A PROJECT PRESENTATION

FOR THE SUBJECT OF

030010611 & DSE10-PROJECT

ON

Smart Library Shelf Management System(Using RFID)

PRESENTED ON : 15/4/2020

BY:

201703100110072 : AMIT H. VALLECHA

201703100110074 :AKHILESH K. SOLANKI

201703100110080 :MRUGESH R. MODI

201703100110092 :MAAZ M. JINWALA

Introduction

➢ Library is an important part of the academic sector.

➢ Mainly Library Management System includes-

◦ Issuing books and returning books.
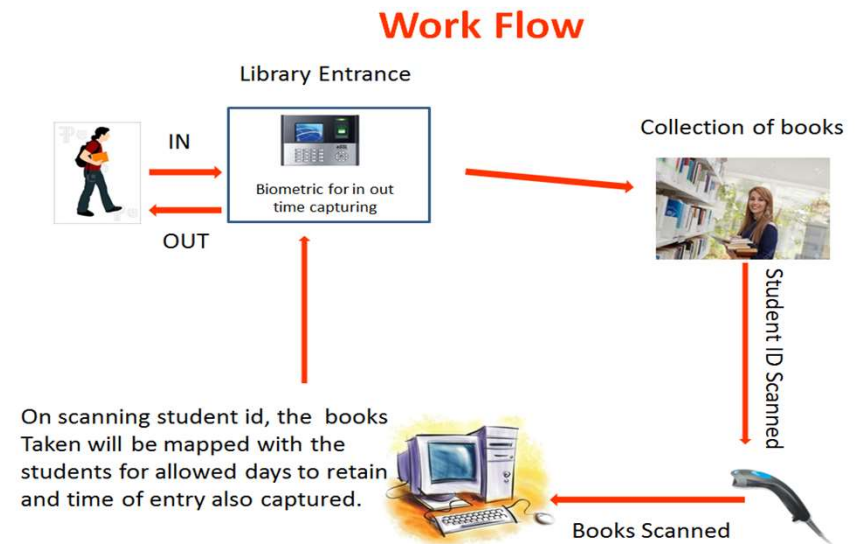
◦ Managing users and book information.

Work Flow

Library Entrance

IN

Biometric for in out
time capturing

OUT

Collection of books

Student ID Scanned

On scanning student id, the books
Taken will be mapped with the
students for allowed days to retain
and time of entry also captured.

Books Scanned

Figure 1:Workflow of Library

Introduction(cont..)

➢ The efficiency of a library lies on-

◦ Way of arranging the books.

◦ Ease of access to the books.

➢Physically a library management process is hectic due to

◦Demand management.

◦Issue and return during peak seasons

◦Books arrangement on the shelves.

Proposed System : Definition

➢The Library Shelf Management System is developed to maintain the reliability of the books on the shelves and to get easy access to the desired books as well as to get the location of the misplaced book.

Proposed System : Objective

➢ The main objective is to manage location of book.

  ◦ Manage book slot and shelf details.

➢ To reduce the man power.

  ◦ Save the physical efforts of the staff.

➢ To save the time of the reader.

  ◦ Get location of book as per search query.

Proposed System : Scope

➢The scope of the proposed system is limited to configuring RFIDs on books and shelves and reading information from them.

➢Provide search facilities on different criteria such as author-wise, book title-wise, publisher-wise, ISBN-wise.

➢The scope of the proposed system is limited to academic institutions only.

User Characteristics & their Functionalities

Administrator	Login	
	Generate RFID	
	Managing Shelf Information	Add
		Update
		Delete
	Generating Reports	Total Generated RFID tags, Total shelves configured on each floor, Audit logs of every action perform by any user.

User Characteristics & their Functionalities

Librarian	Login	
	Managing Book Information	Add
		Update
		Delete
	Alert for Misplaced books	Librarians shall be able to get alert for the misplaced books every 30 minutes.
	Generating Reports	Frequently searched book titles, Statistical Reports of registered students, faculty and total configured books.

User Characteristics & their Functionalities

Members		
	Login & Registration	
	Search Book	ISBN
		Book Title
		Author
		Keyword
	Graphical Representation of Location	provide the graphical interface to display the actual location of the shelf and the books.

Tools & Technology

Hardware

- Arduino Uno R3
- Node MCU
- Bread-Board
- Jumpers
- RFID Reader & tags

Software

- NetBeans 8.2 IDE with JDK version 10
- Glassfish Server version 4.1.1 open-source application server
- JavaScript 5.1
- MYSQL 8.0
- Firebase cloud
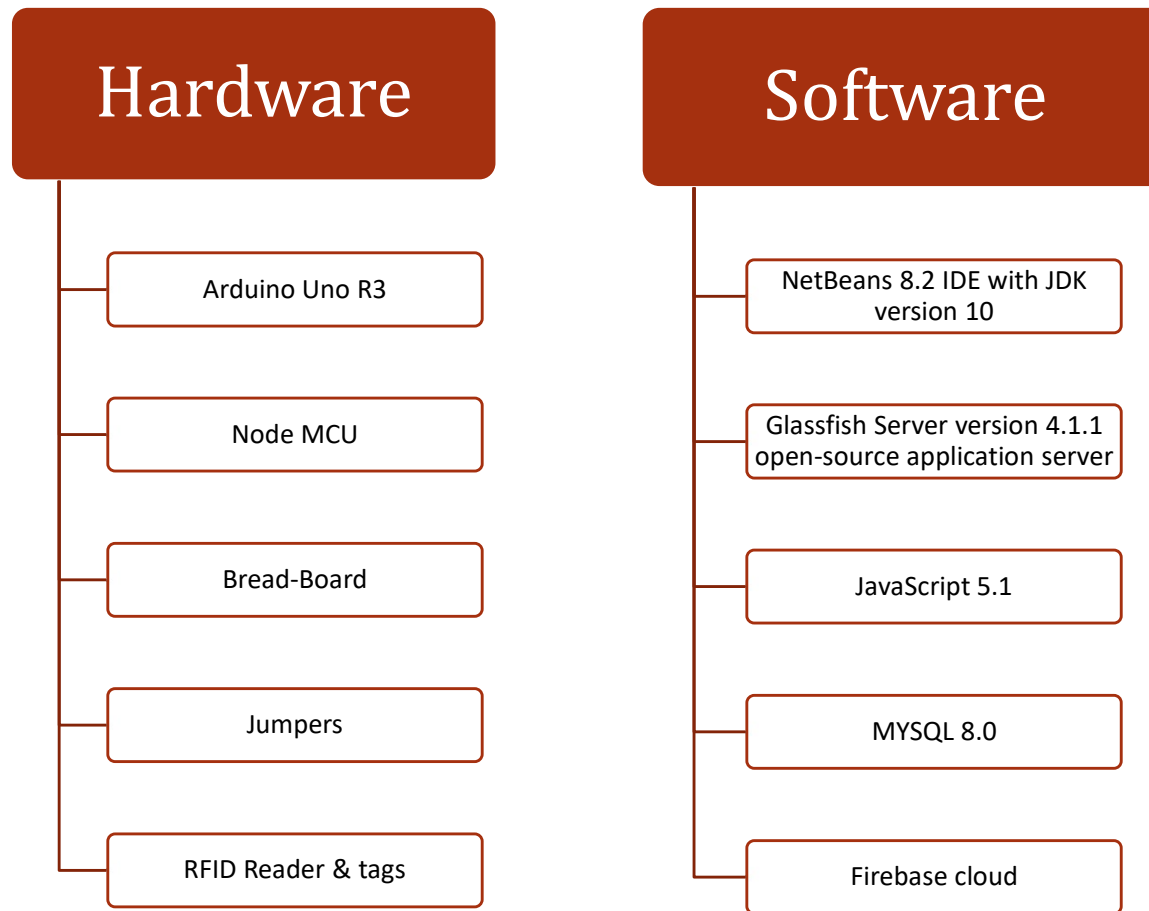
System Design: Data Dictionary with Constraints

Table Name: tbl_nativeuserinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
Username	VARCHAR	256	Primary Key, Not Null	Admin_@12	This represent unique username of the admin	
password	VARCHAR	20			This represent the password.	
u_role	VARCHAR	13		Admin, Librarian	This represent role assigned to particular user	

Continue..

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
email_id	VARCHAR	256		xyz@gmail.com	This represent the email id of the user which is further used for the password verification.	
last_login	TIMESTAMP			2020-4-15 9:23:23	This represent the last login attempt of the user	
last_logout	TIMESTAMP			2020-4-15 10:23:23	This represent the last logout attempt of the user	
Status	BIT	1 BIT		0,1	This represent the enable & disable status of the user	

Table 1 tbl_nativeuserinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_studentinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
enrollment_no	CHAR	15	Primary Key, Not Null	201703100110080	This represents the unique identification number of Students.	
course_id	CHAR	4	Not null	C101, C102	This represents in which course student is enroll.	tbl_coursedetails_slsms
student_name	VARCHAR	256	Not Null	Akhilesh K. Solanki	This represents name of student.	

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
student_birthdate	DATE	3	Not Null	04/08/1999	This represents the birthdate of the Student.	
student_password	VARCHAR	10	Not Null	abcd@072	This represents the password of student. The length of the password must be a minimum 8 character and a maximum of 10 characters. The password must contain a combination of alphanumeric and at least one special character.	

Table 2 tbl_studentinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_studentregistered_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
enrollment_no	CHAR	15	Primary Key, Not Null, Foreign Key	201703100110080	This represents the unique identification number of Students.	tbl_studentinfo_master_slsms
student_email	VARCHAR	256		mrugeshmodi.mm@gmail.com	This represents the email address of Students.	
student_phone_number	CHAR	14		+919099075613	This represents the Contact number of Student	

Table 3 tbl_studentregistered_slsms

System Design: Data Dictionary with Constraints

Table Name: -tbl_facultyinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
faculty_username	VARCHAR	20	Primary Key, Not Null	abc@utc.ac.in	This represents the unique identification of Faculty.	
course_id	CHAR	4	Not null	C101.C102	This represents in which course student is enroll.	tbl_coursedetails_slsms
faculty_name	VARCHAR	256	Not Null	Jigenesh Modi	This represents the name of the Student.	

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
faculty_birthdate	DATE	3	Not Null	20/12/1986	This represents the birthdate of Faculty	
faculty_password	VARCHAR	20	Not Null	abcd@123	This represents the password of Faculty. The length of the password must be a minimum 8 character and a maximum of 10 characters. The password must contain a combination of alphanumeric and at least one special character.	

Table 4 tbl_facultyinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_facultyregistered_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
faculty_username	VARCHAR	20	Primary Key, Not Null	abc@utc.ac.in	This represents the unique identification of Faculty.	tbl_facultyinfo_master_slsms
faculty_email	VARCHAR	256		abc@gmail.com	This represents email of Faculty.	
faculty_phone_number	CHAR	14		+919099075613	This represents the Contact No number of the Faculty.	

Table 5 tbl_facultyregistered_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_shelfmainsection_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
main_section_id	TINYINT	1	Primary Key, Not Null	101,102	This represent the unique identification of main book category.	
main_section_type	VARCHAR	256		Fiction, Non-Fiction	This represents the type of main book category.	

Table 6 tbl_shelfmainsection_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_shelfsubsection_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
sub_section_id	TINYINT	1	Primary Key, Not Null	1, 2, 3	This represents the unique identification of sub book category.	
main_section_id	TINYINT	1	Primary Key, Foreign Key, Not Null	101,102	This represents the type of main book category.	tbl_shelfmainsection_master_slsms
sub_section_type	VARCHAR	256		Programming, Biography	This represents the type of sub section category.	

Table 7 tbl_shelfsubsection_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_floorinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
floor_id	TINYINT	1	Primary Key, Not Null	1,2	This represents the unique identification of Floor.	
max_allowed_shelves	TINYINT	1		1,9,10	This represents the maximum number of allowed shelves in particular floor.	
main_section_id	TINYINT	1	Foreign Key, Not Null, on delete cascade, On update cascade		This represents the section of the floor	tbl_shelfmainsection_master_slsms

Table 8 tbl_floorinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: tbl_categorywise_arrangement_onfloor_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
floor_id	TINYINT	1	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	1,2	This represents the unique identification of floor.	tbl_floorinfo_master_slsms
sub_section_id	TINYINT	1	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	1,2,3	This represents the identification of the sub section.	tbl_shelfsubsection_slsms
No_of_allowed_shelves	TINYINT	1		1,2,5,8,9	This represent number of shelves allowed on particular shelf.	

Table 9 tbl_categorywise_arrangement_onfloor_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_shelfinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
shelf_id	CHAR	4	Primary Key, Not Null	S101, S102	This represents the unique identification of shelf.	
no_of_tiers	TINYINT	1	Not Null	1, 2, 3, 4	This represents the available tiers on shelf.	
floor_id	TINYINT	1	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	1,2,3	This represent ID of shelf on which shelf is to be configured	tbl_floorinfo_master_slsms

Continue..

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
sub_section_id	TINYINT	1	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	1,2,3	This represent the sub section in which shelf is to be placed	tbl_shelfsubsectio n_slsms

Table 10 tbl_shelfinfo_slsms

System Design: Data Dictionary with Constraints

Table Name: -tbl_shelftierconfiguration_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
shelf_id	CHAR	4	Primary Key, Foreign Key, Not Null	S101, S102	This represent the unique identification of the shelf.	tbl_shelfinfo_master_slsms
shelf_tier_id	VARCHAR	6	Primary Key, Not Null	S101_1, S102_1	This represents the identification of individual tier on shelf.	
book_lib_id	VARCHAR	4		B1	This represent the identification of book in the library	

Continue…

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
max_allowed_book	TINYINT	1		10,20,30	This represents number of books allowed to be placed on each tier	
present_book	TINYINT	1		28,30	This represent the actual no of book present on that tier	
start_bookid_range	VARCHAR	4		B1001,B2001	This represent the start book id of the book	

Continue...

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
end_bookid_range	VARCHAR	4		B1099,B2099	This represent the last book id present on this tier	
rfid_reader_Uid	VARCHAR	10		Reader_1	This represent which reader is assigned to the tier.	

Table 11 tbl_shelftierconfiguration_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_instituteinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
institute_id	CHAR	3	Primary Key, Not Null	I01, I02	This represents the unique identification number of institutes.	
institute_name	VARCHAR	256	Not null	B.V. Patel Institue of BMC & I.T.	This represents the name of the institutes.	

Table 12 tbl_instituteinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_coursedetails_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
course_id	CHAR	4	Primary Key, Not Null	C101, C102	This represents the unique identification number of courses.	
institute_id	CHAR	3	Foreign Key, Not null	I01, I02	This represents the unique identification number of institutes.	tbl_instituteinfo_master_slsms
course_name	VARCHAR	256	Not null	Bachelor of Computer Application	This represents the Course name	

Table 13 tbl_coursedetails_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_rfid_reader_configuration_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
rfid_reader_uid	VARCHAR	10	Primary Key, Not Null	Reader_1	This represents the unique Id of the reader.	
universal_product_ code	BIGINT	20		1234567890	This represents the Universal Product Code of the RFID Reader.	

Table 14 tbl_rfid_reader_configuration_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_bookinfo_master_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_lib_id	VARCHAR	4	Primary Key, Not Null	B1, B2	This represent the unique identification of Book Category.	
book_sub_section_id	VARCHAR	256	Primary Key, Foreign Key, Not Null	1,2,3	This represents the type of book category.	tbl_shelfsubsection_slsms
book_title	VARCHAR	256		Java the Complete References	This represents the title of book.	

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_author	VARCHAR	256		Herbert Schildt	This represents the author of the book	
book_publication	VARCHAR	256		McGraw Hill Education; Tenth edition.	This represents publication of the book.	
book_ISBN_10	CHAR	10		9789387432291	This represents International standard book number category-10 of the book	
book_ISBN_13	CHAR	13		9789387432291	This represents International standard book number category-13 of the book	

Continue..

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_language	VARCHAR	10		Hindi, English	This represents language of the book.	
book_paperback	SMALLINT	2		1296	This represents total number of pages available in the book.	

Table 15 tbl_bookinfo_master_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_bookconfiguration_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_lib_id	VARCHAR	4	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	B101, B102	This represents the unique identification of book in library.	tbl_bookinfo_master_slsms
Book_id	VARCHAR	6	Primary Key, Not Null	B101_1	This represents the individual Identification of the book in library.	

Table 16 tbl_bookconfiguration_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_extraallbookslots_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_lib_id	VARCHAR	4	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	B101, B102	This represents the unique identification of book in library.	tbl_bookinfo_master_slsms
book_qty	TINYINT	1		1,2,3,4	This represents the number of books placed on shelf	
start_bookid_range	VARCHAR	4		B1001	This represent the start book id of the book.	

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
end_bookid_range	VARCHAR	4		B199	This represent the end book id of the book.	

Table 17 tbl_extraallbookslots_slsms

System Design: Data Dictionary with Constraints

Table Name: - tbl_notassignedbookslots_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
book_lib_id	VARCHAR	4	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	B101, B102	This represents the unique identification of book in library.	tbl_bookinfo_master_slsms
book_qty	TINYINT	1		1,2,3,4	This represents the number of books placed on shelf	
start_bookid_range	VARCHAR	4		B1001	This represent the start book id of the book.	

Continue..

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
end_bookid_range	VARCHAR	4		B1099	This represent the end book id of the book.	

Table 18 tbl_notassignedbookslots_slsms

System Design: Data Dictionary with Constraints

Table Name: tbl_allfloor_misplacedbookdata_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
Sr_no	INT	11	Primary Key, Not Null	1,2,3,4,5	This represent serial number of the records	
floor_id	TINYINT	4	Foreign Key ,On Update Cascade , On Delete Cascade	1,2,3,4	This represent the floor number at which the book is misplaced.	tbl_floorinfo_master_slsms
shelf_id	VARCHAR	4	Primary Key	S101,S102,S103	This represent the shelf id of the shelf on a floor.	

System Design: Data Dictionary with Constraints

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
shelf_tier_id	VARCHAR	6	Primary Key	S101_1,S101_2,S101_3	This represent the id of the particular tier on the shelf	
bookid	VARCHAR	4	Foreign Key,On Update Cascade,On Delete Cascade	B101,B102,B103	This represent the id of the book which is misplace on the shelf	tbl_bookinfo_master_slsms
Timestamp	Timestamp			10-4-2020 12:45:20	This represent the timestamp of the record	

Table 19 tbl_allfloor_misplacedbookdata_slsms

System Design: Data Dictionary with Constraints

Table Name: tbl_configuredbookreport_slsms

Field Name	Data Type	Size (bytes)	Constraints	Valid input values	Description of the field	Linkage with other tables
Bookid	VARCHAR	4	Foreign Key, Not Null, On Delete Cascade, On Update Cascade	B101,B102,B103	This represents the unique identification of book.	tbl_bookinfo_master_slsms
Timestamp	TIMESTAMP			10-4-2020 10:30 AM	This represents the timestamp of the record.	
flag	TINYINT	1		1,0	This represents the status that weather the book is configure or not.	

Table 20 tbl_configuredbookreport_slsms

Coding Specification

Types	Rules	Example
Local Variable	Starts with small l then underscore then relative name in camel case	int l_name, int l_studentName
Static Variable	All the character should be in capital	int MAXVALUE
Instance Variable	Camel case	int studentName
Session Variable	Starts with small s then underscore then relative name in camel case	s_studentName
Cookie Variable	Starts with small c then underscore then relative name in camel case	c_studentName
Form name type	If input type is text then txt underscore then camel case name	txt_studentName
	If input type is radio button then rd underscore then camel case name	rd_studentName
	If input type is dropdown then drp underscore then camel case name	drp_studentName

Continue..

Coding Specification

Types	Rules	Example
Form name type	If input type is checkbox then chk underscore then camel case name	chk_studentName
	If input type is submit then btnsubmit underscore then camel case name	btnsubmit_login
	If input type is button then btn underscore then camel case name	btn_studentRegistration
Class Name	first letter capital and should be in 'StudlyCaps' format	Class StudentResult
Method of Class	Methods of the class must be in 'camelCase'	getBackground()
Database Tables	If the table is master table then first word is tbl then underscore then information of table followed by underscore master followed by underscore then system name	tbl_bookinformation_master_slsms
	If the table is child table then first word is tbl then underscore then information of table followed by system name	tbl_bookrfid_slsms

Project Structure
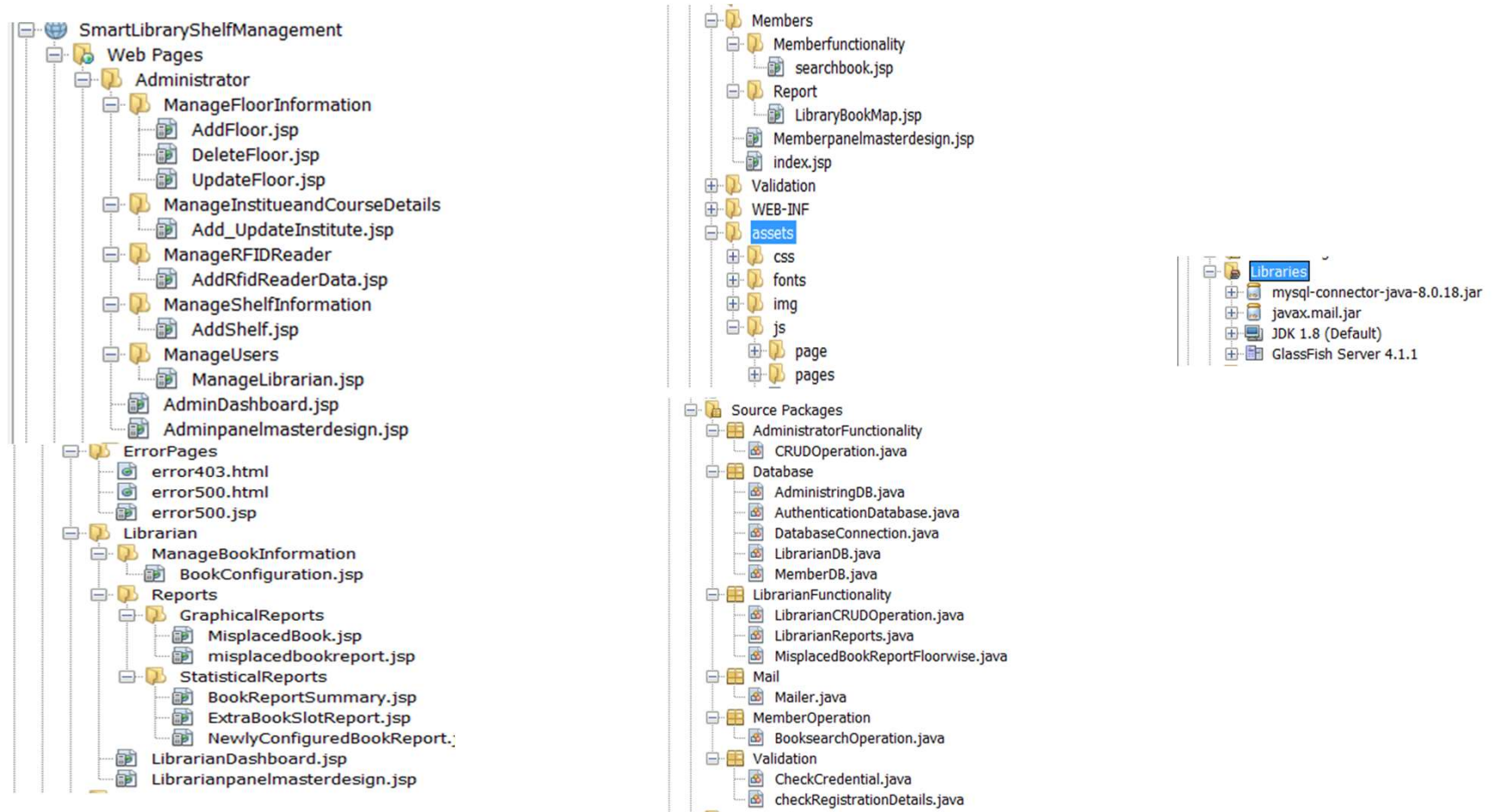
Screenshot :1-All members Login page
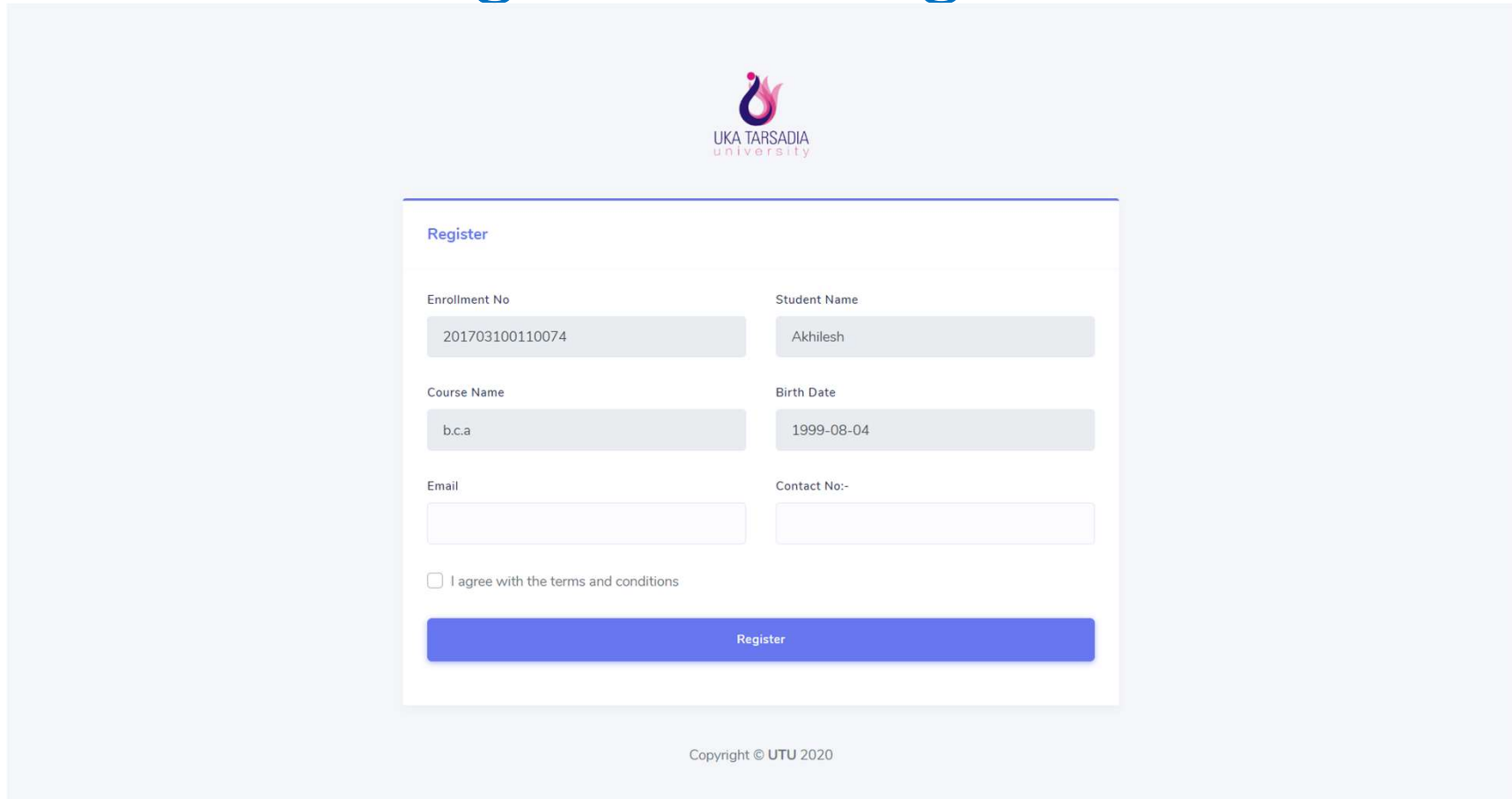
Screenshot : 2-Registration Page for Members

Screenshot 3:Adminstator Dashboard
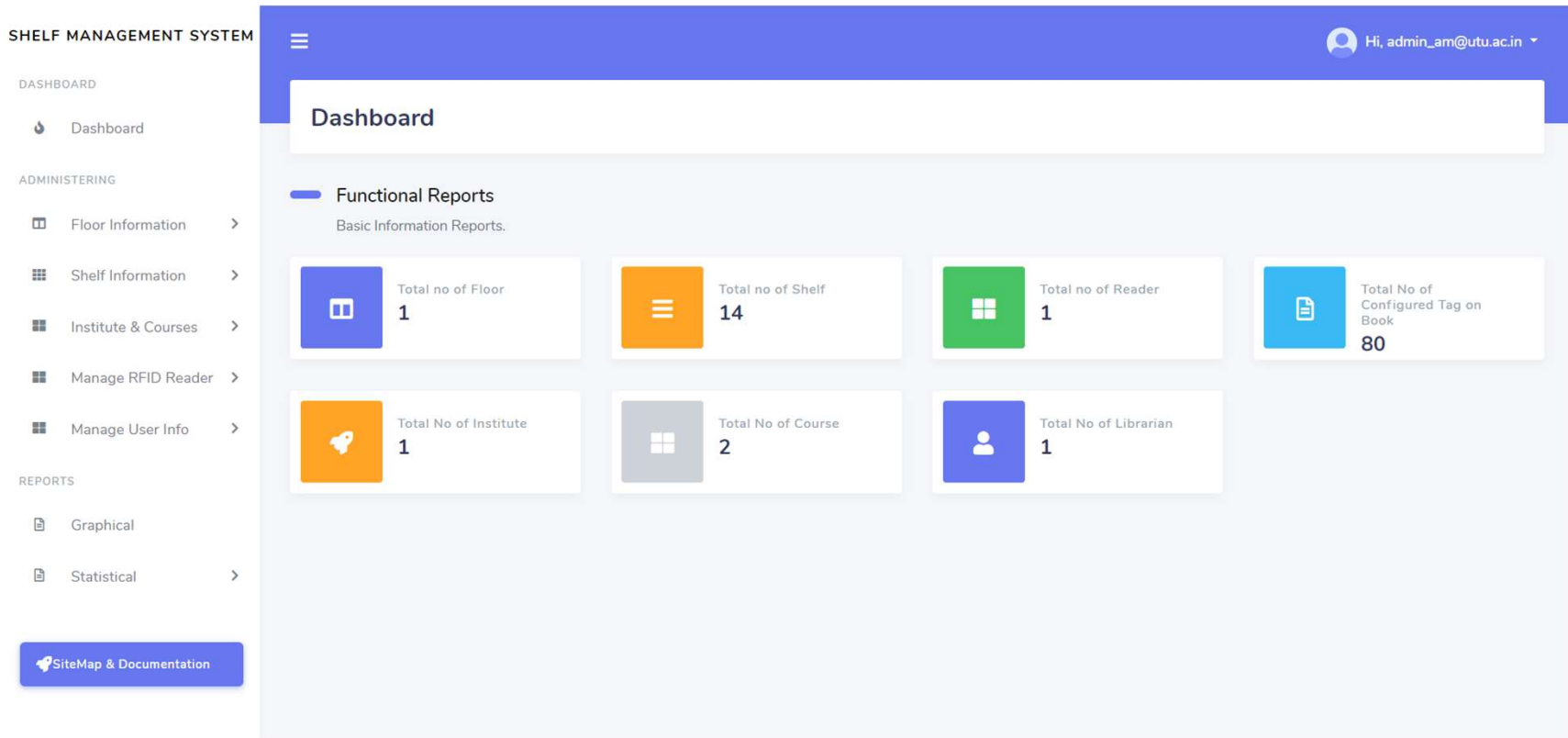
Screenshot 4:-Add Floor(Admin Function)

Screenshot 5:-Add Floor Demo(Admin Function)

Screenshot 6:-Update Floor(Admin Function)

Screenshot 7:-Update Floor Swap Shelf(Admin)

Screenshot 8:-Update Floor Delete Shelf(Admin)

Screenshot 9:-Delete Floor(Admin Function)

Screenshot 10:-Add Tier on shelf(Admin Function)

Screenshot 11:-Manage Institute & Course(Admin)

Screenshot 12:Manage Institute Add Course (Admin)

Screenshot 13:Add Reader (Admin Function)

Screenshot 14:Manage Librarian(Admin Function)

Screenshot 15:Manage Librarian(Add Librarian)

Screenshot 16:Manage Librarian Authentication
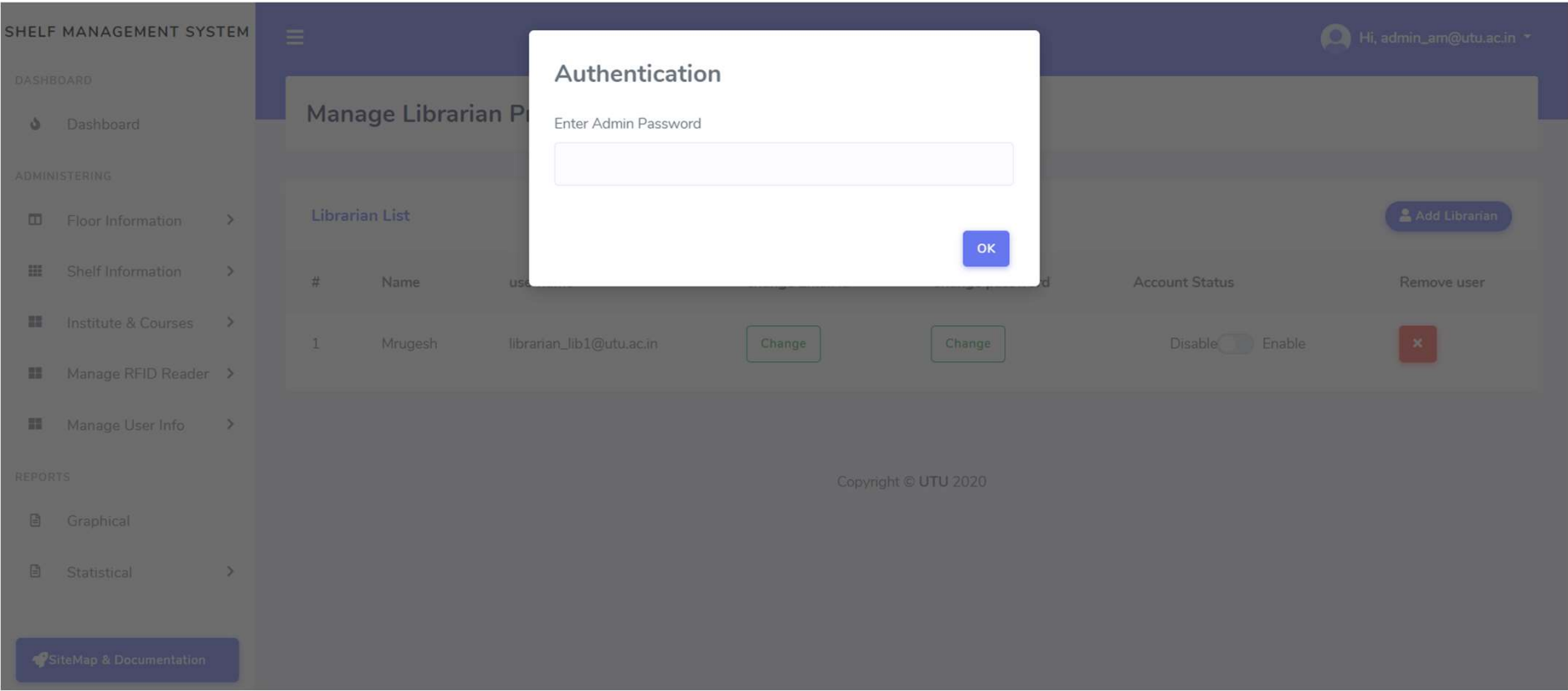
Screenshot 17:Librarian Dashboard
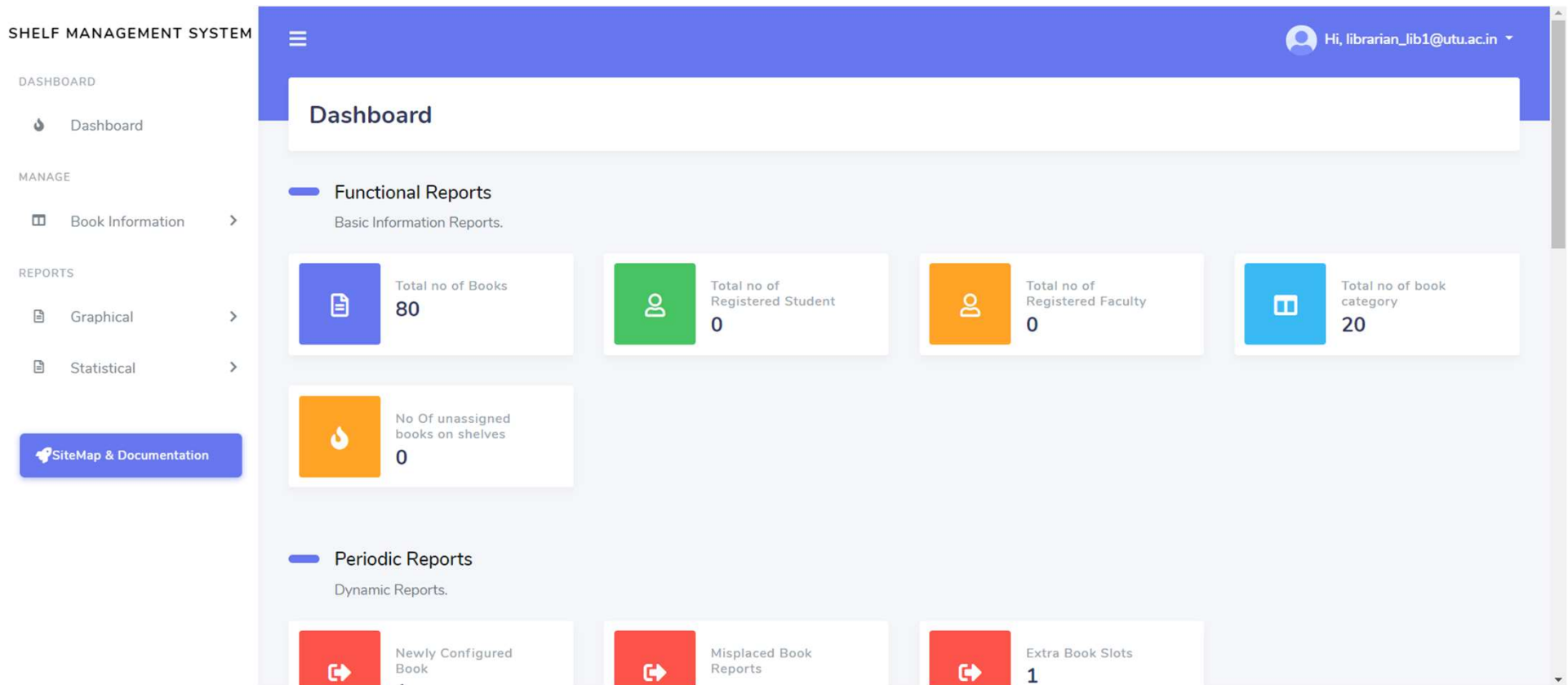
Screenshot 18:Book Configuration (Librarian)

Screenshot: 19 Logout Functionality

Sucessfully Logut

Your Last login time is:- Tue Apr 14 2020 17:37:43 GMT+0530 (India Standard Time)

Back to Home

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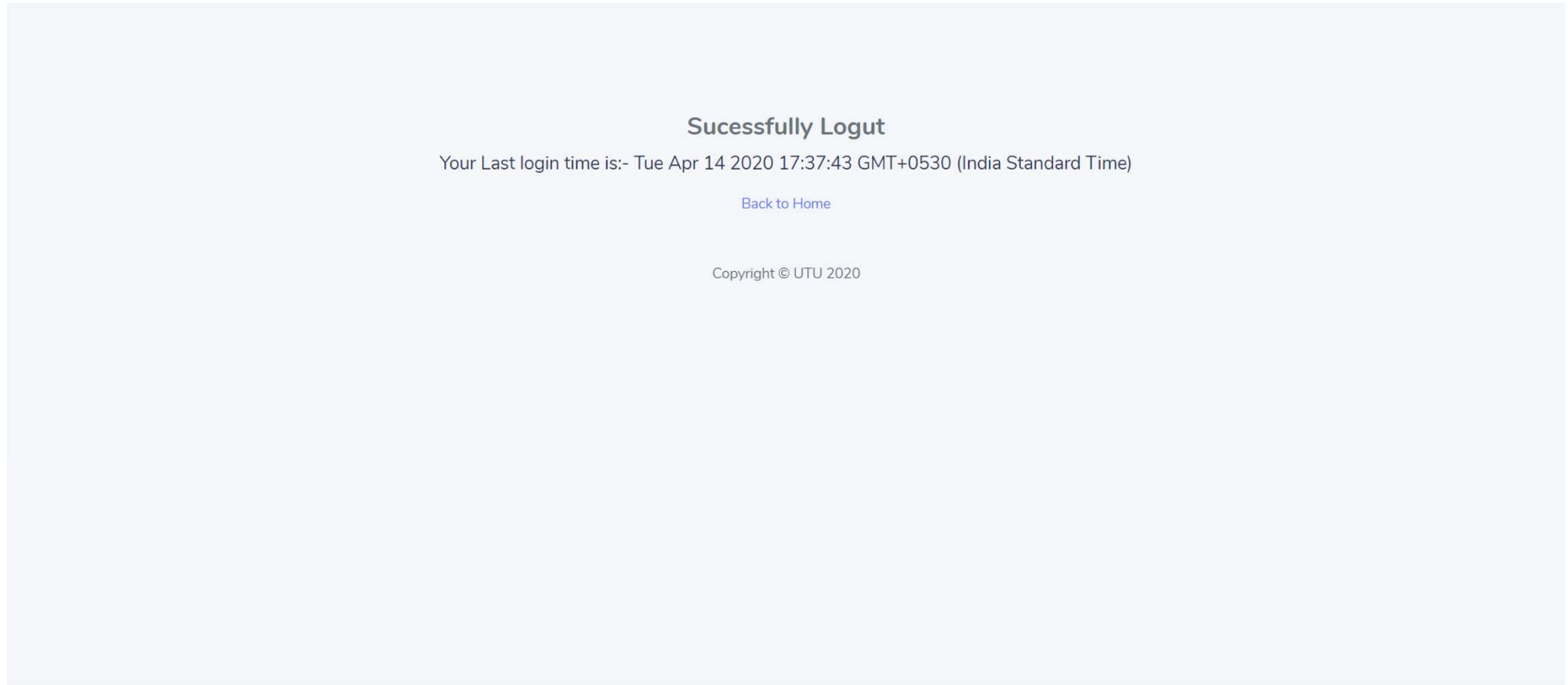
Demonstration Video:-Hardware
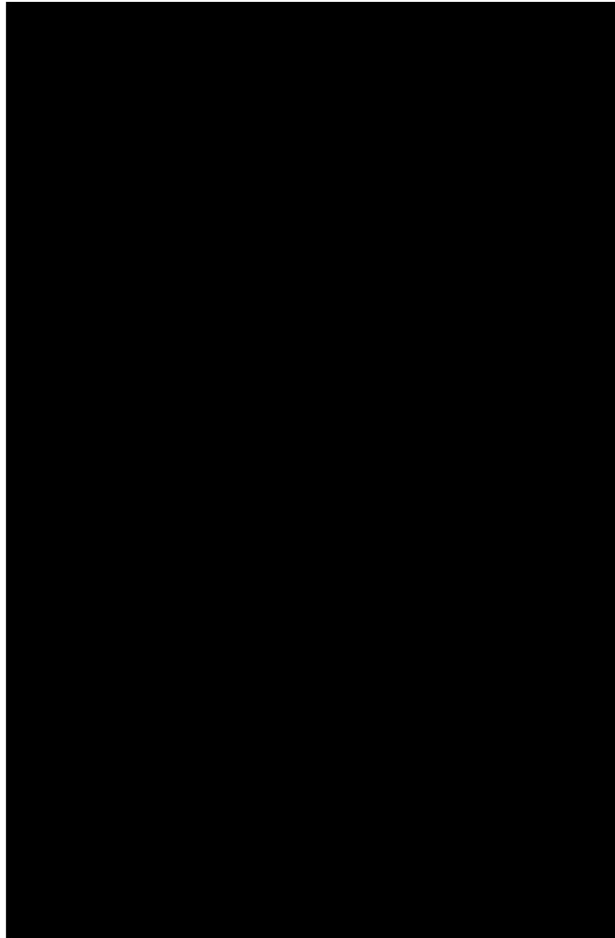
Report 1:Functional Reports(Admin Dashboard)
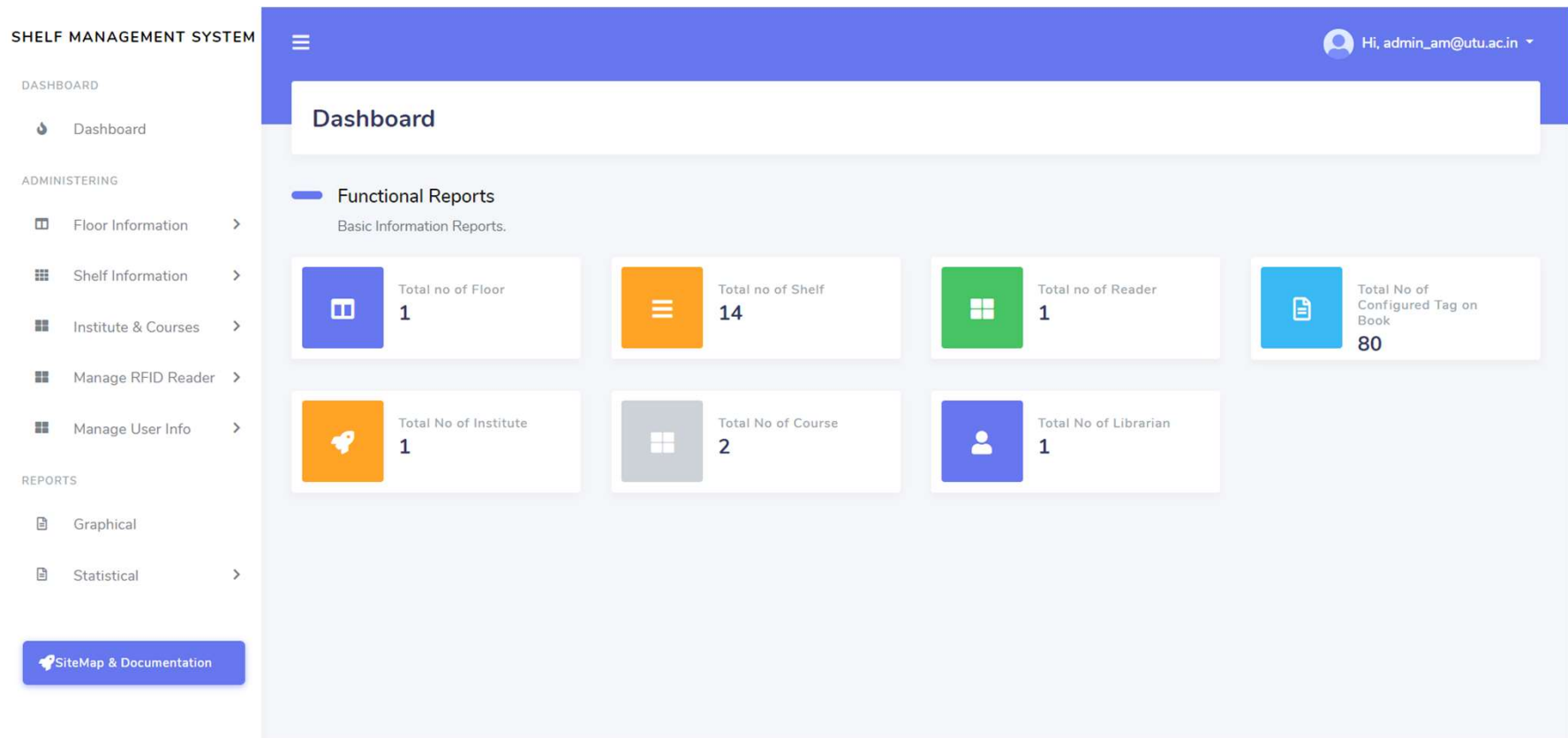
Report 2:Functional report(Librarian Dashboard)
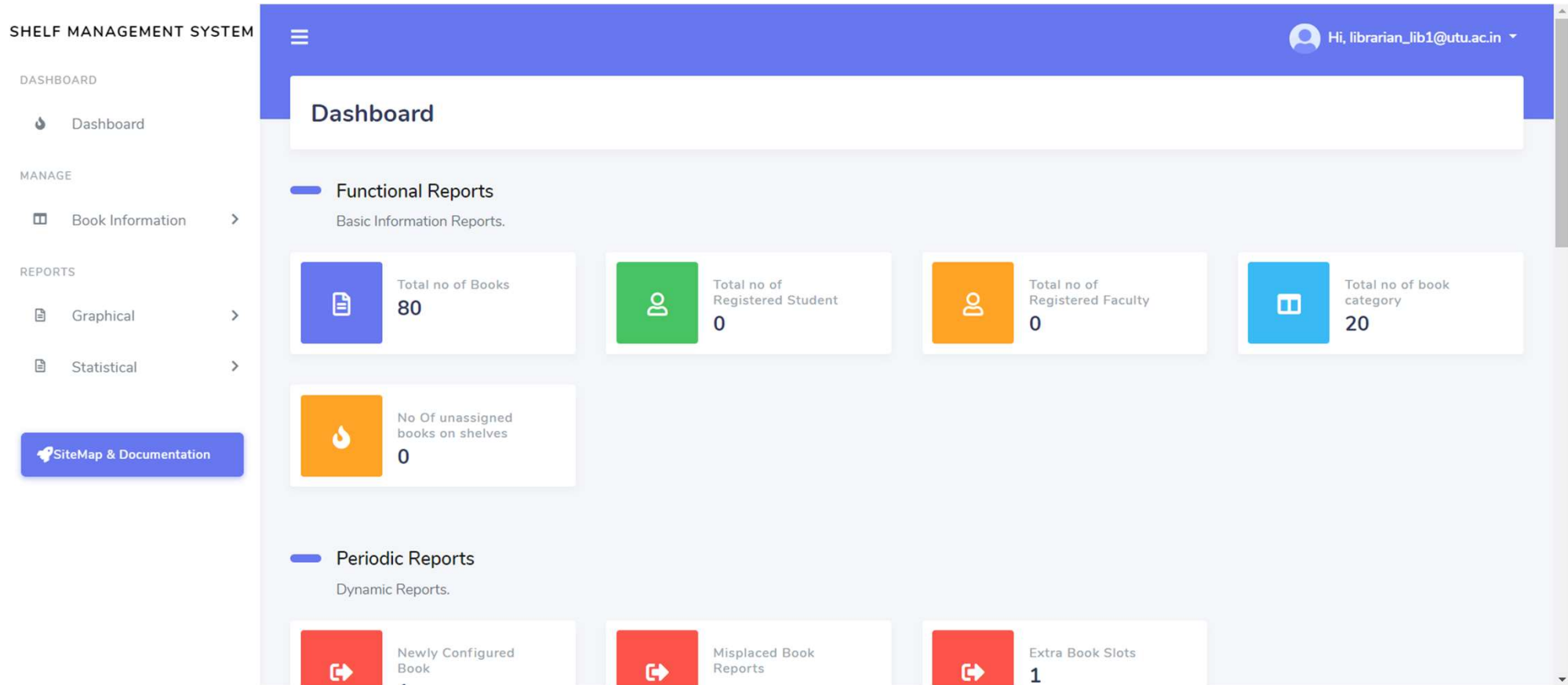
Report 3:Total No of Books Report(Librarian)

Report 4:Book Information(Librarian)

Report 5:Extra Book Slot (Librarian)

Report 6:Misplaced Book Report(Librarian)
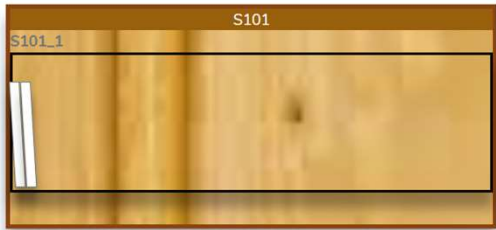
Report 7:Search Book report(Member)

Report 8:Search Book Map Report
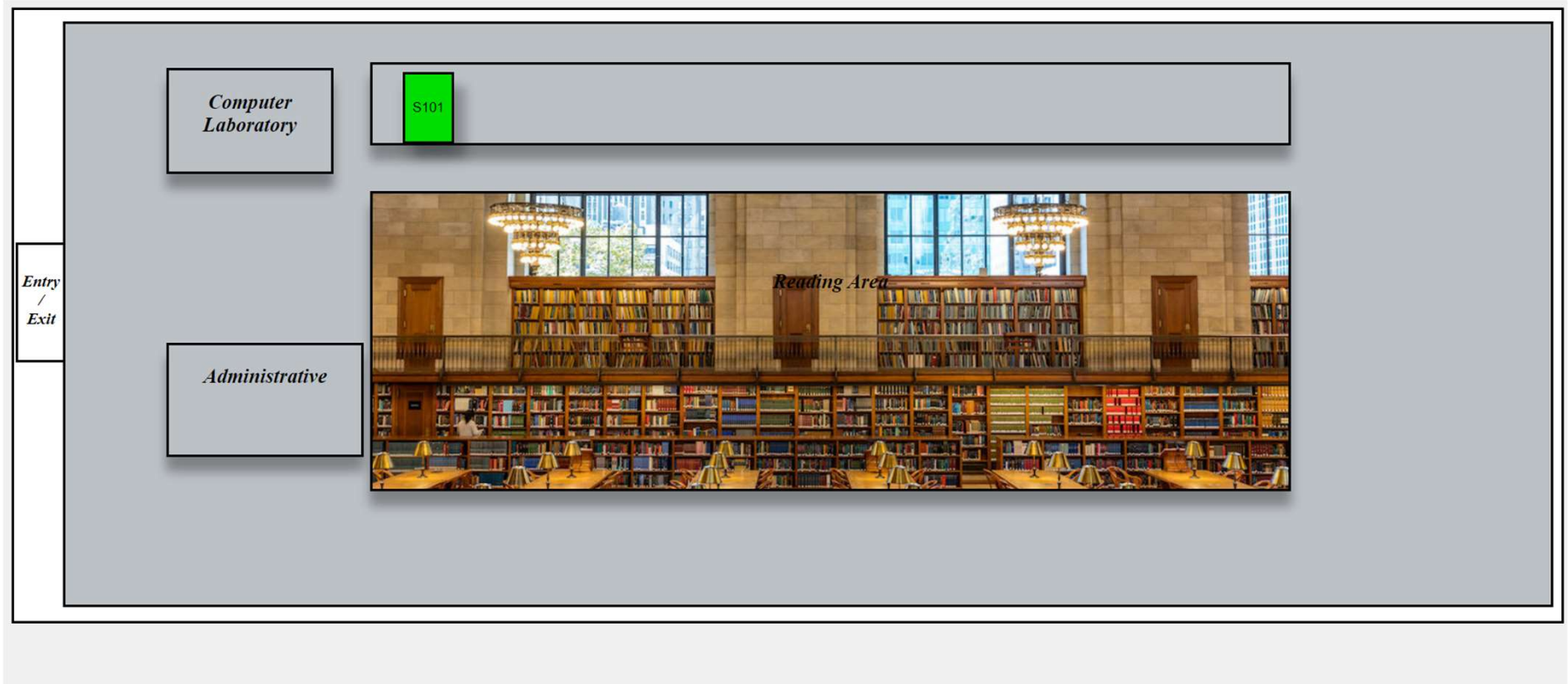
Report 9:Search Book map with Shelf

Web References

➢ https://javascript.info/

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➢ https://blog.arduino.cc/

➢ https://firebase.google.com/docs/web/setup

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➢ https://docs.oracle.com/javaee/5/tutorial/doc/bnagx.html

Thank You.!