Library Management System 'BookTique'

[Developed for ATC India Shared Service Centre]

Classification: Confidential/Proprietary

Version: 1.0

Project Assignment



Project Sponsor



Project Detail:

Project ID	ATC/INTERN/LIB001/19-20
Project Sponsor(s)	ATC India
Project Assignment	Chandigarh University
Chief Project Lead	Mr. Naveen Gambhir
Mentors	Mr.Shubham Saxena and Mr.Amit Mohapatro
Primary Department	ATC IT Shared Service Centre, Gurugram (India)

Document Revision History

Version	Start Date	End Date	Description
1.0	11-Jun-2018		Intern Version

Document Approvers

Role	Name	Title/Désignation	Date (DD-MMM-YYYY)		
Reviewed By	Mr. Naveen Gambhir	GM, IT Center Lead	12-Jul-2019		
Approved By	Pushpinder Gupta	VP, Chief of IT, ATC India	15-Jul-2019		

1. Introduction

1.1.Purpose

Chandigarh University promotes all Engineering students toutilize the skill and knowledge acquired after the second-year training to complete an internship with a professional organisation. These internships ideally which should be under the domain in which student want to contribute to the industry. It is aimed to improve student's employability prospects by giving them industry exposure.

1.2. Project Background

ATC Shared Service Centre has a library which consists of a large number of books related to latest IT Tools/Techniques. Procurement of new books is an ongoing activity. These books are used as a reference study material for Software Developers. Books in ATC Library were managed manually as additional activity to an existing employee. All book-related records (Masters/Transaction) were recorded manually in MS Excel.

Since the entire process was being managed manually, optimum utilization of existing books was lacking. So management decided to have this entire end to end process automated.

1.3. Objectives:

1.3.1. ATC Objective:

The objective of this project was to have a system in place which should manage the entire book without any manual intervention.

The system should facilitate:

- Management of books (Addition/Deletion)
- Tracking book issued to ATC Employees
- Tracking defaulters (book not submitted timely)
- Searching/Adding books
- To generate various MIS reports.

1.3.2. Intern Objective:

- Utilize skill and knowledge acquired in a real-world scenario
- Gain valuable work experience
- Explore a career path
- Give yourself an edge in the job market
- Develop and refine skills
- Network with professionals in the field
- Gain confidence
- Transition into a job

1.4. Scope of the Project:

Initially, the scope of the project was to have a standalone system which could automate the entire manual process. However, soon after the initiation of the project, the scope of the project revised as per the guidance of mentor:

- Web-based Application using latest IT Tools/Techniques
- Secure & Robust
- Efficient & User-Friendly
- Portable
- East to debug and maintain

1.5. Tools & Techniques used:

- HTML
- CSS
- JAVASCRIPT
- BOOTSTRAP
- JSP Ajax

2. Project Development Cycle:

2.1. Project Planning:

- Complete end-to-end study of existing library process
- Thorough understanding of existing day to day operational
- Mentors were allocated to give an understanding of the existing system as well as the proposed/new system
- Discussion and finalization of Application Requirement Specifications.
- Development of the existing system's flow diagram to avoid any lapse in process study and got it verified from mentors
- Discussed tools and technology being used for the project
- Effort estimation and planning
- There was a lot to do find the needed technology stack/type to be used in the project with mentors. The result of this discussion with Shubham Sir and Amit Sir on 23rd May was that I was able to finalize to Java because of the huge libraries support and code once and run everywhere benefits.

2.2. Requirement Analysis:

- Thorough understanding of existing system done.
- Established project goals and objectives
- Discussed existing process with users/mentors
- Ensure all the existing challenges in the manual process must be captured
- Expectation from the upcoming system captured. (Refer Annexure-1)
- Developed a high-level data flow diagram of the system to be developed
- Fine-tuning of the flow diagram in line with the various input received from mentors/users
- Performed impact analysis of system requirement in line with the existing IT infrastructure and techniques being used for project development
- Received sign—off from mentors on requirement document before initiating system design phase.

2.3. System Design:

2.3.1. UI based discussion:

- On 18 May, Shubham Sir and I had done a series of discussion about which technology to use like it would be the Desktop-Based application or Web-Based Application.
- After it, Mentors had arrived at this solution that I will be going to create a prototype of both and then it's testing will be going to takes place.

2.3.2. System Security:

- As Entreprise Based Application, I had also focused upon the security of the application and for it and used the DBMS.
- I had also done much discussion upon the structure of the database with Amit and Shubham Sir likedata_types/default_values/field_nameetc from 18 May to 28 May.
- After of discussions, I had chosen MySQLas a primary database because of easy configuration method in Eclipse IDE.

2.3.3. Portability:

- The system must be able to run on Windows and Macintosh systems.
- The system must support UNIX/Linux systems.
- The code should be readable, well commented, and maintainable.

2.3.4. Sessions based Logging:

- Through discussion, I have come up with an idea about Session Management and utilize it to for Quick Login and Logout Option.
- It will help to differentiate between the different section of the projects which is divided into Admin, Librarian, Member and Transaction Part.
- The technology stack which was decided to be used in the project is Servlets and Ajax as it will be going to prevent the user from illegally logging.
- A user will not be able to login and logout without any kind of the login id and password, so it is one of the important features for maintaining data privacy and redundancy.

2.3.5. Code Reusability:

- It was also one of the factors which were focused during the work to reduce the unwanted code and better readability for other developers.
- Techniques of Indentation and Comments were discussed out so that better application can be developed.
- So after every week plan I had a Code Reusability review, where I and Shubham Sir had a detailed discussion about the code of the project in a one week session from 18 May to 25 May.
- The **benefits** of this round were that I was able to utilize some repeated code and formulate them into a form of a template which can be reused from anywhere in the project.
- It had reduced hundreds of lines of unnecessary code from the project.

2.3.6. Robust Nature:

- The project should need to work on any condition like it should not depend upon the predefine hardware (i.e. RAM, CPU etc.)
- There is a need to find out which will be the best technology needed to use to make the application robust in nature and how to bring down the unnecessary things which might be going to slow the application during running.
- It makes the application lightweight and I was able to create the project in less
 2.1 MB file size and this is one of the most important achievements of the project planning.

2.3.7. Additional Feature:

- The Application was divided between **3Modules** like **Librarian**, **Admin** and **Transaction** and each of them are independent of each other and Admin is going to be the Head of the Library Management System.
- MARK TO BE DELETED: As an MNC, it was very important for me to know
 the importance of data and how to make it more secure and robust so
 for it I had used flags (Yes/No) options in Database which will be going to
 help us in the retrieval of data from database.
- **POP UP Box:** After discussion through Mentors(Shubham Sir and Amit Sir), I had came onto the need to develop the pop-up box to make the code more efficient and robust to use.

- Session Management: Every individual is going to be assigned with individual ID and Password which will help them to login and logout without any hassle. These functions help in making the system more secure and robust in nature.
- The application is also helping by providing us with the **statistical report** according to the different parameters in the form of bar chart, line chart, box chart and pie chart.
- It will reduce the manual work by **automating** the whole process from Excelbased work to Web-Based work.
- System will fetch the important information from the data which will be going to **speeding up** the overall process.

2.3.8. Database Design:

During the Database Design Part Seminar, I had come upon the conclusion to have 4 Modules for the Project like Admin, Librarian, Member and Transaction.

The overall design and layout of the table can be found in **Annexure-2**, which can be further be used to show them the variety of the

- Table Design (refer Annexure-2)
- Table fields prototype finalization
- Declaration of primary and foreign keys
- Developed and tested relationships between tables
- Primary testing of table/database integrity

2.3.9. Tools &Technology Used:

2.3.9.1. Primary Selected Tools/Technology:

- As, an intern I was very focused upon the no of days I have and vastness of the project, so it was very important to create a prototype. So, created a Prototype in Java-based AWT Application which really helped to find the problems and constraints of the primary technology.
- As,I had already seen the application with primary technology Java with AWT so
 to make any kind of application hardware-independent so to make it software
 dependent and it could only be possible with the help of web.
- So tried to utilize the prototype learning during the final Tools Selection and after of again doing discussion with Mentors I had come upon Java with JSP and Ajax.

2.3.9.2. Finally Selected Tools/Techniques:

HTML:

 HTML (Hypertext Mark-up Language) is the most basic building block of the Web. It defines the meaning and structure of web content.

CSS:

• Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a mark-up language like HTML.

JAVASCRIPT:

• JavaScript, often abbreviated as JS, is a high-level, interpreted programming language that conforms to the ECMA.

MYSQL:

 MySQL is an open-source relational database management system. It is a structured query language used to create, insert and delete table according to the needs and its workings.

AJAX:

• Ajax is a set of web development techniques using many web technologies can send and retrieve data from a server asynchronously without interfering with the display and behaviour of the existing page

2.3.9.3. The different tools selected and used in the project:

- **Eclipse IDE**: To create a robust application which can manage the overall the project and its intelligent completion feature had also helped in the overall development of the project.
- **JDBC Driver** A **JDBC driver** is a software component enabling a Java application to interact with a database. It will be used in connecting the database with the MySQL Database.
- TOMCAT Server 8.5: As the name says, it is going to create a link between Eclipse IDE and Internet Browser; it can easily handle the small to medium type of application with an overall accuracy of more than 1000 times refreshing.
- MYSQL Server: It had helped in creating the link between the Eclipse IDE and MySQL Command Line Client for easy working.
- MySQL Database: It is a procedural query language which can be used to create a database user in the project.

2.3.9.4. A week on Week Progress Report: Refer Annexure - 3

2.3.9.5. Hardware Requirements:

 Hardware is one of the most important requirements which are basically needed to run and develop any software/application over any kind of the system. As this project is totally Web-based but still hardware could boost the overall performance and make it more performance efficient.

2.4. Project Testing:

- Completed Test Planning with the mentors
- Developed various test cases.
- Setting up the test environment.
- Execution of the test.
- Closing the test cycle.

2.5. Project Implementation:

Project Implementation is one of the most important parts in which I had basically worked according to the Application Requirement Specifications.

The project Implementation was divided into 2 different approaches:

2.5.1. Project Timeline:

- In the Project Timeline session, Shubham Sir and I had basically developed the methodology of dividing the project progress into week by week basis, and through it, Mentors (Shubham and Amit Sir) will be able to monitor the improvement and how much I had accomplished the goal and objective.
- As my internship was of about 12 weeks, so I had divided the working of the project into twelve different weeks. The Timeline with the task completed is given in the **tabular format** given below.

2.5.2. Review based Progress:

 Every week,I used to have a detailed discussion about the achievement of theweek with my Mentors and I haddiscussed about the other approaches of solving it. Because of it I was able to quickly able to achieve the above objective and was also able to deliver the important changes.

2.5.3. Project Close-Out & Hand Over:

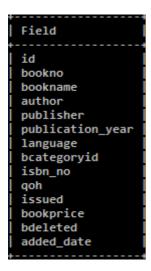
- Deployed system in the production environment
- Obtained mentors sign-off
- Developed user manual/screenshots for day to day operation (Refer to Annexure-4).

Annexure-2

Book Table Structure:

The book table structure is going to show all the fields related to the books. The description of the different field entries are as follows:

- 1. ID: Primary Key
- 2. **Bookno**= Auto-generated like BOOK01, BOOK02 etc.
- 3. Bookname= Name of Book like Geeta
- 4. Author=Name of the Author like Krishna
- 5. Publisher= Name of the publisher like Geeta House Publications
- 6. Publication_year= Year of the book in which it is was published like 1998
- 7. Languages=To find the language like Hindi, English, and German etc.
- 8. **Bcategoryid=** Type of the book like Religious, Horror and Adventure etc
- 9. **Isbn_no=** Unique No written at the back of every book
- 10. QOH= No of books I had purchased in the starting
- 11. Issued= Noof books going to be issued
- 12. Bookprice= Price of the book in INR format
- 13. **Bdeleted=** Book removed from the Library or not. Example in YES/No condition.
- 14. **Added_date=** When the book was first added into the Library. To keep track of the book added list.



Librarian Related Table:

- 1. **Id** = primary key of Librariantable
- 2. Lid= Unique Id of the Librarian irrespective of Employee Id.
- 3. Lname= Name of the person
- **4. Currentpassword**=password used for logging the system.
- 5. Lemail=registered email of the person

```
| Field
| id
| lid
| lid
| lname
| currentpassword
| lemail
| laddress
| lcity
| lcontact
| ldoj
| bdeleted
```

Member Related Table:

```
| Field
| id
| memid
| mname
| maddress
| mcontact
| memail
| mcity
| memtyp
| superviser_name
| superviser_emailid
| mdoj
| mdeleted
| mcount
| mReturn
| mPending
```

Transaction Related Table:

```
| Field
| transno
| bookno
| memid
| transactiondate |
| expreturndate
| tdeleted
| ReturnDate
```

Once the project was progressed towards the next phase **SystemDesigning** was done for two different sections for the **Librarian** and **Admin**.

Admin is going to be the *Head of Library Management System* and in the future, the roles and responsibilities of the Admin are going to increase with lots of powers.

Librarian is basically a person assigned by the Admin who can add/issue and return the books and members in the Library Management System easily.

The whole of the project is going to be conducted into three different parts called:

- 1. Admin
- 2. Librarian
- 3. Member
- 4. Transaction
- 5. Reports

Week 1 MNC's Work Environment Bonding Period (13 May-18 May)

- In this period I was first introduced with the team of ATC and got to meet my mentors and learnt about how Corporate works and plans before Project Commencement.
- Got to know about the requirement specification for the Project (Library Management System (Library Management System (Booktique))).
- After it, I had tried to find more information through meetings and sessions with my mentors Amit Sir and Shubham Sir.

Week 2 First Milestone System and Database Designing (19 May-25 May)

- Created a dummy prototype with Java Swing and AWT, to find how Java works on the client-side without any integration of Server.
- Learnt about the JSP configuration through Eclipse IDE and was also introduced with MySQL and Javascript Basics.
- Learnt how to do the configuration of Tomcat Server Version 9.0 with Eclipse, to run the project on Google Chrome, Firefox and Microsoft Edge.
- Created a Basic Application Requirements Report and Database Table Report, which will be used to check the required columns and its data types used during the Project Development.

Coding

Coding Period basically began from the 3rd week of May where I had targeted the development into 3 different corners:

- 1. Modules
- 2. Entities
- 3. Libraries

Modules:Modules are the base of the whole system on which the whole of the project is built or made. The Library Management System (Booktique) is basically divided into 4 different modules like Admin/Librarians/Members/Transactions.

- 1. Admin: Admin is going to be any of the HR or Management Head, who can manage the different records and working of the project with each other.
- 2. Librarian: Librarian is the 2nd highest authority who cans add/edit/update and mark as deleted to anyone book/member. It will be going to work closely with the Team Management to create the system.
- 3. Members: Member is a separate module who can issue and return any book of his/her choice anytime and anywhere.
- 4. Transaction: in this section authorities like Admin/Librarian/Members can get themselves aware of the result and progress of the system. All the records related to the issue and return book can be seen through it.
- 5. Report Generation: It is the module in which an individual can easily monitor the progress with the help of different charts like a pie chart, box chart, bar chart etc.

Week 3 Second Milestone Coding Week (26 May-2 June)

- Created 3modules (Login Page, Home Page and Books Page) in JSP.
- The basic layout was decided and need for Bootstrap/Javascript came into existence.
- With seminars/meeting,I had finalised the structure of MySQL Database
 Librarian/Books andtested it thoroughly.
- With the help of MySQL server both the Database and Web-based Application and deployed it with the help of the TOMCAT Server on Firefox.

Week 4 Third Milestone (4 June –18 June)

- On the basis of the Phase 1 Evaluation, I had added some more required columns to the tables of **Transaction/Member** and updated it into the Application Requirement Specification Report.
- Add some cool features like Modal **Box(Pop Up Box)**, Edit and Mark as Delete Option on the Book, Librarian, Member page, so that our project will look more robust and better UI/UX looking.
- Completed the 3 out of 4 modules like Book, Librarian and Members and rectified all the problems from Project Referral to Project.
- Version 1.0 is completed and every Unit is tested individually.

Week 5 Fourth Milestone (19 June- 26 June)

- Add the features to download Static Report File(CSV file) through a button in the C: directory automatically of the PC/Laptop which will help them to easily work on the data without any hassle.
- Started the work towards the Issuing Book / Return Book Panel so that the author cannot issue more than 2 books in one go.
- Fixed the Data Redundancy Issue while adding books in the System and made it easier for the Librarian to update the quantity for the same book of the same author but with different ISBN no and Publishing Year.
- Version 1.1 Released and brought to it in Unit Testing.

Week 6 Fifth Milestone (29 June- 6 July)

- Started working upon the Report Generation Panel with the help of Google Charts and JSON and able connected them through the database.
- Added more options for dynamic charts like from Bar Charts to Pie Chart to Box Chart. And it will be used to show reports to the Management with more added features.
- Version 1.3 Released and brought to in Integration Testing.

6 July -10 July

Project Completion / Testing

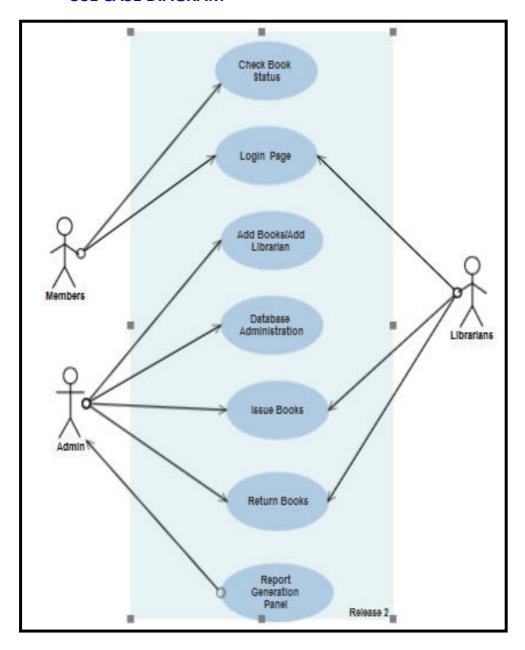
Week 7 Sixth Milestone/Testing Phase/Concluding Phase (6 July- 10)

- In this Last Milestone, I had integrated the whole process and tested it thoroughly with the help of various testing tools like **lambdatest.com** etc.
- Worked upon my Final Presentation and delivered it to Pushpinder Sir.

Annexure-3

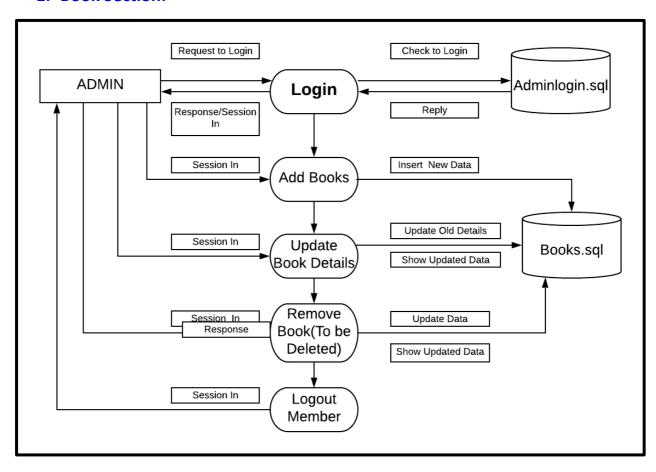
UML DIAGRAMS

USE CASE DIAGRAM

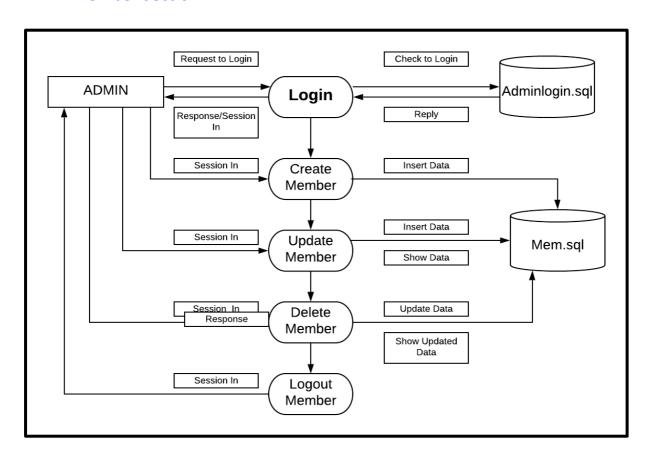


DATA FLOW DIAGRAM:

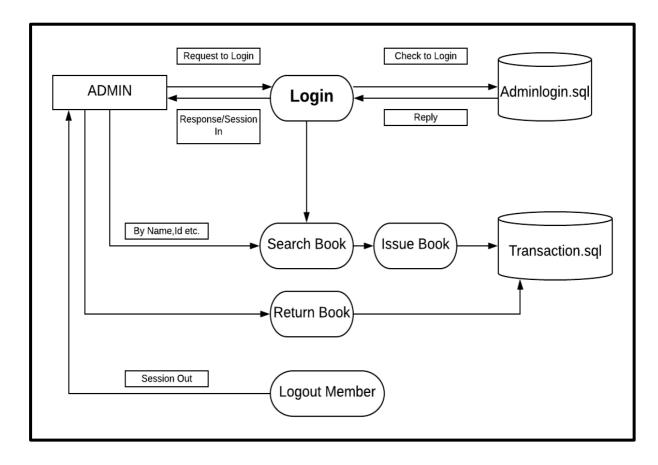
1. Book Section:



2. Member Section:



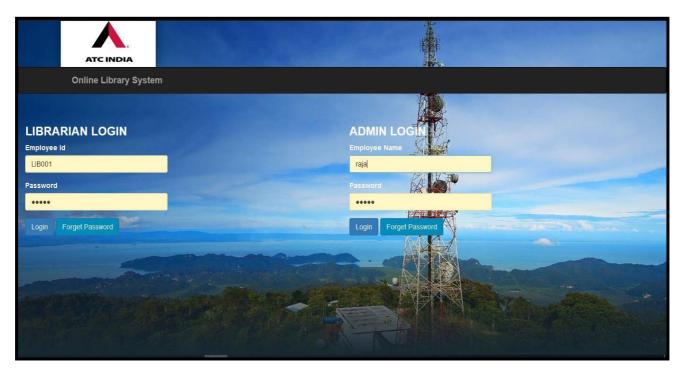
3. Transaction Section:



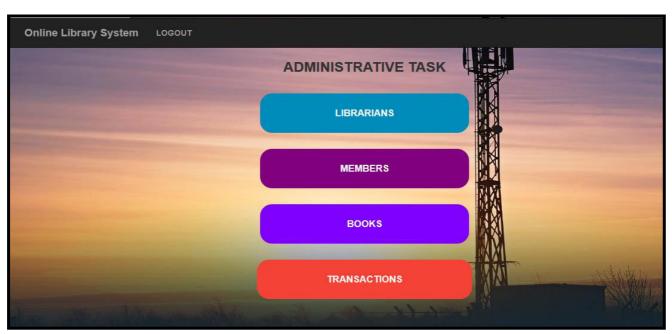
Annexure-4

User Manual/Screen Shots:

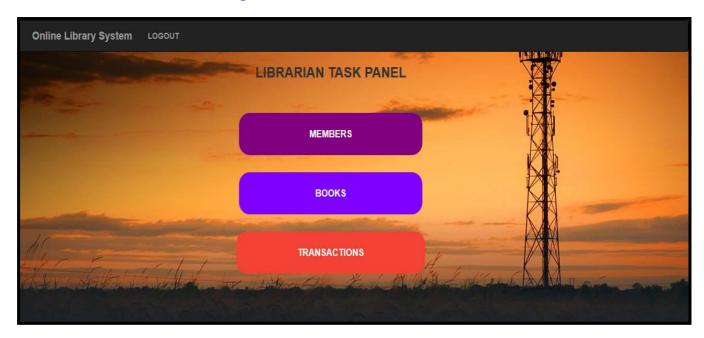
4.1 Main Page of Library Management System



4.2 Admin Panel after Login:



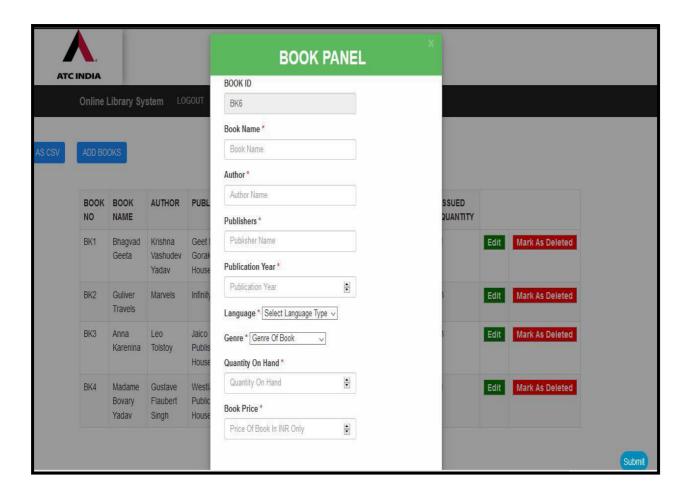
4.2.1 Librarian Panel After Login:



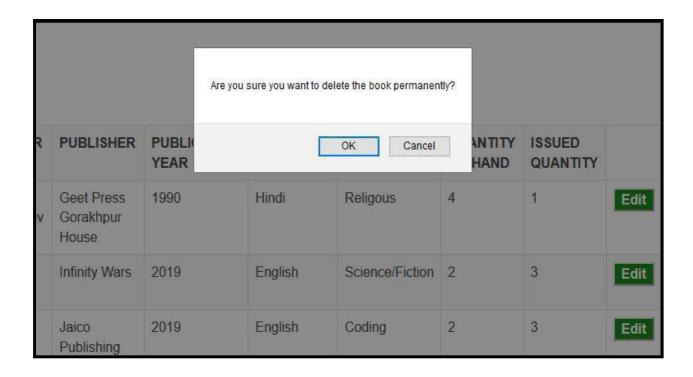
4.3 Book Management Section:

ILOAD AS CSV	ADD BO	DOKS		В	OOK SE	CTION				
BOOK NO	BOOK NAME	AUTHOR	PUBLISHER	PUBLICATION YEAR	LANGUAGE	GENRE	QUANTITY ON HAND	ISSUED QUANTITY		
BK1	Bhagvad Geeta	Krishna Vashudev Yadav	Geet Press Gorakhpur House	1990	Hindi	Religous	3	2	Edit	Mark As Deleted
BK2	Guliver Travels	Marvels	Infinity Wars	2019	English	Science/Fiction	2	3	Edit	Mark As Deleted
BK3	Anna Karenina	Leo Tolstoy	Jaico Publishing Houses	2019	English	Coding	2	3	Edit	Mark As Deleted
BK4	Madame Bovary Yadav	Gustave Flaubert Singh	Westland Publications House	2019	English	Health	100	1	Edit	Mark As Deleted
BK6	Geeta	Bharat	Sharma Publications	9099	French	Religious	1222	0	Edit	Mark As Deleted

4.4 Bootstrap Based Add Book Pop-Up Box:



4.5 Delete Book Confirmation Box:



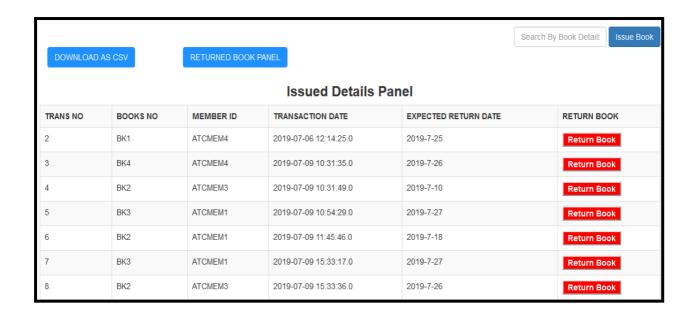
4.6 Member Management Section:

DOWN	LOAD AS CS	V ADD									
ID	NAME	CONTACT	EMAIL	EMP TYPE	SUPERVISOR NAME	SUPERVISOR EMAIL ID	ISSUED BOOKS	RETURNED BOOKS	PENDING BOOKS		
ATCMEM1	Aditya Bakliwal Singh	9911328263	aditya@americantower.com	Permanent	Aman Singhania	amansinghania@americantower.com	10	5	5	Edit	Mark As Deleted
ATCMEM2	Aayushi Singh	8146582353	aayushi@americantower.com	Permanent	Aakash Singh	aakashsingh@americantower.com	1	1	0	Edit	Mark As Deleted
ATCMEM3	Rohan Chandra	9810541189	rohan@americantower.com	Contract	Amrinder Singh	amrinder@americantower.com	2	0	2	Edit	Mark As Deleted
ATCMEM4	Sonal Ranjan Chandra	9810541189	sonal@americantower.com	Contract	Rohit Kumar Singh	rohit@americantower.com	2	0	2	Edit	Mark As Deleted
ATCMEM5	Karan Thakur	9717097707	karan@americantower.com	Permanent	Rahul Chandra	rahul@americantower.com	0	0	0	Edit	Mark As Deleted
ATCMEM6	Nikhil Thomas	9876543210	nikhil@americantower.com	Contract	Subhashree Singh	subhashree@americantower.com	2	2	0	Edit	Mark As Deleted

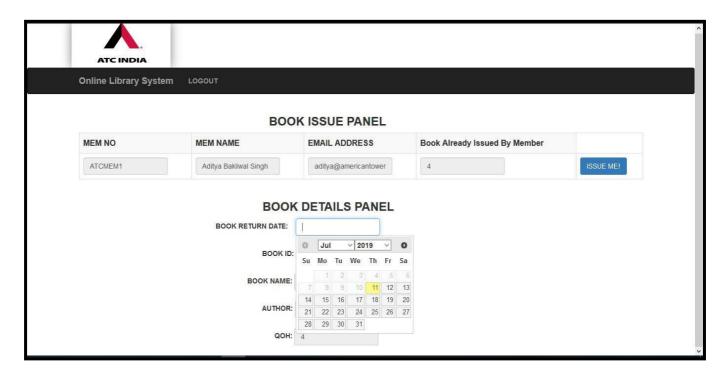
4.7 Update Member Details Panel:

ID
ATCMEM1
NAME
Aditya Bakliwal Singh
CONTACT
9911328263
EMAIL
aditya@americantower.com
EMP TYPE
Permanent
SUPERVISOR NAME
Aman Singhania
SUPERVISOR EMAIL ID
amansinghania@americantower.com
BOOK ISSUED TILL NOW
10
Update

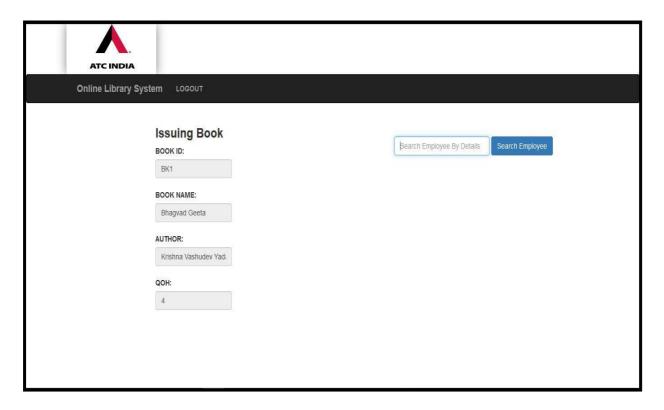
4.8 Issued Book Section:



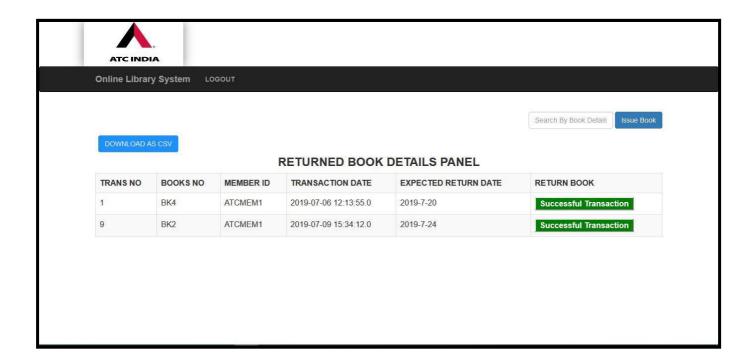
4.9 Search Book Section/ Issue Book Confirmation:



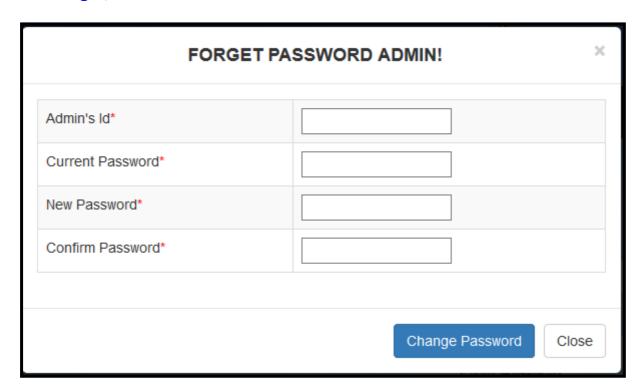
4.10 Search Employee Section For Issuing Book:



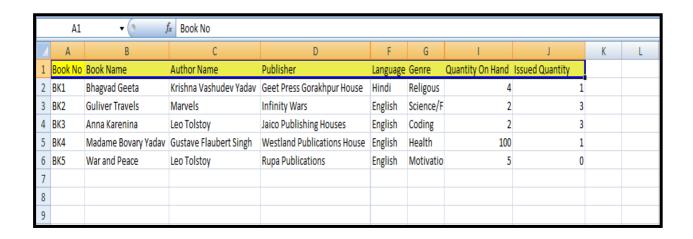
4.11 Returned Book Section (Already Returned Book):



4.12 Forget/Reset Admin and Librarian Password:



4.12 Exported Records in Local Computer System:





Thanks a lot to my mentors — Mr. Shubham Saxena sir and Mr. Amit Mohapatro sir. Thank you for being a such a great mentor and wonderful teacher. I look up to you so much — I hope one day to have achieved all in my career that you have achieved in yours.

Thanks **Mr. Naveen Gambhir sir!!** Thank you so much for giving me the opportunity to complete my internship under your guidance. I have thoroughly enjoyed my time working under your leadership.

Thank you **Mr. Pushipender Gupta sir**, for your supportYou are truly a great inspiration for me. Thanks for the inspiring talk and the wonderful workshop.

Thank you **Mr. Jagat Mohanty** sir (**Head ATC India HR Operations**), I would like to thank you for all that you have done for me.

My heartiest thanks to Mr. Pankaj Mittal sir (CHRO, Asia Pacific, ATC) for giving me the opportunity to complete my internship with ATC India.

