	4	$400.00	High Q - 5th ED
10092	3	4	$399.00	High Q - 5th ED
10098	17	3	$233.00	Low Q - 4th ED

Figure 29: Books table

BOOK_ID	USER_ID	RESERVATION_DATE	STATUS_OF_RESERVATION	DUE DATE
1000	1	4/22/2015 0:00:00	1	4/24/2015 0:00:00

Figure 30: Reservation table

6 ADDITIONAL MATERIALS

6.1 Sequence Diagram

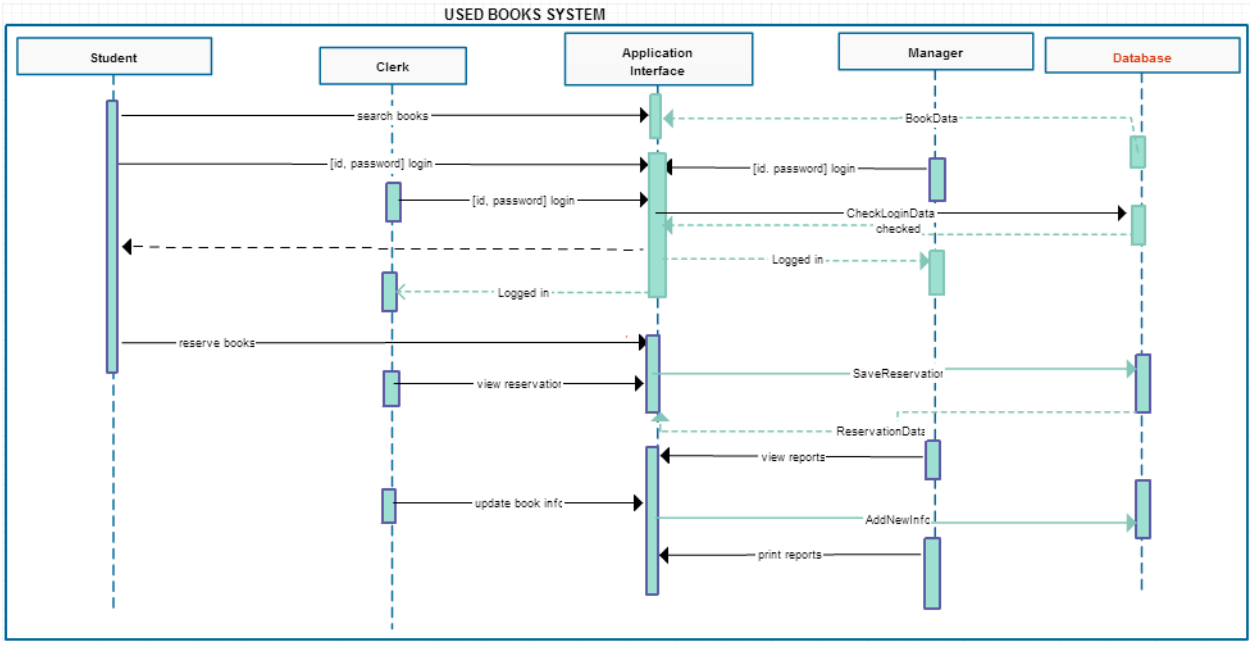

Figure 31: Sequence diagram