**Remote Internship Report**

**On**

***Library Management System Add-On Notifications Android App***

**At**

***(Tata Consultancy Services)***

***Submitted by***

**Dolly Rijwani**

***(130210019)***

**And**

**Shailendra Singh Verma**

***(130210042)***

***In partial fulfillment for the award of the degree***

***Of***

**Bachelor of Technology**

**IN**

**Computer science and engineering**

**Madan Mohan Malaviya University of Technology**

**Gorakhpur**

**(May-June 2016)**

**Table of contents**

1. Acknowledgement

2. Abstract

3. System requirement specifications (SRS)

3.1. Introduction

3.1.1 Purpose

3.1.2 Scope

3.1.3 Document Conventions

3.2. Overall Description

3.2.1 Product perspective

3.2.2 Product functions

3.2.3 User Classes and Characteristics

3.2.4 Assumptions and Dependencies

3.2.5 Operating Environment

3.3. External Interface Requirements

3.3.1 GUI

3.3.2 Login Interface

3.3.3 Search

3.3.4 Categories View

3.3.5 Librarian Control Panel

3.4. System Features

3.5 Other Non-Functional Requirements

3.5.1 Performance Requirement

3.5.2 Safety Requirement

3.5.3 Security Requirement

3.5.4 User Requirement

3.6 Other Requirement

3.6.1 Data and Category Requirement

3.6.2 Glossary

4. Workflow Diagram

4.1 Application Icon

4.2 Splash Screen

4.3 Welcome Screen

4.4 Member Login Screen

4.5 User Authentication

4.6 User Registration Screen I

4.7 User Registration II

4.8 Home Screen

4.9 Navigation Menu

4.10 Wish List Screen I

4.11 Wish List Screen II

4.12 Account Details Screen

4.13 About Us Screen

4.14 Help Screen

4.15 Terms & Conditions Screen

4.16 Search Screen

4.17 Menu Screen

4.18 Logout Screen

4.19 Librarian Authentication

4.20 Home Screen (Librarian)

4.21 Navigation Menu (Librarian)

4.22 Member List Screen

4.23 Librarian Account Details

4.24 Student Database

4.25 List view database

4.26 Admin Database

5. Summary of project work

6. References

**ACKNOWLEDGEMENT**

*“It is not possible to prepare a project report without the assistance & encouragement of other people. This one is certainly no exception.”*

On the very outset of this report, we would like to extend our sincere & heartfelt obligation towards all the personages who have helped us in this endeavor. Without their active guidance, help, cooperation & encouragement, we would not have made headway in the project. We are ineffably indebted to Mr. Anupam Sharma for conscientious guidance and encouragement to accomplish this assignment. We are also extremely thankful and pay our gratitude to our faculty Mr. Muzammil Hassan for his valuable guidance and support on completion of this project. We would also like to thank Tata Consultancy Services (TCS) who gave us the golden opportunity to do this project on the topic (Library Management System Add-On Notifications Android App), which also helped us in doing a lot of research and we came to know about so many new things about Android development.

We place our gratitude to our parents who always encouraged us to pursue our interest, who have led us onto the right path. Many are responsible for the knowledge and experience we have gained during our project. With profound sense of gratitude and regards we acknowledge for support extended by our friends for their support in completion of this project.

Finally, we would also like to thank all those who knowingly or unknowingly helped to us all throughout our project. Any omission in this brief acknowledgement does not mean lack of gratitude.

**ABSTRACT**

Our project “**Library Management System Add-On Notifications Android App**” is related to online notification system for availability of books.

The application to be developed benefits greatly the members and the Librarian of MMMUT. The system provides books catalog and information to members and helps them decide on the books to borrow from the library. The Librarian can keep the books catalog updated all the time so that the members (students) get the updated information all the time. This app will help students to track the books they need, and get notifications regarding the availability of the books.

The product to be developed has interactions with the users: Librarian, Members who are the students of Madan Mohan Malaviya University of Technology.

**Software Requirement Specification (SRS) Document**

1. **Introduction**

Borrowing books, returning books or viewing the available books at the Library of the local University is currently done manually where in the student has to go to the Library and check the available books at the Library. This takes at least twenty to thirty minutes.

We have decided to investigate the use of **Library Management System Add-On Notifications** **Android App**. This system would be used by members who may be students or professors of that University to check the availability of the books and borrow the books, and by the librarian to update the databases. The purpose of this document is to analyze and elaborate on the high-level needs and features of the *Library Management System***.** It focuses on the capabilities and facilities provided by a Library. The details of what all are the needs of the *Library Management System* and if it fulfils these needs are detailed in the specifications below.

* 1. **Purpose**

The main objective of this document is to illustrate the requirements of the project Library Management system. The document gives the detailed description of the both functional and non-functional requirements proposed by the client. The purpose of this project is to provide a friendly environment to maintain the details of books and library members. The main purpose of this project is to maintain easy circulation system using computers and to provide different reports.

## Scope

The Software Requirements Specification captures all the requirements in a single document. The *Add-on Notification App* that is to be developed provides extended support to existing Library system and books information to the members and employees of the library. The application is supposed to have the following features.

* The app provides Student/Faculty registration including create unique log-in (id/password).
* The app provides the members with the option to check their account and/or change their options like password of the account whenever needed all through the day during the library hours.
* The app lets the library staff to check which all members have been issued the books and whether they can borrow any more books or not.
* The app allows the Librarian to create the books catalog, add/delete books and maintain the books catalog.
* The app updates the billing system as and when the member borrows or returns a book.
* Based on the role the access level to be determined e.g. Faculty may be able to view more links than students or Faculty request should be given preference over students
* Admins and Faculty member should be able to generate reports with any number of fields (2 to 20) in a report in PDF, excel.

The features that are described in this document are used in the future phases of the software development cycle. The features described here meet the needs of all the users.

* 1. **Document Conventions**

Throughout the document we refer to the authority which is managing the library as Library Management System, SDK (acronym for software development kit), JDK (acronym for java development kit).

The term ’system’ refers to the software system that is setup for the purpose of managing issue of books, returning of books etc.

# Overall Description

1. **Product Perspective**

The application to be developed benefits greatly the members and the Librarian of MMMUT. The system provides books catalog and information to members and helps them decide on the books to borrow from the library. The Librarian can keep the books catalog updated all the time so that the members (students and the professors) get the updated information all the time. This app will help students to track the books they need, and get notifications regarding the availability of the books.

The product to be developed has interactions with the users: Librarian, Members who are the students and professors of the MMMUT.

**2.2 Product Functions**

The application provides real time information about the books available in the Library and the user information. The Product functions are more or less the same as described in the product perspective. The functions of the system include the system providing different type of services based on the type of users [Member/Librarian].

* The member should be provided with the updated information about the books catalog.
* Provisions for the members to borrow the books they want, if all the other required rules hold good.
* The member is given a provision to check his account information and change the account information any time in the given valid period.
* The members are provided with the list of books available and allowed to choose the books, which they want to use in the coming up days.
* The librarian can get the information about the members who have borrowed or returned the books.
* The librarian is provided with interfaces to add/delete the books available in the book catalog.
* The members when complete the book borrowing or returning process, the due to be paid by the member must be calculated and the information about the member and the due amount is sent to the billing system.
* The system uses the University information security requirements to provide the login facility to the users.

**2.3 User Classes and Characteristics**

The system provides different types of services based on the type of users [Member/Librarian]. The Librarian will be acting as the controller and he will have all the privileges of an administrator. The member can be either a student or staff of the university who will be accessing the Library online.

The features that are available to the Librarian are:-

* Can view the different categories of books available in the Library
* Can view the List of books available in each category
* Can take the book returned from students
* Add books and their information to the database
* Edit the information of existing books
* Can check the report of the existing books
* Can check the report of the issued books
* Can access all the accounts of the students

The features that are available to the Members are:-

* Can view the different categories of books available in the Library
* Can view the List of books available in each category
* Can own an account in the library.
* Can view the books issued to him
* Can put a request for a new book
* Can view the history of books issued to him previously
* Can search for a particular book

**2.4 Assumptions and dependencies**

* The users have sufficient knowledge of android mobile.
* The product can access the university student database.
* The system should be user-friendly so that it is easy to use for the users.
* Any update regarding the book from the library is to be recorded to the database and the data entered should be correct.
* Working Internet connection.

**2.5 Operating Environment**

The server should have Android SDK installed on the machine, along with JDK.

1. **External Interface Requirement**
   1. **GUI**

The software provides good graphical interface for the user and the administrator can operate on the system, performing the required task such as create, update, viewing the details of the book.

* It allows user to view quick reports like Book Issued/Returned in between particular time.
* It provides stock verification and search facility based on different criteria.
* The user interface must be customizable by the administrator
* All the modules provided with the software must fit into this graphical user interface and accomplish to the standard defined
* The design should be simple and all the different interfaces should follow a standard template
* The user interface should be able to interact with the user management module and a part of the interface must be dedicated to the login/logout module

**Login Interface:-**

In case the user is not yet registered, he can enter the details and register to create his account. Once his account is created he can ‘Login’ which asks the user to type his username and password. If the user entered either his username or password incorrectly then an error message appears.

**Search:-**

The member or librarian can enter the type of book he is looking for and the title he is interested in, then he can search for the required book by entering the book name.

**Categories View:-**

Categories view shows the categories of books available and provides ability to the librarian to add/edit or delete category from the list.

**Librarian’s Control Panel:-**

This control panel will allow librarian to add/remove users; add, edit, or remove a resource. And manage lending options.

1. **System Features**

The users of the system should be provided the surety that their account is secure. This is possible by providing:-

* User authentication and validation of members using their unique member ID
* Proper monitoring by the administrator which includes updating account status, showing a popup if the member attempts to issue number of books that exceed the limit provided by the library policy, assigning fine to members who skip the date of return
* Proper accountability which includes not allowing a member to see other member’s account. Only administrator will see and manage all member accounts

1. **Other Non-functional Requirements**
   1. **Performance Requirement**

The proposed system that we are going to develop will be used as the Chief performance system within the campus of the university which interacts with the university staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the university.

* The performance of the system should be fast and accurate
* The application shall handle expected and non-expected errors in ways that prevent loss in information and long downtime period. Thus it should have inbuilt error testing to identify invalid username/password
* The system should be able to handle large amount of data. Thus it should accommodate high number of books and users without any fault

**5.2 Safety Requirement**

The database may get crashed at any certain time due to virus or system failure. Therefore, it is required to take the database backup so that the database is not lost.

**5.3 Security Requirement**

* System will use secured database
* Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
* System will have different types of users and every user has access constraints
* Proper user authentication should be provided
* No one should be able to hack users’ password
* There should be separate accounts for admin and members such that no member can access the database and only admin has the rights to update the database.

**5.4 User Requirement**

The users of the system are members and Librarian of the university who act as administrator to maintain the system. The administrators of the system should have more knowledge of the internals of the application. The proper user interface, user manual, online help and the guide to install and maintain the application must be sufficient to educate the users on how to use the application without any problems.

The admin provides certain facilities to the users in the form of:-

* Backup and Recovery
* Forgot Password
* Data migration i.e. whenever user registers for the first time then the data is stored in the server
* Data replication i.e. if the data is lost in one branch, it is still stored with the server
* Auto Recovery i.e. frequently auto saving the information
* Maintaining files i.e. File Organization
* The server must be maintained regularly and it has to be updated from time to time

1. **Other Requirements**
   1. **Data and Category Requirement**

There are different categories of users namely teaching staff, Librarian, Admin, students etc. Depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, delete, append etc. All other users except the Librarian only have the rights to retrieve the information about database. Similarly there will be different categories of books available. According to the categories of books their relevant data should be displayed. The categories and the data related to each category should be coded in the particular format.

* 1. **Glossary**

The following are the list of conventions and acronyms used in this document and the project as well:

* **Administrator**: A login id representing a user with user administration privileges to the software
* **User**: A general login id assigned to most users
* **Client**: Intended users for the software
* **Layer**: Represents a section of the project
* **User Interface Layer**: The section of the assignment referring to what the user interacts with directly
* **Application Logic Layer**: The section of the assignment referring to the Web Server. This is where all computations are completed
* **Data Storage Layer**: The section of the assignment referring to where all data is recorded
* **Interface**: Something used to communicate across different mediums
* **Unique Key**: Used to differentiate entries in a database (Student Roll No.)

WORKFLOW DIAGRAM

|  |  |
| --- | --- |
| 1. Application Icon   As shown in the figure, the highlighted icon is the icon for our app. |  |
|  | 1. Splash Screen   After launching the app, a splash screen as depicted is shown for 5 seconds. |
| 1. Welcome Screen   After the splash screen ends, we are directed to welcome screen that shows two options that are Member Login and Librarian Login. In the background of this activity, a handshake with GCM server is done after which the device is registered for notifications. |  |
|  | 1. Member Login Screen   After choosing Member Login option, the user is directed to Member Login Screen which takes username and password as input and checks the authenticity of user. If the user is not currently registered, he/she can do so by clicking the register button. |
| 1. User Authentication  * The first and second screen shows a toast when the user presses login button without entering his credentials. * The third screen shows a toast when the user tries to login with incorrect credentials. | |
|  | |

|  |
| --- |
|  |
| 1. User Registration Screen I   When a new user hits register button, he is directed to the first screen as shown. Here the app checks if any field is empty or not and also generates a toast regarding it. Also if the passwords don’t match in the last two fields, it generates a toast for it. |

|  |
| --- |
|  |
| 1. User Registration Screen II   If a user tries to register with already registered Roll No, he gets toast depicting data insertion error for duplicate entry. Otherwise, the user is successfully registered and is taken back to login screen. |

|  |  |
| --- | --- |
|  | 1. Home Screen   After successful login, the user is directed to home screen which contains screen slider which shows the recent additions to the library.  Below screen slider, there is a listview which depicts all the books available in library database.  On the right hand side of action bar, we are provided with Search action and Menu bar and on left hand side, we have a navigation menu for different functionalities for general members. |
| 1. Navigation Menu   In the navigation header name and email-id of the user is displayed.  Below it the navigation menu has several options for checking out his account details, terms & conditions for the use of app. Furthermore, it also gives information about help center and developer team. Books can also be added to wish list by the option Add to Wish list. Users can also logout from the logout option given at the bottom. |  |
|  | |
| 1. Wish list Screen I   On selecting add to wish list option we are directed to the first screen showing list of available books. On clicking on the item we are directed to next screen from where we can add an item to our cart after clicking on add to list button and a toast is generated showing that item is added to list. If the user adds an item that is already in cart then the text on button is changed to item in cart. | |
|  | |
|  | |
| 1. Wish list Screen II  * If the user tries to see his wish list when he has not added any books then we get the first screen. * If the user has added some books then on clicking on the view wish list button the second screen is displayed and if he has to remove certain items from his wish list, then the below two screens depict that transition. | |
|  | |

|  |  |
| --- | --- |
|  | 1. Account Details Screen   On clicking the Account info option on navigation menu the user is directed to this screen which has all the details the user has given at the time of registration. |
| 1. About Us Screen   This screen displays the details about developers of the application when the user clicks on the About Us option on navigation menu. |  |

|  |  |
| --- | --- |
|  | 1. Help Screen   This screen is displayed when the user clicks on Help center option on navigation menu which has contact information of help desk. |
| 1. Terms & Conditions Screen   This screen is displayed when the user clicks on terms & condition option on navigation menu which has legal information about the use of app. |  |

|  |  |
| --- | --- |
|  | |
| 1. Search Screen   When the user clicks on search action button on the action bar of home page a search query field is provided as shown in first screen. If for instance search query is “java” and the user hits search button, the app displays all the books of Java. If the user clicks on any item he is directed to next screen showing all the details of that particular book. | |
|  | 1. Menu Screen   On clicking the menu button on action bar we get four options; Account Info, Wish list, developer team info and a log out option. |
| 1. Log Out Screen   The user gets these screens when he clicks the log out option either from Menu bar or from Navigation menu or simply by pressing back button from home screen. | |
|  | |

|  |  |
| --- | --- |
|  | |
| 1. Librarian Authentication   After choosing Librarian Login option, the librarian is directed to Login Screen which takes username and password as input and checks the authenticity of librarian. The second and third screen shows a toast when the user presses login button without entering his credentials. The fourth screen shows a toast when the user tries to login with incorrect credentials. | |
|  | |
|  | 1. Home Screen (Librarian)   After successful login, the librarian is directed to home screen which has all the functionalities same as that of the user home screen. |
| 1. Navigation Menu (Libraraian)   In the navigation header name and email-id of the librarian is displayed.  Below it the navigation menu has several options: Add to wish list, About Us, Help Center, terms & conditions and Logout options are same as in user navigation menu. The extra option added to the Librarian navigation menu is Member list in which we get the list of all the members who have registered to this app. Librarian can also check out his account detail by clicking on Account Info option. |  |
|  | 1. Member List Screen   This screen displays the list of the members who have registered to this app. The list shows the Name, Email, Roll No and Branch of the members. |
| 1. Librarian Account Details   On clicking the Account info option on navigation menu the librarian is directed to this screen which has all the details the librarian. |  |
| 1. Student databse   In this database we have the details of the users, who have registered to the app. | |
| 1. Listview Database   The listview which is displayed in the home screen has been fetched from this database in which we have Book-Image, Name of the book, Author Name and Availability of the book. | |
| 1. Admin Database   In this database we have login credentials of Librarian. | |

Summary of the Project work

In whole procedure to develop the application, we first gather the requirement of the project and decide the time schedule. After planning we design the documentation of project. After the design we generate the code of application. In design the code we do the error estimation and effort estimation. If error is occur then solve it. Finally when code is designed then tests the project.

References

* https://openshift.redhat.com
* https://developer.android.com
* http://stackoverflow.com
* https://github.com