



LMS5 - Software Design and Architecture

Software Design and Architecture (National University of Computer and Emerging Sciences)

Software Requirements Specification

For

Web Library Management System

Version x.xx

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Revision History

Name	Date	Reason For Changes	Version
CE_ONB	8-3-2011	Upgrading the report to SRS	2.0
CE_ONB	15-3-2011	Upgrading the report to SRS	2.1

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1. Introduction

1.1 Purpose

The purpose of this document is to describe the Web Library Management System (WLMS) product with the release number 0.1. This document contains the functional and non-functional requirements of the project. This document contains the guidelines for website developers system engineers and designers to start working the project.

1.2 Scope

WLMS product is basically updating the manual library system into a internet-based application so that the users can know the details of their accounts, availability of books and remaining time for borrowing.

The project is specifically designed for the use of librarians and library users. The product will work as a complete user interface for library management process and library usage from ordinary users. WLMS can be used by any existing or new library to manage its books and book borrowing, insertion and monitoring .

WLMS can work as a powerful library management system for big libraries, and can provide a free easy-to-use system for rising libraries.

1.3 Audience Definitions, Acronyms and Abbreviations

1.3.1 Audience Definitions

The intended readers of this document are the developers of the site, testers, library owners and managers and coordinators.

Any suggested changes on the requirements listed on this document should be included in the last version of it so it can be a reference to developing and validating teams.

1.3.2 Acronyms and Abbreviations

Acronym	Meaning
WLMS	Web Library Management System
MS SQL	Microsoft Structured Query Language
ASP	Active Server Pages
ISBN	International Standard Book Number
DVD	Digital Video Disc
IEEE	Institute of Electrical and Electronics Engineers

1.4 References

- IEEE 830-1998 standard for writing SRS document.
- I. Sommerville, *Software Engineering*, 8th ed. England: Addison-Wesley, 2007.

1.5 Overview

Section 2 defines the general functions of WLMS, operating environment and user constraints along with our assumptions.

Section 3 specifies functional and nonfunctional requirements; all of them are described to a level of detail sufficient for designers to design a system.

Section 4 illustrates interfaces and its possible scenarios along with some screenshots to make a general idea about the interfaces.

Section 5 specifies all stored information that we are concerned about for every entity in the website .

2. Overall Description

2.1 Product Perspective

WLMS is a replacement for the ordinary library management systems which depend on paper work for recording book and users' information.

WLMS will provide an advanced book search mechanism and will make it easy to borrow, insert and index a book in the library.

2.2 Product Functions

2.2.1 Administrators

- Admin should be able to insert, modify and delete books.
- Can accept or reject a new user according to the library policy or payment methods.
- Increase the period for borrowing a book for specific type or group of users.
- Can get the information (status report) of any member who has borrowed a book.
- Add and edit book categories and arrange books by categories.
- Add and edit authors and publishers information.
- Can send lateness warnings to people who have exceeded deadline date.
- Can record books returned by users.

2.2.2 Normal Users (Library Members)

- The member should be provided with the updated information about the books catalog.
- Members are given a provision to check their account's information and change it.
- Members have the ability to search through books by subject, title, authors or any information related to the book.
- Can extend the period of borrowing books according to the library policy.
- The customer may suggest a book to be brought to the library book collection.

2.3 Operating Environment

The WLMS is a website and shall operate in all famous browsers, for a model we are taking Microsoft Internet Explorer versions 7.0, 8.0 and 9.0, with Flash Player 9 and JavaScript.

2.4 User Characteristics

Users of the website are members, librarians and the administrators who maintain the website. Members and librarians are assumed to have basic knowledge of computers and Internet browsing. Administrators of the system should have more knowledge of internal modules of the system and are able to rectify small problems that may arise due to disk crashes, power failures and other catastrophes. Friendly user interface, online help and user guide must be sufficient to educate the users on how to use this product without any problems or difficulties.

2.5 Design and Implementation Constraints

- The information of all users, books and libraries must be stored in a database that is accessible by the website.
- MS SQL Server will be used as SQL engine and database.
- The Online Library System is running 24 hours a day.
- Users may access WLMS from any computer that has Internet browsing capabilities and an Internet connection.
- Users must have their correct usernames and passwords to enter into their online accounts and do actions.

2.6 Assumptions and Dependencies

The product needs the following third party products.

- Microsoft SQL server to store the database.
- ASP.net to develop the Product.

The success of this system depends on

- Existence of an Internet service to all people in Gaza Strip.
- Are librarians and users comfortable with computers and have enough conation to work with the product?
- Website interface must be friendly and easy-to-use.
- The search mechanism should be simple and fast.

3. Specific Requirements

3.1 Functional Requirements

3.1.1 Librarian

Prerequisite	(admin signed in) for all requirements below
Requirement ID	R1.01.01
Title	insert book
Description	This action is done to add new book to library book collection.
Priority	2
Requirement ID	R1.01.02
Title	delete / modify book
Description	this event is to delete an existing book or modify its information.
Priority	2
Requirement ID	R1.01.03
Title	Validate user account
Description	when a new member sign up then he should wait for acceptance by Administrator according to library policies (e.g. fees required).
Priority	1
Requirement ID	R1.01.04
Title	delete member
Description	Admin can delete a member due to some specific rules.
Priority	2
Requirement ID	R1.01.05
Title	modify member rank
Description	Admin can extend the borrowing time or number of book borrowed simultaneity to a user.
Priority	2

Requirement ID	R1.01.06
Title	return book
Description	Admin should confirm the return of books borrowed by users.
Priority	1

3.1.2 Normal User

Requirement ID	R1.02.01
Title	register
Description	when new user enters WLMS for the first time then he has to register
Priority	3

Requirement ID	R1.02.02
Title	extending borrowing deadline.
Description	member can extend the borrowing time to some limit decided by Admin
Priority	2
Requirement ID	R1.02.03
Title	reset password
Description	when a member forgets his password he can claim it back via e-mail.
Priority	1

Requirement ID	R1.02.04
Title	edit personal information
Description	if some user changes for example his mobile number, he can modify it.
Priority	2

Requirement ID	R1.02.05
Title	reset password
Description	when a member forgets his password he can claim it back via e-mail.
Priority	1

3.1.3 Common Functions

Requirement ID	R1.03.01
Title	login
Description	both Admin and members must be logged in before they modify any information
Priority	1

Requirement ID	R1.03.02
Title	search for book
Description	when user or admin wants to search on some book by name, author or subject etc.
Priority	1

3.2 Non-functional Requirements

3.2.1 Error handling

- WLMS product shall handle expected and non-expected errors in ways that prevent loss in information and long downtime period.

3.2.2 Performance Requirements

- The system shall accommodate high number of books and users without any fault.
- Responses to view information shall take no longer than 5 seconds to appear on the screen.

3.2.3 Safety Requirements

- System use shall not cause any harm to human users.

3.2.4 Security Requirements

- System will use secured database
- Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
- System will have different types of users and every user has access constraints.

4. Interfaces and Possible Scenarios

4.1 Login Interface

We can see "تسجيل دخول" pannel in the main page in Figure 1 which asks the user to type his username and password then click "دخول". If the user entered either his username or password incorrectly then an error message shown in Figure 2 will be shown.

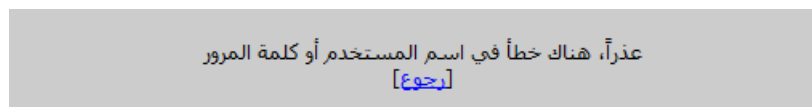


Figure 2: Login error message

Another possible scenario that an already-registered Member has forgotten his password then he can click on "فقدت كلمة المرور" and this will lead him to password recovery page shown in Figure 3 so he can enter his e-mail and the password will be sent instantly to him via e-mail.

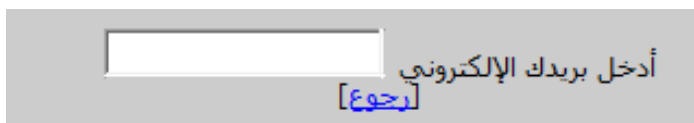


Figure 3: Retrieve password form

In case the user is not registered yet, he can enter the registration form after clicking on "تسجيل" link as shown in Figure 4.



Figure 1: Main menu

4.2 Registration Interface

After the guest reads "شروط وضوابط" and agrees it he can continue with registration operation by entering his name, password, e-mail, address, mobile, telephone and personal photo.

When the user finishes entering the required fields, he should click "تسجيل" to be a member of the library.

Users will be warned about any mistakes on data format or any other constrains by validation notes and error messages. Figures below show some of these mistakes with their correction examples.

يرجى قراءة [شروط وضوابط](#) التسجيل جيداً قبل تعبئة الحقول

<input type="text"/>	اسم المستخدم
<input type="password"/>	كلمة المرور
<input type="password"/>	تأكيد كلمة المرور
<input type="text"/>	البريد الإلكتروني
<input type="text"/>	تأكيد البريد الإلكتروني
<input type="text"/>	العنوان
<input type="text" value="08-03-2011"/>	تاريخ الميلاد
<input type="text"/>	جوال
<input type="text"/>	هاتف
<input type="text"/>	صورة شخصية

Figure 4: User registration form

When the button "تسجيل" is clicked, the server will check if the username or email is already taken and alert the user as shown in Figure 5

التسجيل

يرجى قراءة [شروط وضوابط](#) التسجيل جيداً قبل تعبئة الحقول

اسم المستخدم المدخل مسجل لدينا مسبقاً، اذا كنت انت **username\$** [اضغط هنا](#)

<input type="text"/>	اسم المستخدم
<input type="password"/>	كلمة المرور
<input type="password"/>	تأكيد كلمة المرور

Figure 5: Server-Side Validation

If the user who is trying to register is already a member with the same username he can click on "اضغط هنا" to move to login page.

There are some errors that will be shown instantly to users and do not require the server response after "تسجيل" is clicked. Figure 6 shows these errors.

التسجيل

يرجى قراءة [شروط و ضوابط](#) التسجيل جيداً قبل تعبئة الحقول

اسم المستخدم المدخل مسجل لدينا مسبقاً، إذا كنت أنت **username\$** [إضغط هنا](#)

اسم المستخدم

كلمة المرور

تأكيد كلمة المرور

البريد الإلكتروني

مفتاح: ahmed@company.com

تأكيد البريد الإلكتروني

العنوان

تاريخ الميلاد

جوال

يرجى ادخال رقم جوال صحيح رقم جوال صحيح

مفتاح: 0970-599-123456

هاتف

يرجى ادخال رقم هاتف صحيح

مفتاح: 0970-82-812345

صورة شخصية

...Browse

تسجيل

Figure 6: Client-Side Validation

Validation fields are used to check if passwords entered are identical and it is also used to check if the e-mails are identical.

The Registration form also checks for the entered mobile and telephone and view an example to help the user to enter date in the correct form.

4.3 Personal Data Editing

If any member wants to change his personal information he can enter his profile by clicking on his name at the top right of the main page and he will be directed to page shown in Figure 7.

تعديل البيانات (username\$)

كلمة المرور السابقة

كلمة المرور

تأكيد كلمة المرور

البريد الالكتروني

كلمة السر غير متطابقة

ادخل بريد الكتروني صحيح

مثال: ahmed@company.com

العنوان

تاريخ الميلاد

جوال

هاتف

صورة شخصية

يرجى ادخال رقم جوال صحيح

مثال: 0970-599-123456

يرجى ادخال رقم هاتف صحيح

مثال: 0970-82-812345

...Browse

حفظ إلغاء

Figure 7: Personal data editing interface

Member should enter his old password to verify that he owns the current account then he can edit his personal information.

The form is similar to the registration form since same validation was used here. After the member edits his information he should click "حفظ" otherwise his changes will be discarded. In case the user does not want to continue editing his information, he can click on "إلغاء" button to abort the page.

4.4 Search

Figure 8 shows the search form.

In the form member or librarian can enter the type of media he is looking for and the title he is interested in them he can click on "بحث". User can also use advanced search for more options.

Figure 8: Search interface

4.5 Advanced Search

In advanced search user can perform search operation in more specific criteria, as shown in Figure 9, user can search by "العنوان", "المؤلف", "الموضوع" and/or other criteria. And he can select search in "الصحف", "المجلات", "الكتب" and/or "الأقراص المدمجة".

The user can roughly select the language of his search contents and how to display the results by two options which are sorting the results and number of results per page. Finally he can specify the date of the contents he wants to find by determining start and end dates.

4.6 Book View

When a Librarian or a member wants to view some book from search results or directly via some link, the page on Figure 10 shall be shown to him.

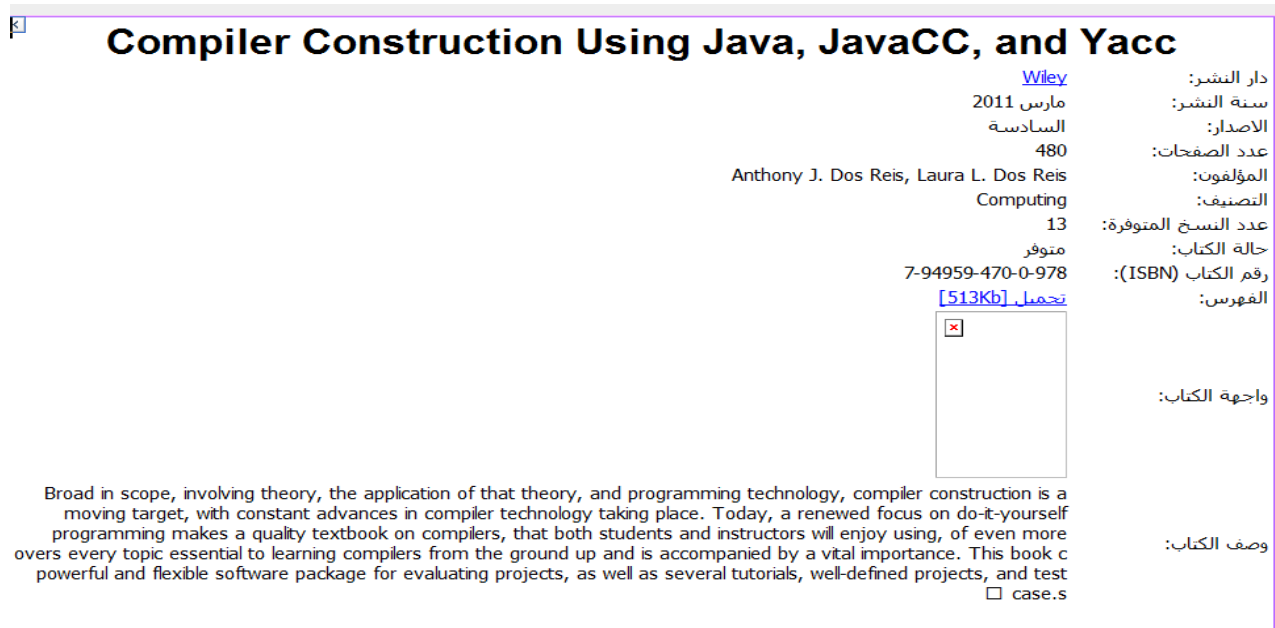


Figure 10: View book interface

As shown in Figure 9, a lot of useful information about the book will be displayed so the user can decide whether this book can be helpful to him or not. This information includes the publication year, publisher, edition, and number of pages, ISBN, table of contents, cover photo and description, from that page the Librarian can edit or delete the book and an active member can borrow it if there is enough number of copies.

4.7 DVD View

Simple information will be shown about the DVDs including its length, type, and available copies. See Figure 11.

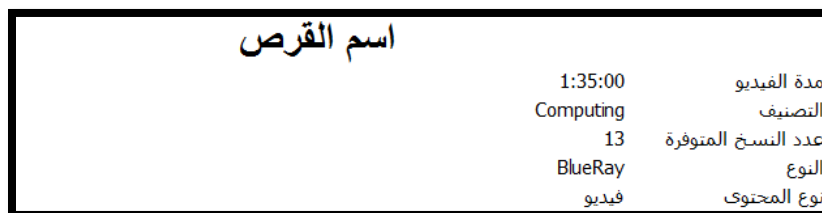


Figure11 : DVD view interface

4.8 Categories view

Figure 12 shows the books categories view with ability to Librarian to add/edit or delete a category from the list; the same view for DVDs, journals and magazines.

تصنيفات الكتب

- المعارف العامة عدد الكتب [324] | تصنيفات فرعية [5]
- الفلسفة عدد الكتب [564] | تصنيفات فرعية [2]
- الديانات عدد الكتب [876] | تصنيفات فرعية [5]
- العلوم الإجتماعية عدد الكتب [986] | تصنيفات فرعية [9]
 - الإحصاء
 - العلوم السياسية
 - الإقتصاد
 - الفنون
 - الإدارة العامة
 - الاجتماعات الإجتماعية
 - التربية والتعليم
 - التجارة والمواصلات والنقل
 - المعاداة والفكر والأيديا
- اللغات عدد الكتب [864] | تصنيفات فرعية [6]
- العلوم البحتة عدد الكتب [2475] | تصنيفات فرعية [9]
- العلوم التطبيقية عدد الكتب [1876] | تصنيفات فرعية [15]
- الفنون الجميلة عدد الكتب [468] | تصنيفات فرعية [25]
- الآداب عدد الكتب [5738] | تصنيفات فرعية [38]
- التاريخ والجغرافيا عدد الكتب [90] | تصنيفات فرعية [2]

Figure 12 : Categories view

4.9 Librarian's Control Panel

This control panel will allow librarians to add, confirm, or remove users; add, edit, or remove a medium. And manage lending options. See Figure 13.

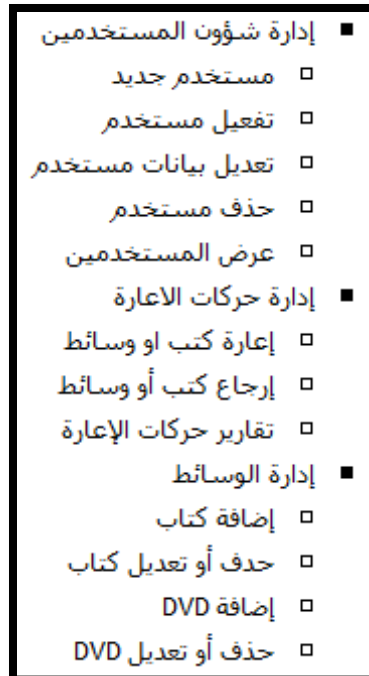


Figure 13 : Librarian's control panel

4.10 Activating a User Account

A librarian must activate the new user account before user can borrow.

Librarian can check user info and edit them as will, before he activates the account. See Figure 14.

Figure 14 : Activating a user account interface

4.11 Adding A book

Librarian can add a book using form shown in Figure 15, all required fields are validated automatically, and results the error messages shown in red.

Figure 15: Adding a book interface

4.12 Library Manager Control Panel

This control panel will allow Library manager to add, edit, view, or remove librarians; as an addition to all what librarian can do. See Figure 16.

Figure 16: Library Manager Control Panel

4.13 Adding a Librarian:

Library manager can add employees using form shown in figure 17, all required fields are validated automatically, and results the error messages shown in red.

اضافة موظف جديد

اسم الموظف

رقم الهوية

الراتب الشهري

كلمة المرور

تأكيد كلمة المرور

البريد الالكتروني

تأكيد البريد الالكتروني

العنوان

تاريخ الميلاد

جوال

هاتف

صورة شخصية

اضافة

Figure17: Adding a Librarian interface

5. Stored Items

In this section we will list all stored information about every entity in WLMS system.

5.1 Member

All important data related to the user will be stored in a database. Table 1 shows this data with its constraints.

Item	Type	Constraints / notes
Name	String	Maximum 40 char , should include first name, middle name and last name.
ID	Number	This is a unique ID in the database.
Email	String	Should be valid e-mail address with the formula xx@yy.zz
Telephone	String	Should not contain any letters and should be in full form with detailed prefix. For example 00790-08-2884665.
Address	String	Accurate address containing city, street and house number.
Birth date	Date	Under the formula : 19-08-1989.
Rank	Number	As the rank goes higher as the user get more privileges. By rank librarians can divide members into groups with different proprieties.
Mobile	String	Should not contain any letters and should be in full form with detailed prefix. For example 00790-599-852840.
Date registered	Date	Under the formula : 19-08-1989.
Membership status	String	Include : {OK, Suspended, Expired, Waiting for validation}
Borrowed books	String	The list of borrowed books and DVDs.
Late warnings	Number	How many times this member was warned about lateness?
User name	String	Registered username.
Password	String	Password.
Maximum books	Number	Maximum number of books that can be borrowed together.
Personal photo	Photo	Personal photo of the member.

Table 1: Attributes saved about member

5.2 Librarian

Table 2 below illustrate the main attributes stored about librarians.

Item	Type	Constraints / notes
Name	String	Maximum 40 char , should include first name, middle name and last name.
ID	Number	This is a unique ID in the database.
Email	String	Should be valid e-mail address with the formula xx@yy.zz
Telephone	String	Should not contain any letters and should be in full form with detailed prefix. For example 00790-08-2884665.
Address	String	Accurate address containing city, street and house number.
Birth date	Date	Under the formula : 19-08-1989.
Mobile	String	Should not contain any letters and should be in full form with detailed prefix. For example 00790-599-852840.
Date hired	Date	Under the formula : 19-08-1989.
Hours of work	number	Indicates how many hours this librarian works per week.
Salary	money	Salary per month for a librarian.
User name	String	Registered username.
Password	String	Password.
Personal photo	Photo	Personal photo of the member.
ID	String	The identity number of the librarian.

Table 2: Attributes saved about librarians

5.3 Library Items

Table 3 includes common attributes that will be stored for every library item (book, DVD etc.)

Item	Type	Constraints / notes
Type	String	book, magazine, lecture, notes, DVD.
Title	String	Title of the item in clear words.
Language	2 chars	First two letters of the book language for example : AR, EN.

Table 3: Attributes saved about library Items

5.4 Books, DVDs and Magazines

Table 4 below clarifies the major properties that will be stored for every book in WLMS.

Item	Type	Constraints / notes
ISBN	String	A unique numeric commercial book identifier.
Authors	String	Names of authors.
Edition	Number	No letters are allowed.
Publisher	String	Publisher name.
Cover page photo	Photo	Must be clear and colored.
Field	String	Entertainment, science etc.
Number of copies	Number	Copies available for the same book.
Year	Date	Date in this format 1999.
Number of pages	Number	No letters are allowed.
Status	String	Available, lost, damaged.
Chapters names	String	Main chapter names.

Table 4: Attributes saved about books

Table 5 illustrates the attributes saved about DVD's

Item	Type	Constraints / notes
Duration	Time	Minuets.
Number of copies	Number	Copies available for the same DVD.
Content type	String	Indicates type of files burned on this disk.
Type	String	CD / DVD / Blue Ray

Table 5: Attributes saved about DVD's

Table 6 illustrates the attributes saved about Magazine

Item	Type	Constraints / notes
Website	String	URL to the main webpage of the magazine.
Number of copies	Number	Copies available.
Date	Date	Date for this magazine.

Table 6: Attributes saved about Magazine