

(SoW) The Dream

Library Management

System

PURPOSE OF PROJECT:

The purpose of this model's design and implementation is to create a library system model that is capable of withstanding the growing demands of Dream College. Our new design of the existing system is focused on improving the experience of both the students and the staff of the institution.

We understand the growing need for enrollments of Dream College as well as support the welfare of education. In addition, our design is adaptable and expandable to fulfill the College's plans of further expanding to new departments and hiring additional staff. The tasks such as software services and decision making would be simulated through our consultancy, relieving the workload from Dream College to allow better utilization of manpower and money. As Dream College becomes more recognized, it is important that this new system is in line with current technology to attract more people to study or work at this college and maintain its ranking in the world.

OBJECTIVES:

Our system hopes to achieve full implementation with the upgrade and completion of the library management system.

This library management system will represent the following facets:

- Build a system that can access, record, store and retrieve all books and resources in the library.
- Maintain a database of its users (students, members and administration staff) for a secured & reliable access.
- Connect the centralized registration system to the library system for authentication purposes.
- Develop an easy and user-friendly interface to help students search for books according to Title, Author, Subject, ISBN or Barcode.
- Keep track of books and other library resources that are checked-in and checked-out automatically.

- Generate periodic (daily, weekly & monthly) reports about charges and fines for students.
- Train the policies, dos and don'ts and conduct a workshop for all the members of the library (including students).

SCOPE OF WORK:

The design and implementation of a proposed library system that can perform on the basis of design specifications and its efficiency in a real time application. Keeping the usefulness and practicality in mind, we've cleared certain limitations of our model as follows:

- A step-by-step compare and contrast subsystem for evaluating books or any price information, bidding testimonials, retailer details, student difficulty level, etc. won't be available anywhere.
- Any info that doesn't come across library systems will be rooted out.
- Our system is capable of supporting 8000 books/resources and we will not anticipate the chances of failure on numbers higher than that.
- Any students that don't register through the central registration system won't be members of the library without student IDs. Similarly, any faculty of departments not registered in the system will have to show authorization to the admin to be entered manually into the system.
- A staff member except the library admin won't have an idea about which books are available without logging in with their credentials and won't be having any Admin privileges.
- Members are required to be self aware of the library system and attend the workshop to gain knowledge of the computations included.
- Any future modifications suggested by Dream College will manifest into additional equipment costs, labor costs, etc.

An indispensable administration of tools and resources that would be required during the setup of this new system:

- One-time installation of 5 newly functioning computers in the computer lab with Windows 10 OEMs for students to access their course materials and books availability.
- Microsoft Office 2019 Professional Plus installed on 1 PC which will be accessed by only the Librarian under admin ID/ password.
- Professional software such as Proprietary Bookey™ on 5 PCs to have the efficiency/ accuracy of searching available to students, admin, members alike.
- Subsequently, providing resources available to library admin for generating specialized reports for overdue books, availability overview, etc.
- Self checkouts are possible through this model. Upon completion, a member should be aware of the availability of their books in hard/ soft copies. Soft copies can be downloaded without having to borrow from the front desk.

SYSTEM REQUIREMENTS:

A. Hardware Requirements

- Computer Unit
- Barcode Scanner
- Printer
- Tattle-tape Detection gate
- Tattle tape

B. Software Requirements

- Microsoft Windows 10
- Microsoft Office 2019 Professional Plus
- Microsoft SQL Server
- Java Programming
- Bootstrap
- Adobe

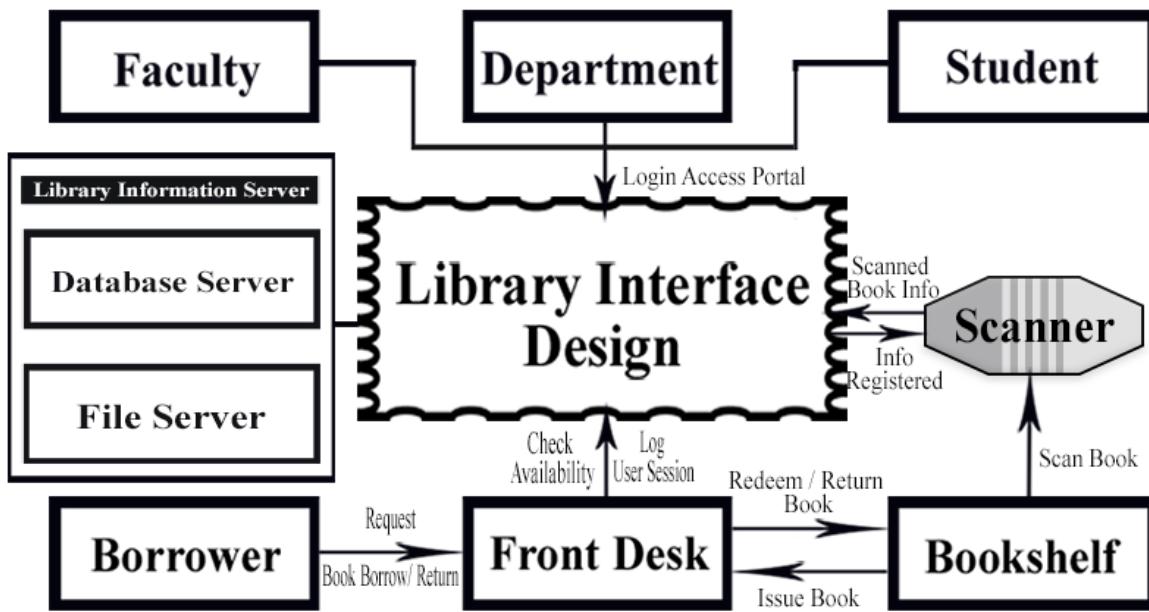
C. Functional Requirements

The library management system works on the foundations of 5 main groups: students, faculty, department staff, library information server (LIS) and the front desk.

Our members: **Faculty**, **Department** staff and **Students** have access to the computer lab where they can search for any book and reserve a book based on its availability.

All materials (including user databases, barcodes, admin info,etc.) of the virtual space are stored in the **Library Information Server**, which is controlled by the administrator. Once the staff or student users are in the library management system, they will have access to the database containing information about all the resources that students and staff have access to as well as information regarding the departments of the college.

CONCEPTUAL DESIGN



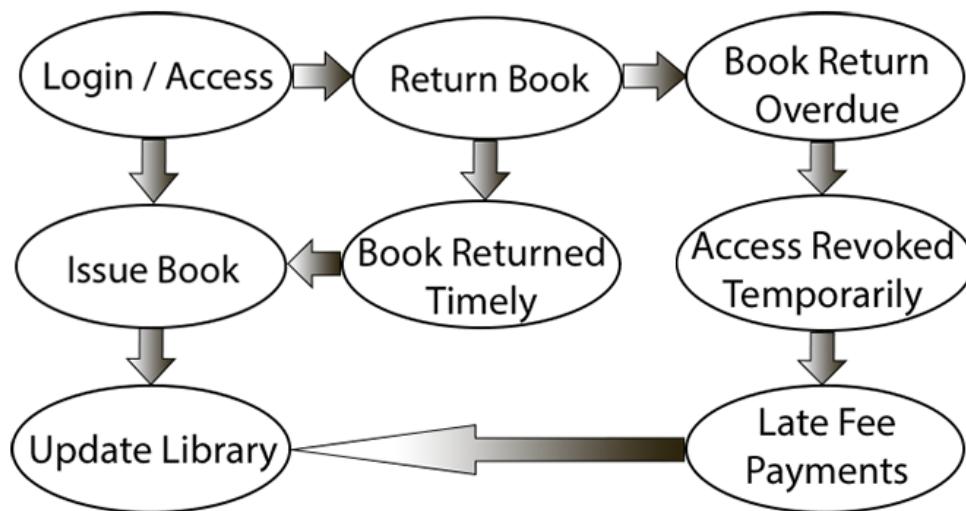
Borrowers can be one of the 3 member groups, they have to know the book they're looking to borrow (book name, edition,etc.) but the way to the front desk will be the same.

Barcode Scanners are available at the front desk and are the only way onsite to checkout with a book(s).

Library Interface Design is where the magic of software happens. It uses a program of binary numbers to communicate with the computer hardware and present meaningful information to the users' screens, through Bookey™.

Front Desk can only be accessed by the administrator by logging in to the system with their assigned username and password. Once they have entered the system, they have the authority to add, edit and remove books as well as siphon other resources from the Bookshelf.

Mechanism of Book Withdrawal & Late Fee Payments



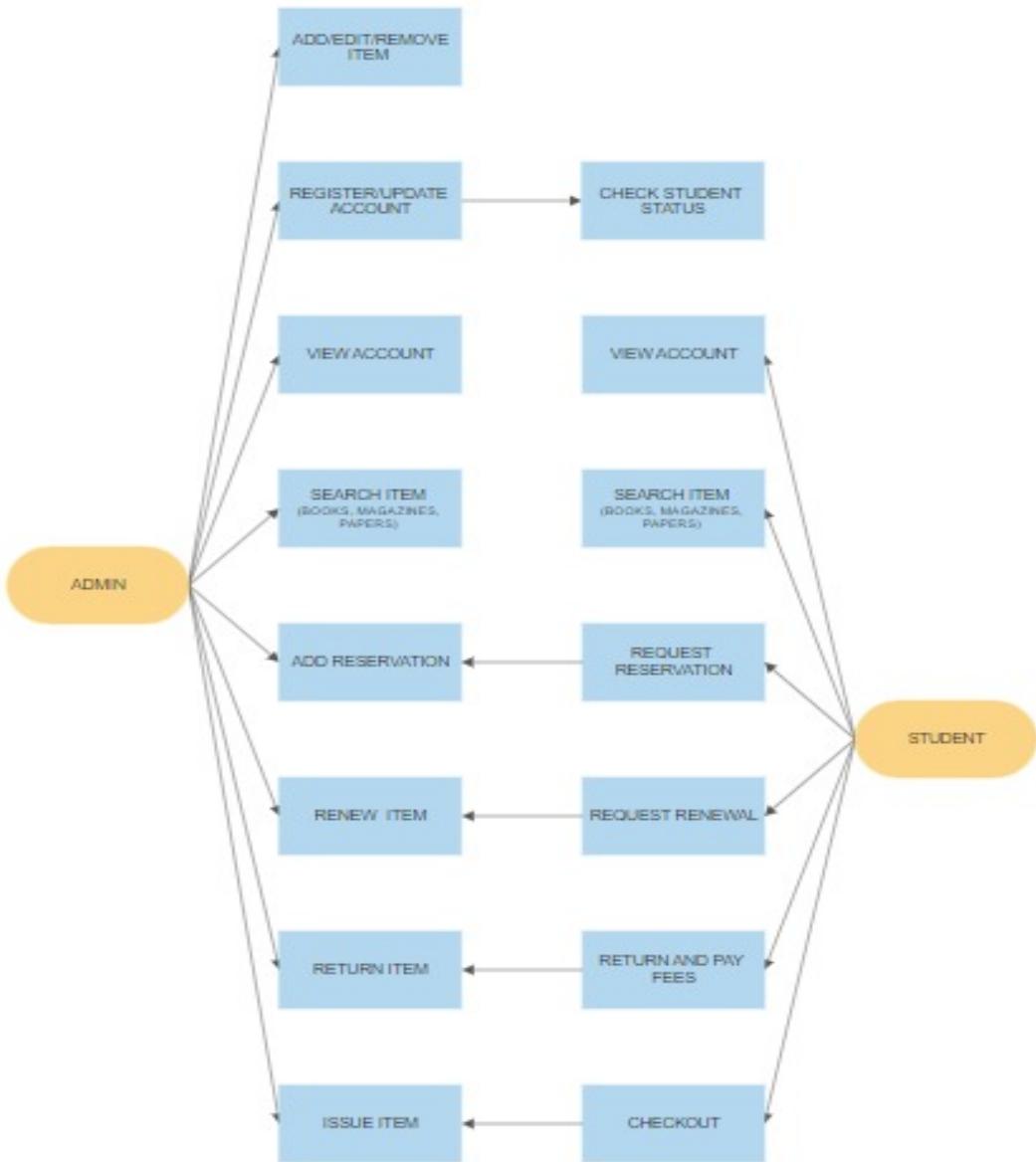
Although each member has access to the library judiciously, there are separate borrowing privileges for students. Once the book is issued, a student will have a month or less to return the book since the time they picked it up.

Students can access this system in two ways:

1. They can login to check the status of their borrowed books or books waiting to be borrowed (on hold). If they decide to visit the library, they can view the due date on Bookey™ and borrow/ return the book at the front desk by scanning the barcode of the resources they are borrowing/ returning.
2. Students may find it convenient to borrow an ebook online which means they can return the book without having to scan their books/ resources at the front desk.

If for any reason, students are unable to return the borrowed books within the stipulated time frame, a fine will be charged on the student's account and subsequent fines amounting to \$100 will result in temporary lock on account privileges.

These fines have to be paid at the front desk to the administrator who will access students' records to lift the temporary lock once paid in full.



Administrators and students have similar access to many features of the library management system. However some of the tasks requested by students need to be processed with the administrator's help. This includes paying overdue fees, checking out books that were on hold, and updating personal information. One main difference between what students and administrators have access to is that administrators have the authority to edit information in the database of the system. This includes adding or removing books and other resources to and from the catalog and editing student accounts.

DELIVERABLES:

Our Bookey™ search engine is one of the leaders in data mining and optimization. It presents a visually appealing and robust information retrieval system developed on MySQL and RDBMS.



OVERDUE BOOKS

REPORTED DATES:	02/01/2021	TO	02/07/2021	User Group	Students (Current)
SEMESTER:	WINTER 2021	Sort			
				Descending to Ascending	
Materials					
Title	Author	Call #	Student ID	Loan Date	Due Date
Introduction to computers	Joos, I.	R 917 J291 2021	500528639	01/19/2021	02/02/2021
Heartstopper [Vol 2]	Oseman, A.	R 932 J381 2019	528501877	01/24/2021	02/07/2021
Depression: your questions ans	Vitelli, R.	R 920 U491 2003	50719446	01/21/2021	02/04/2021
The Picture of Dorian Gray	Wilde, O.	R 920 F920 1989	509898194	01/20/2021	02/03/2021
Nothing to See Here	Wilson, K.	R 905 J492 2019	5003396500	01/21/2021	02/04/2021
Becoming	Obama, M.	R 917 B291 2018	500491175	01/18/2021	02/01/2021
Ready Player One	Cline, E.	R 902 J492 2015	500840821	01/19/2021	02/02/2021
The Woman in the Window	Finn, A. J.	R 913 A842 2016	510486020	01/20/2021	02/03/2021
Station Eleven	Mandel, E. S. J.	R 932 J829 2015	5008830513	01/20/2021	02/03/2021
The Song of Achilles	Miller, M.	R 920 U418 2010	501827454	01/21/2021	02/04/2021
The Vanishing Half	Bennet, B.	R 915 J482 2020	5009374707	01/24/2021	02/07/2021
And Then There Were None	Christie, A.	R 930 J550 1992	501839046	01/19/2021	02/02/2021
Little Fires Everywhere	Ng, C.	R 989 B392 2012	500048204	01/21/2021	02/04/2021
Lock Every Door	Sager, R.	R 944 B943 2009	505030184	01/22/2021	02/05/2021
Daisy Jones & The Six	Reid, T. J.	R 922 U391 2012	529420582	01/20/2021	02/03/2021
Teen Titans: Raven	Garcia, K.	R 911 A928 2015	507291047	01/22/2021	02/05/2021
Sharp Objects	Flynn, G.	R 925 J185 2017	501947298	01/20/2021	02/03/2021
The Hate U Give	Thomas, A.	R 934 A932 2019	500375038	01/18/2021	02/01/2021
The One	Marrs, J.	R 930 J958 2019	501837593	01/21/2021	02/04/2021
Sing, Unburied, Sing	Ward, J.	R 937 A943 2017	5003857359	01/18/2021	02/01/2021
Talking to Strangers: What we st	Gladwell, M.	R 938 U530 2015	501847247	01/22/2021	02/05/2021
American Gods	Gaiman, N.	R 926 B446 2000	500385023	01/22/2021	02/05/2021
Uzumaki	Ito, J.	R 912 B053 2002	520385038	01/18/2021	02/01/2021
Long Way Down	Reynolds, J.	R 935 J392 2017	500483017	01/22/2021	02/05/2021
Slaughterhouse-Five	Vonnegut, K.	R 928 U214 1996	500294857	01/23/2021	02/06/2021
Report Generated:	TOTALS:				25

This report displays a list of overdue books for current students sorted by fines for books that had due dates between February 1, 2021 to February 7, 2021. It is organized by descending to ascending order and the database would be able to sort other columns such as alphabetical list, student ID number, and due dates.

Students who had overdue fines exceeding \$100 had borrowing privileges suspended and the cells were highlighted in yellow for the librarian supervisor to follow up on. Totals and the date the report has been generated are noted on the bottom. This report is an output that would be printed on a regular basis and this information would help inform the library staff about costs that are able to be compensated for.

**BOOK INVENTORY**REPORTED DATES: ANY
SEMESTER: WINTER 2021

TO ANY

Search	Heartstopper	in	Books (Fiction)
Category	Graphic Novels		
User Group	All		
Sort	Alphabetical		

Materials

Title	Author	Year	Call #	ISBN	Edition	Category	Due Date	Status
Heartstopper [Vol 1]	Oseman, A.	2017	R 932 J194 2017	978302847	1	Graphic Novels	02/07/2021	Available
Heartstopper [Vol 2]	Oseman, A.	2019	R 932 J381 2019	978328100	2	Graphic Novels		Overdue

Report Generated: 02/10/2021 15:30

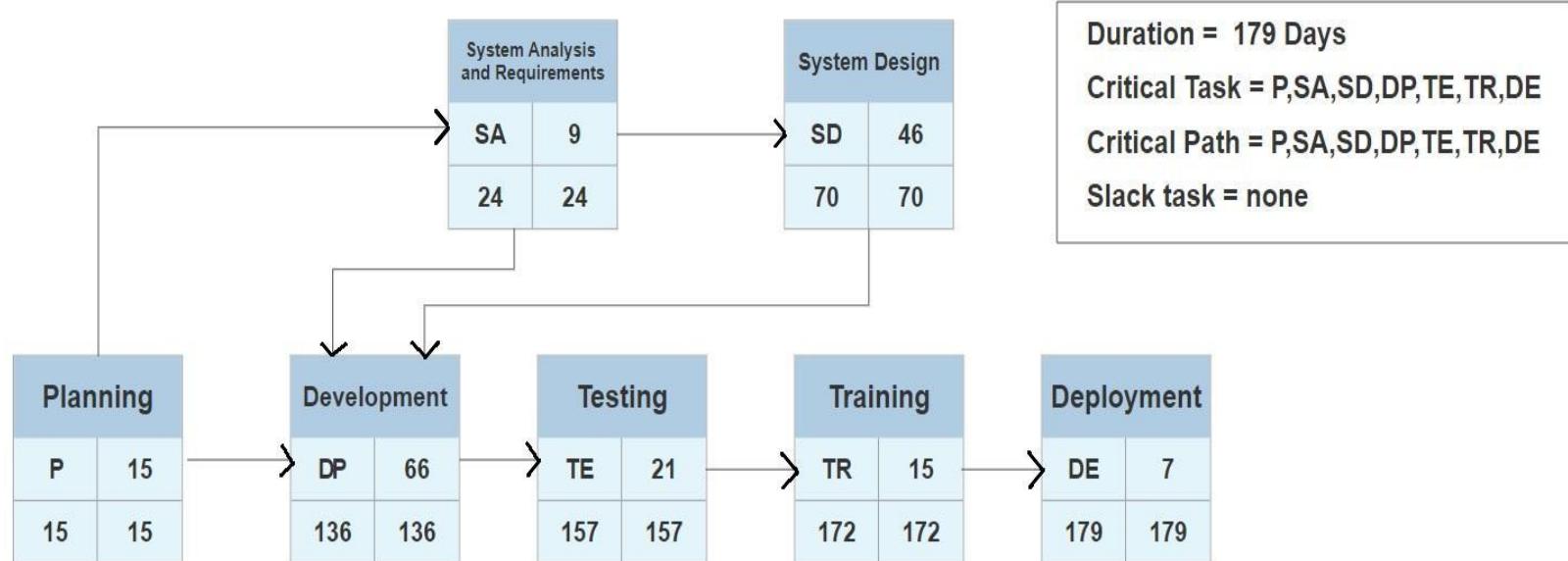
TOTALS: 2

The report below illustrates the simple yet powerful search engine of Bookey™ database wherein you can input the title of the book you want in the search bar, select the category of media, which semester you are searching for and can obtain specific results. The results will show details about the title, author, year, call number, ISBN, edition, category, due date and availability.

The system will not only show the exact product of the search but also the number of books in the library. This report would address the record tracking of books that have been checked out by implementing this system, especially with the expected increase of enrollment at Dream College.

TIMELINE (GANTT CHART):

PERT CHART:



COST ESTIMATION:

HARDWARE			
ITEM	AMOUNT	QUANTITY	TOTAL
Intel E3 1270 V6 Server	\$1393	1	\$1393
Computer Unit (CPU, monitor, keyboard, mouse)	\$1500	5	\$7,500
Barcode Scanner	\$80	2	\$160
Printer	\$2800	2	\$5,600
Tattle-Tape Detection Gate	\$20,000	1 (2 aisle set)	\$20,000
Tattle-Tape	\$400	8 (box of 1000)	\$3,200
SOFTWARE			
PROGRAM	AMOUNT	QUANTITY	TOTAL
Proprietary Software Bookey™	\$250	5	\$1250
Windows 10 OEMs	\$200	5	\$1000
Microsoft Office 2019 Professional Plus	\$569	1	\$569
McAfee 2017 Total Protection Antivirus - 5 devices	\$76	1	\$76
Services			
TYPE	RATE PER HOUR	NUMBER OF HOURS	TOTAL
Designing	\$100	168	\$16,800
Development	\$200	208	\$41,600
Testing/Implementation	\$75	104	\$7,800
Training	\$15	160	\$2,400
Total Cost of Project:	\$109,348/-		

Recurring Costs:

Server Rental Intel E3 1270 V6 Server (Cores: 4 x 3.8GHz, RAM: 32 GB, HDD: 2 x 500 GB SSD) @ \$1393 per year following 1st year

Maintenance Costs (if applicable) will be an extra fee of \$50 once per month to be transferred on the designated service date. Cloud storage service is included.

AIM / GOALS:

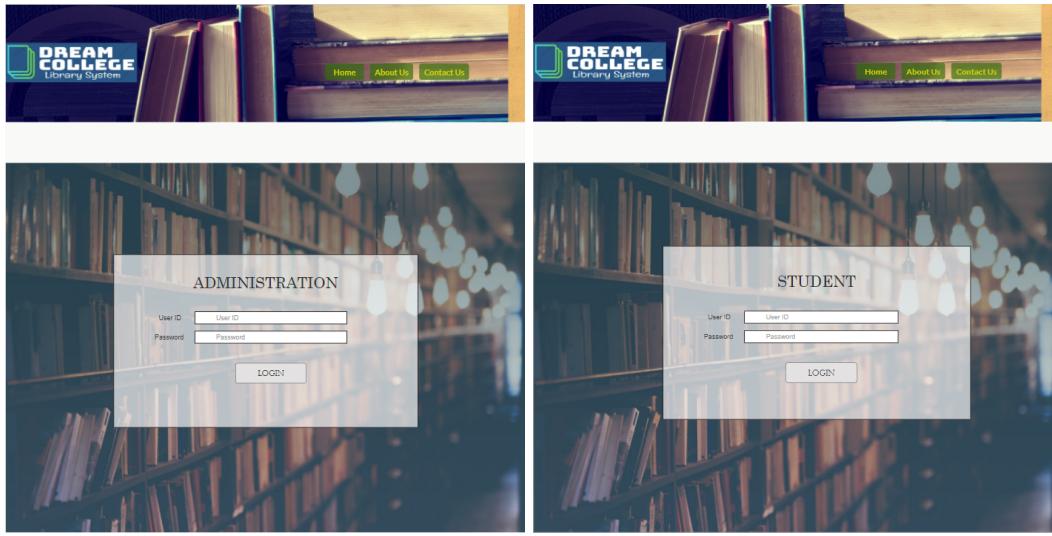
- Harnessing the abilities of web development, hosting and server management that effortlessly adopt the standard library of Dream College within a calculated budget as discussed in the Statement of Work.
- Building a website that will work on traverse-and-fetch technique implemented by Developer's proprietary Bookey™ where the user is capable of viewing the entire web collection and doing the checkout on their own terms. Members will have different accesses with student / faculty / admin privileges as discussed in the Statement of Work.
- Standard libraries will maintain issuing books through the barcode scan-and-shop technique as discussed in the Statement of Work.
- Operating under the Gantt chart representation, expecting completion before the registration starts in August 2021 as discussed in the Statement of Work.
- Policies and documentation about Bookey™ will be available to Dream College.

SIGN IN PAGE:



Homepage Dashboard

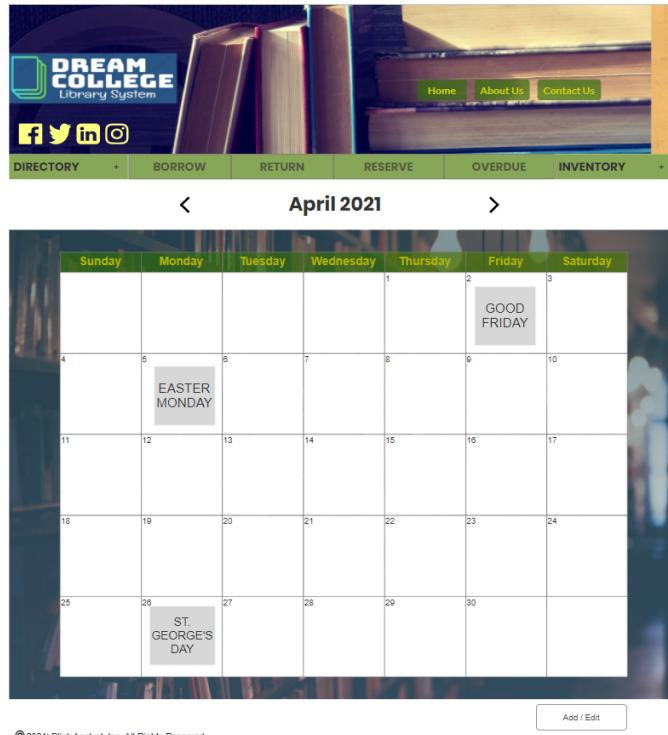
The library management system begins at the dashboard. Two interactive buttons are present to differentiate users and what access they have to the system.



Login (Admin & Student)

Pressing on the “ADMIN” button on the dashboard will guide the user to the page on the left. A specific user ID and password is necessary to advance to the Admin Home page. Admin access allows the user to manage the catalog of books by editing or adding new items. In addition, they will have access to information about registered students and staff and the books they have reserved or books that are overdue. Moreover, the login of an admin will grant them the ability to scan books that are being borrowed and returned. To test this function of our prototype, enter in the **user ID: AdminVictor** and **password: 123456** and then press “LOGIN”.

Similar to the “ADMIN” button, pressing on the “STUDENT” button on the dashboard would bring you to the login page for a student (Image on the right). Students have access to less features of the library management system. Things they can do include searching for a book, requesting a book to be reserved, and viewing upcoming events of the library on the calendar. To test this function of our prototype, enter in the **user ID: CSIS2200** and **password: 123456** and then press “LOGIN”.



Admin Home

This is the homepage for Admin users. The calendar allows them to see upcoming events and add or edit the events. On the top, the banner lets the admin navigate all the functions of the system easily. Under directory, they can find student and staff information and under inventory they can view the booklist and add or edit items to or on the list.

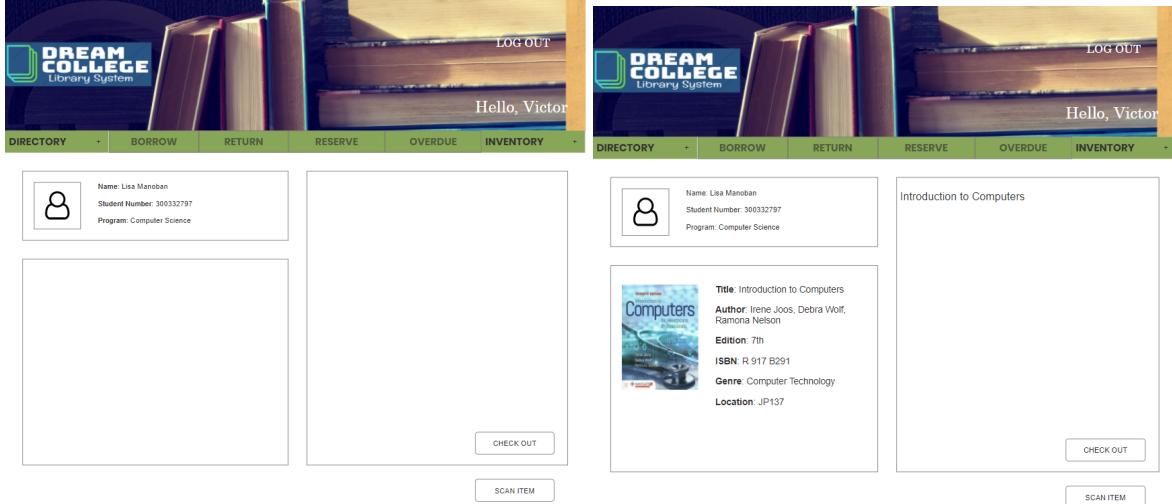
Name	Student ID	Program	Address	Contact Number	Email

Directory (Staff & Student)

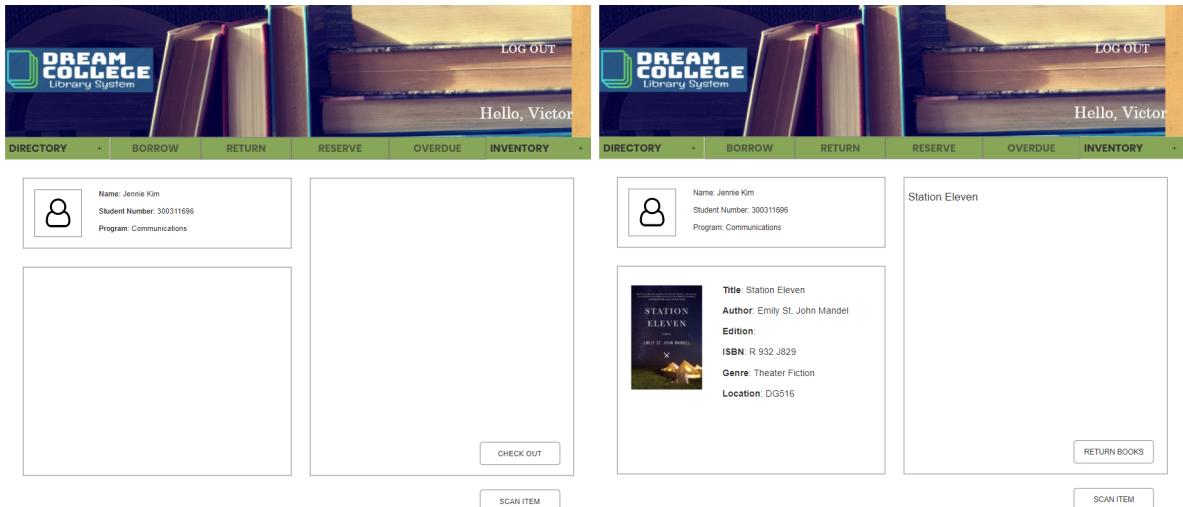
The staff and student directory are similar in design and function. It contains information about what program or department the individual is from and contact information such as

email, address, and phone number to reach the user about an availability of a book they have on hold or a reminder about a return or overdue expenses.

INPUT/OUTPUT FUNCTION:



Return (Input & Output)



Borrow (Input & Output)

The borrow and return tabs are similar in design as they go through the same process of scanning the barcode of the item and then submitting the changes to the system. The top left will show the information of the student or staff borrowing the book upon scanning their ID card. In the case of returns, that information will automatically show up as the barcode of each book is unique and can identify the ID that had borrowed it. Below it will display the information of the book scanned including an image, the title, author, ISBN, genre and location of where the book is stored. Lastly, the right side will show a cumulative list of all the items scanned.



RESERVED BOOKS User Group
 Sort

[PRINT REPORT](#)

Materials

Title	Author	ISBN	DATE PUBLISHED	GENRE	LOCATION	STATUS
Introduction to Computers	Joos, I.	R917 J291	2021	Computer Technology	JP137	RESERVED
Becoming	Obama, M	R 917 B291	2018	Memoir	OB448	AVAILABLE
Ready Player One	Cline, E	R902 J492	2015	Fiction	AG235	AVAILABLE
Station Eleven	Mandel, E. SJ	R932 J829	2015	Theater Fiction	DG516	UNAVAILABLE

Reserve

This page shows the list of all books that are currently reserved by students. The admin can sort each category alphabetically or by ascending or descending order if sorting by numerical fields such as the date.



OVERDUE BOOKS User Group
 Sort

[PRINT REPORT](#)

Materials

Title	Author	ISBN	Student ID	Loan Date (mm/dd/yyyy)	Due Date (mm/dd/yyyy)	Current Fines	Suspended Borrowing Privileges
Introduction to Computers	Joos, I.	R917 J291	500528639	01/19/2021	02/02/2021	\$335.00	YES
Becoming	Obama, M	R 917 B291	500491175	01/18/2021	02/01/2021	\$65.50	NO
Ready Player One	Cline, E	R902 J492	500840821	01/19/2021	02/02/2021	\$65.00	NO
Station Eleven	Mandel, E. SJ	R932 J829	500840821	01/20/2021	02/03/2021	\$44.00	NO

Overdue

Under the “Overdue” tab, the admin can see the list of books that are overdue and not returned by students. They can sort the data by user group (staff or students active, inactive, or both) in ascending or descending order.

This page is the output design prototype of the email that is sent to each student automatically by the incharge who has borrowed books and has some fines that needs to be paid as soon as possible to avoid complete revocation of his/her borrowing privileges.



✉️ Reminder from Dream College Library System

Philip Chan <philip.chan@gmail.com>

To: Lisa Manoban

Today at 10:45 AM

Hie Lisa,

This email is a final reminder that the book you borrowed needs to be returned with the fine mentioned to be paid, the library records still show the following item(s) overdue:

Title: <i>Introduction to Computers</i>
Author: Joos, I.
Call# R 917 J291
Issue Date: Jan-19-2021
Due Date: Feb-02-2021
Fine: \$65.50

Please return them as soon as possible to avoid the revoking of your borrowing privileges.

Thank you

Contact your Library for more information:

Phone no: 604-321-0327
Email: <library@dreamcollege.ca>
Address: 1234 Dream College Lane
West Vaciuver BC, V3K 2B1

Overdue (output)

The screenshot shows the library system's main menu with the 'OVERDUE' tab highlighted. The menu includes links for DIRECTORY, BORROW, RETURN, RESERVE, OVERDUE (which is active), and INVENTORY. The user's name, 'Hello, Victor', is displayed in the top right corner. The background features a photograph of books on shelves.

<p>Becoming By Obama, Michelle ISBN: R 917 B291 Publish Date: 2018 Genre: Memoir Location: OB448</p>	<p># Copies: 0 of 1 Current Holds: 0 Status: Unavailable</p>	<input type="button" value="Reserve"/>
<p>Introduction to Computers By Joos, Irene ISBN: R 917 J291 Publish Date: 2021 Genre: Computer Technology Location: JP137</p>	<p># Copies: 2 of 3 Current Holds: 0 Status: Available</p>	<input type="button" value="Reserve"/>
<p>Ready Player One By Cline, Ernest ISBN: R 002 J402 Publish Date: 2015 Genre: Fiction Location: AG235</p>	<p># Copies: 1 of 1 Current Holds: 0 Status: Available</p>	<input type="button" value="Reserve"/>
<p>Station Eleven By Mandel, Emily St. John ISBN: R 932 J829 Publish Date: 2015 Genre: Theater Fiction Location: DG510</p>	<p># Copies: 2 of 2 Current Holds: 0 Status: Available</p>	<input type="button" value="Reserve"/>

Inventory - Catalogue

The book catalog can be accessed by pressing the inventory tab. The entire booklist will be displayed in alphabetical order. To find a particular book, information can be inputted into the search bar.



Title:	<input type="text"/>
Author:	<input type="text"/>
Genre:	<input type="text"/>
ISBN:	<input type="text"/>
Rack:	<input type="text"/>
Aisle:	<input type="text"/>
Copies:	<input type="text"/>

SUBMIT

Inventory - Add

Under the inventory tab, there is a tab for adding new books. The “add” page has a very simple design with structured data fields to ensure consistency in the format of the data being entered into the system. The “edit” page will have the same design except it will already have some fields filled out. It can be accessed by pressing the edit button of the book shown in the book catalog.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
					Good Friday	
4	5	6	7	8	9	10
	Easter Monday					
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	
	St. George's Day					

Student Home

This is the student home page. The calendar on the home page allows users to easily see upcoming events. Further development may allow students to click on specific dates to book study rooms or tutors. On the top, there is a search bar with a drop list next to it to select the type of category the user is searching. Categories include title, author, and ISBN.

The screenshot shows the student search results for the book "Becoming" by Michelle Obama. The search bar at the top contains the text "Becoming". To the right of the search bar are dropdown menus for "Title" and "Author", and a "LOG OUT" button. Below the search bar, the text "Hello, Lisa" is displayed. The search results show one item: "Becoming" by Michelle Obama, with a thumbnail image of the book cover. The book details are listed as follows:

Becoming	Add to Hold
By Obama, Michelle	
Call No. R 917 B291	# Copies: 0 of 1
Genre: Memoir	Current Holds: 0
Location: OB448	Status: Unavailable

Student Search Result

This is an example of what will show up after entering the book title “Becoming” in the search bar. The student will be able to see if the book is available and where to find it in the library. If there are no copies at the library, they can add the book onto the reserve list by pressing on the button “Add to Hold”.

DIRECTORY • **BORROW** **RETURN** **RESERVE** **OVERDUE** **INVENTORY** •

About Us

At Dream College Library, we strive to provide a warm and comfortable space for our community work and learn.

Our Library offers a wide variety of services and resources to support the academic needs of staff and students.

Types of Resources <ul style="list-style-type: none"> - Books - Journals - eBooks - Database - Media 	Services Available <ul style="list-style-type: none"> - Study Rooms - Printing - Writing & Citing - Book a Tutor - Tech Help - Virtual Workshops
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OUR MISSION

To provide an organized and user-centered environment that fosters academic enhancement to the Dream College community.

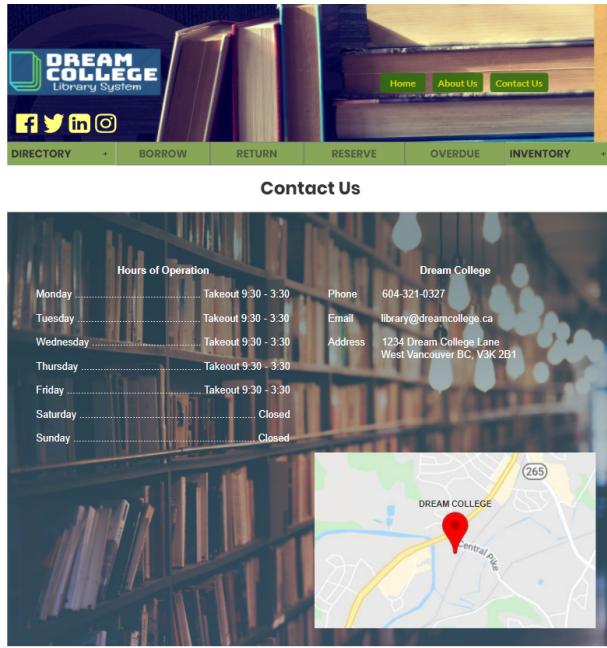
OUR VISION

To inspire and promote self-development to the leaders of the future.

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About Us

Pressing on the “About Us” button on the top will lead to this page. Both student and admin accounts have access to this page. The only difference is that from the student’s point of view, there are no tabs at the top. This page provides a brief summary of what services and resources Dream College Library provides. It also states the mission and vision of the library.



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Contact Us

Pressing on the “Contact Us” button on the top will lead to this page. As with the About Us page, both student and admin accounts have access to this page and the overall page design is the same. This page provides information about when the Library is operating and how to reach them through phone, email, and the location of the facility.

IMPLEMENTATION:

We use several programming technologies including implementation of client-server architecture. We are working with HTML5, CSS3, Javascript as front-end web technologies, PHP and MySQL for our server's back-end RDBMS.

First, we designed the Dream College Library website. Designing the website using interactive menus, text fields, buttons, object-oriented classes, webforms, etc. will feature a lot of dynamic web pages and fluid mechanics. We are adding more detailing to navigation and user experience so that it attracts all members of the library. Improving the web layout, responsive design and ease of use ensures that anyone between a layman and professional will utilize the website immersively.

We initiate and complete the installation of the server so that the go live system can be developed.

Although our Library Information Server will be a combination of knowledge databases and files server, we're implementing a dual-drive single server capable of delivering great performance with good speed and reliability. Due to the many kinks and corners that occur with server installation, a 24x7 support is much more feasible than buying the server with no assistance. Our data experts think of the Intel E3 1270 V6 server with quad core x 3.8GHz processor with 32GB RAM and 2 x 500GB Solid State Drives. We will program the SSDs with RAID5 (Mirroring + configuration). It has an additional 50GB

backup on the cloud server which could be expanded to meet larger storage requirements. The server will come with 24x7 assistance for installation and services.

RDBMS, which stands for Relational Database Management Systems, is a collection of databases with relational constraints to maintain a large structured dataset. Our proprietary software Bookey™ uses the following languages to navigate within the RDBMS:

PHP (Hypertext Preprocessor): PHP is the interpreting tool for the web browser that doesn't understand the commands but tells the server what is required by the user based on input. It has the opportunity to request for information, retrieve resources and display them on the user's screen. Without it, the user cannot access the login page and all of its contents as the login username / password is stored in the server.

mySQL (Structured Query Language): It is based on the principles of SQL scripting. PHP includes mySQL commands within the code so that the server is not looking for unnecessary information. The first query is always the only one required in order to fetch the right results.

Server is ready. Library system is up and running.

TRAINING:

Our team will organize a 4-day workshop to train the members of the Dream College family. Our new policy will include the reservation system which lends books on a first come-first serve basis.

In the interest of time, we have arranged the workshop to be held between deployment and starting of admissions on August 1st 2021. Workshop will also be streaming online. All members are required to register themselves 24hrs prior to the online workshop. If a member isn't able to attend the online workshop for any given reason, they will deregister themselves from the platform and be required to view the recordings published on the Dream College Library website.

Students are encouraged to complete the online module provided to them for succeeding in the workplace. The library policies and know-hows will be emailed to students' addresses with timed updates if applicable.

Training is just as important as the work in developing the library system because the efforts of staff are visually presentable. Addressing different members on how to tackle these changes keeping in mind the effective training methods.

Our workshop training will teach the library staff how to search for members' account details like books loaned, fines, availability, etc. maintaining forefronts on data security, data backup & recovery, reports generation and professional verbiage. After completion of training:

- **Students** will learn the procedures, good / bad practices of the library system and the importance of not returning books / resolving issues on time.
- **Library staff** will be able to identify book locations, complete checkout transactions, identify phishing emails, backup specific data and generate reports on a weekly basis.

- **Library administrators** will be able to check for inactive accounts, fix abnormal system behaviors, add / change / delete file permissions, user accounts information, borrowing privileges, revoke / reinstate user access, delete archived footage after checking with supervisor and initiate push notifications for all members.
- **Library supervisor** has the most important job of keeping everything on par with Dream College standards. They will be able to recover encrypted data from the cloud server in the case of total system failure, generate metadata reports, detect any fraudulent activities and manage the operations of library staff and administrators.

SECURITY:

The library system encompasses the hardware with varying areas of data security from softwares to user records. It requires the active participation of all staff as security is the responsibility of everyone. We will take into account the main aspects of security in different views:

Physical View

The physical security ensures that the hardware components are safely secured with a locking kit and carbon steel cables. There will also be surveillance cameras at high-contact points, for instance the library reception, library entrance and exit, and computer lab.

Library staff will wear identification badges and signage will indicate that the area is under video surveillance. Recordings will be archived in storage for 60 days and then erased as directed by the library administrator. The location of equipment such as the barcode scanner and printer will be behind the reception desk to minimize opportunity for theft of sensitive documents and peripherals.

The Tattle-Tape Detection system, inserted in the binding of each book, will provide security assurance to prevent the theft of school property. If an item is not checked out in the library system, the Tattle-Tape Detection Gate alarm will sound.

The logistical measures of theft prevention for the books and media are indicated in the Statement of Work budget.

Onsite, a local server which stores the data for user ids/passwords, client-server architecture, etc. is placed in a designated control room behind a locked door accessible to library administrators only. Surge protectors will be installed to protect the server from voltage spikes in the case of power outages. Backup data will also be stored as encrypted information in a backup server on the cloud. It will be encrypted with an encryption key that only the library supervisor and Developers will possess. With the anticipation of higher enrollment, a proxy server is helpful in helping offload some of the traffic and provide an additional layer of protection.

Logical View

Library staff must sign in with their login IDs to check out books for students as indicated. All students will have to agree to the terms and conditions set by Dream College during account creation. Their accounts will be authenticated with their login username and password of their choice, requiring at least 8 characters made up of an uppercase letter, lowercase letter, number and a symbol. Passwords expire after a period of 6 months and need to be changed regularly for security purposes. Access controls include terminal resource security that automates logging off users' screens after 10 minutes of idle time. Inactive accounts will lose access. All library account changes will have a confirmation box appear to confirm the user's choice and prevent any unintentional deletion of data.

Enabling firewall protection in the computers will prevent any net surfing casualties. When students log into their accounts, the connection will be encrypted with Secure Sockets Layer in order to view personal information such as the amount of fines they have. Any website not relevant to the Board Curriculum will be out of bounds and therefore blacklisted. Antivirus software will be installed as a measure against viruses and updated automatically.

To print out reports, system software will identify the username of the library staff logged in and date of report generated for accountability purposes. Data about users will be reviewed on a regular basis to ensure that all accounts are current staff and students.

BACKUP PLAN:

The backup plan incorporates the complete backup and recovery of RDBMS and metadata in the event of disaster. Backup and recovery procedures will be covered in a workshop prior to the library staff onboarding to acknowledge they have completed the training.

RAID 5 configuration system has been implemented. It will allow for the continued function of the system performance even if one of the disks fails. In the event that a system failure happens, the company will be able to retrieve data stored as encrypted information in a cloud server. The library supervisor will be responsible to initiate this process if it is appropriate.

The cloud server is an additional service included in maintenance costs to ensure that no data loss occurs.

Any ongoing maintenance that needs to be updated to the members will be started in a system administrator account before becoming active in the go-live system. Developers are able to make changes with the support of library supervisor post deployment in case any errors occur. Lastly, Developers will also possess the encryption key allowing for an additional layer of protection against data loss.

REFLECTIONS:

This is intended to give specific thoughtfulness to areas where we can improve as well as identify the gaps in the domain knowledge and skills from the timeline tasks and try to work in areas to overcome them.

We followed detailed steps in developing our knowledge and skills in Gantt and PERT charts in terms of use and the steps we have used to learn and improve our ability to create and use it. This final report required a lot of organizational skills and coordination of valued input from the team. Each task had to be clearly defined to avoid a duplication of work, so delegating who is responsible for each part was helpful in clearing up confusion. This had to be done early in the process or there was a risk of redundant work happening in the project.

Defining the scope meant focusing time and resources on the practicality of system implementation. It affected the budget of the system design and expectations of how much work had to be done for the system to function.

First, we assigned one person to oversee each task and a certain time frame to complete it. Therefore as a group we had to discuss the privileges that library staff would have over students, and the library supervisor overseeing all of the staff. Also, some tasks could only happen after a different task had been completed.

In the input and output design phase, we encountered a challenge for creating a design that satisfied the vision of every team member. What contributes to this is that our

group consists of members living in different time zones having different schedules. As two members were predominantly in charge of this portion of the project, it was important that other members were engaged in their vision for the final design. With constant communication between members working on different areas of the project, we were able to do parallel processing. Having members from different programs was very valuable to our group and led to our success. We were able to learn from one another and gain new skills such as using the Axure PR 9 Prototyping software.

Although one of the tasks was to manage the write up for operations from the groundwork to the client base, handling dimensionality was a challenge. The conceptual design was included and appreciated by the team members. There were instances of bad network connections and time-outs but we persevered and delivered results. There was no trouble with finding relevant topics as the Internet always provides. Teammates were not always available as the group members lived in different time zones. Manufacturing material for deployment and training was really important as we had to maintain the timeline for relevant parts only.

We took decisions collectively and ensured that a quality model was implemented. We spaced the time to divide the work and meet weekly after class discussing what were the next steps to deliver the final report.