

Student Companion
Fourth Iteration Report
COMP-SCI 5551 Advanced Software Engineering

Group 7

Sri Harsha Chennavajjala (7)

Teja Garidepally (12)

Raj Kiran Reddy Munnangi (32)

Suhas Sai Raparathi (51)

Introduction

This document is intended to provide an overall description of the project named “Student Companion” in detail. The project schedule and the plan of action is also discussed. The proposal document will give an insight on the project. The outcome of the fourth increment is the final web and mobile application with end to end user functionality.

Project Goal and Objectives

The goal of this project is to provide various functionalities that a student uses regularly such as updating the profile, checking for computer lab availability, library study room reservation etc. The student details will already present in the database. The student has to login before he uses these functionalities. Main objectives of this application are:

- To reduce the student’s stress and to save the student’s time by providing the latest availability of the computer labs.
- To develop an application that helps the students in taking the decision on to which laboratory the students have to go.
- To secure the information by providing a login form to the end user.
- To provide a tool with which the students will be able to reserve the library study rooms.
- To ensure that the student will never miss his schedules by setting reminders.
- To enable the Student Assistants to view their shifts, post and take substitutions.
- To provide the students with the option to update their address or mobile phone number etc.

Project Background and Related Work

Some functionalities of this application are already exist. We are creating a new android application which integrates (mash up) all the available and new functionalities under one hood, thus making the application a viable one. Some functionalities will be developed by importing the existing APIs into our application like Google Calendar API, Google Maps API etc. We are inspired by the problems that the Students are currently facing in reserving the study rooms, problems related to their working shifts and we came up with a solution which can resolve the existing challenges.

Significance:

The major significance of the application lies in mashing up of all the useful services under one system. This will save the student’s time and increases the productivity. The application will prevent the fraudulent usage by restricting the resources access to only the students who

successfully logged in to the system. As of now, the student assistants has to go through a lengthy process in order to post or take shifts. The proposed application will make it easier for the student to perform such tasks by providing on-the-go support.

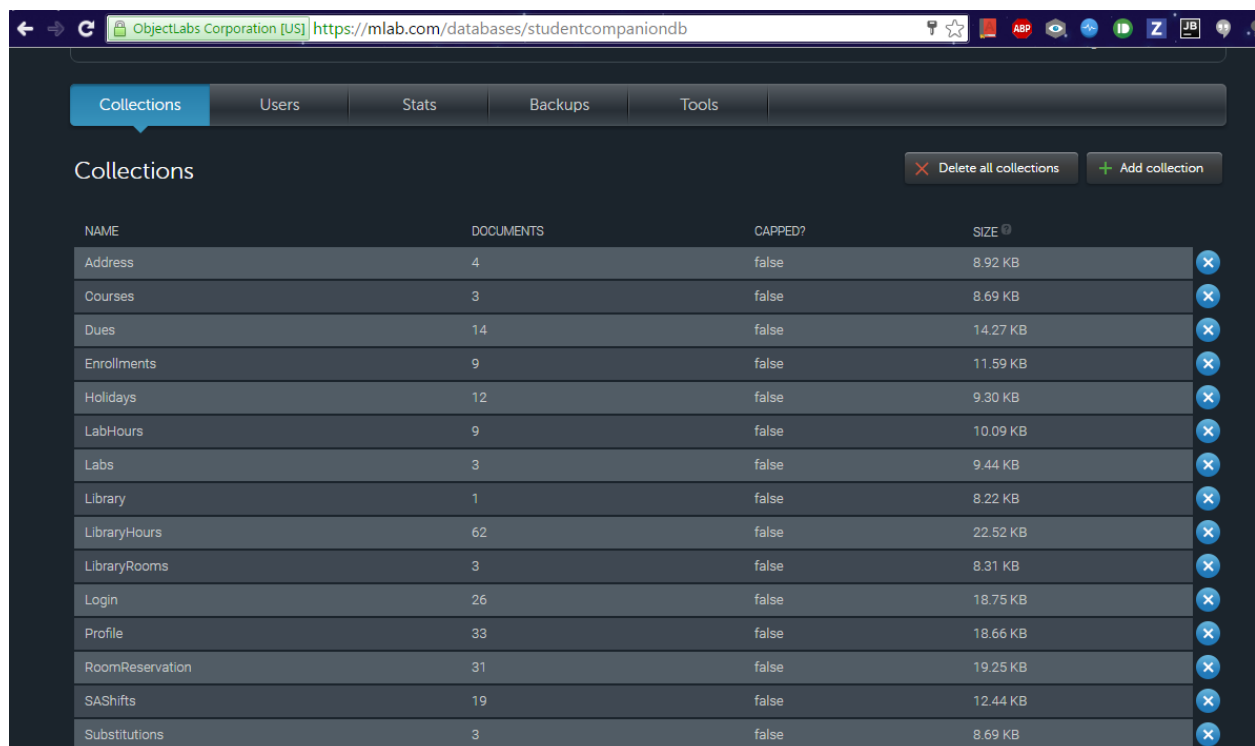
Work flow

The first workflow of the application is that of the designing the User Interface for the system. Our application goal is to provide instant access to the user regarding lab availability and library room availability. So, for this we are developing a mobile application. We are using ionic framework so that we can develop hybrid application.

Second, we have created the login page and database using MongoLab and we have successfully authenticated the user based on his details which are stored in database in mongodb.

The third workflow deals with the creating a mongodb database to store and retrieve the user profile and information about IS labs, library study rooms etc. The work flow of the each and every feature of the application is explained through sequence diagrams and state chart diagram presented in the first increment report.

Fourth workflow deals with the end to end functional development of the application. Development of each and every feature of the application. Successfully running the application on web browser and in mobile phone.



NAME	DOCUMENTS	CAPPED?	SIZE	
Address	4	false	8.92 KB	X
Courses	3	false	8.69 KB	X
Dues	14	false	14.27 KB	X
Enrollments	9	false	11.59 KB	X
Holidays	12	false	9.30 KB	X
LabHours	9	false	10.09 KB	X
Labs	3	false	9.44 KB	X
Library	1	false	8.22 KB	X
LibraryHours	62	false	22.52 KB	X
LibraryRooms	3	false	8.31 KB	X
Login	26	false	18.75 KB	X
Profile	33	false	18.66 KB	X
RoomReservation	31	false	19.25 KB	X
SAShifts	19	false	12.44 KB	X
Substitutions	3	false	8.69 KB	X

Fig: Collections in Mongo Database

Technological and architecture requirements

In the application system need to interact with the database for retrieving the data to do this interaction between the system and database is done through REST technology. We use CRUD API calls of the REST for accessing the database.

Ionic framework, it is a powerful SDK used to develop hybrid applications using web technologies like HTML, CSS and JavaScript. It is also a core in providing better UI to the user.

The architectural requirement aims at the development of flexible architecture for the better interaction between the system and the database.

Existing Services/API

We have so far used the MongoDB in our application. MongoDB is a cross-platform document-oriented database and it is a NoSQL database, MongoDB avoids the traditional table-based relational database structure in favor of JSON-like documents with dynamic schemas making the integration of data in certain types of applications easier and faster.

We have used mongoDB to store the information of the users and data about the IS labs, library study rooms, student assistant information etc. Using REST API calls data is retrieved from the database and displayed to the user.

mLab is a fully managed cloud database service that hosts and provide featuring automated provisioning and scaling of MongoDB databases. Data can be accessed from mongoDB using two ways. First, by using the DATA API URL in which it contains database name, collection name and API key.

Example URL:

https://api.mongolab.com/api/1/databases/studentcorner/collections//Ase_project/' + id + '?apiKey=Q_u73BV4oOdMGpnu3WFGmJ8YH_lxHDHQ

Second, accessing the mongoDB using a driver to connect the database. An example driver:

```
mongodb://<dbuser>:<dbpassword>@ds011399.mlab.com:11399/studentcompaniondb
```

REST Services:

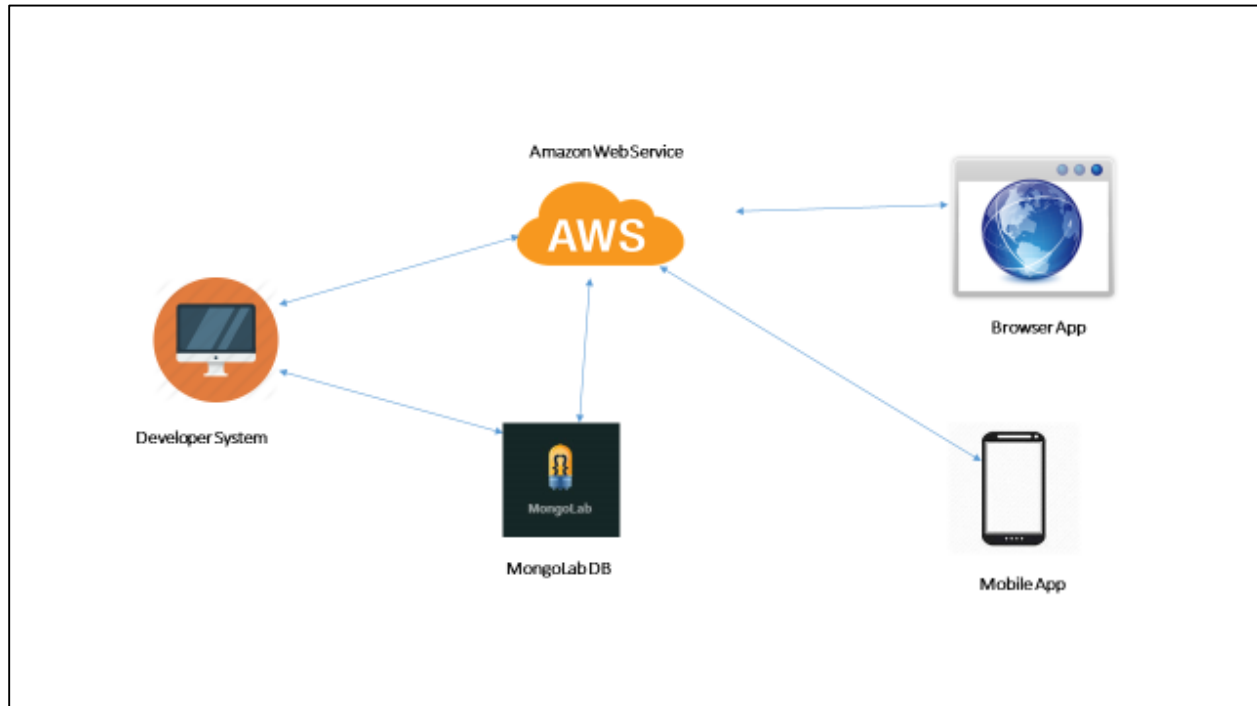


Fig: REST API Communication with mongoDB and Application

We have developed an API through which we perform the REST services for our application. As in the second increment we have developed database in the mongoLab and the data is fetched from the mongoLab through REST services.

Amazon Web Services (EC2):

We have used Amazon Web Services as a server to host our REST API. Our REST API will run in background and listen to port 9000. Our application send data request to the REST API hosted on Amazon EC2 cloud server. REST API will fetch the request data from mongoDB collections and perform the filtering of data according to the criteria and sends responds to the client application. This enables us complex queries on the server instead on the client thereby increasing the performance of client application.

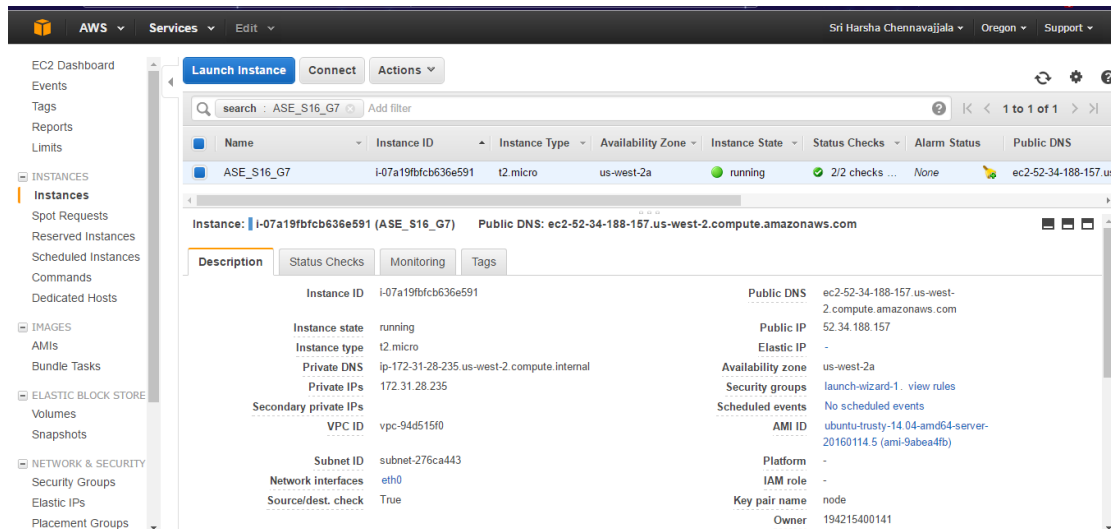


Fig: Amazon Web Services (EC2) Dashboard - Hosting our REST API

Architecture Diagram

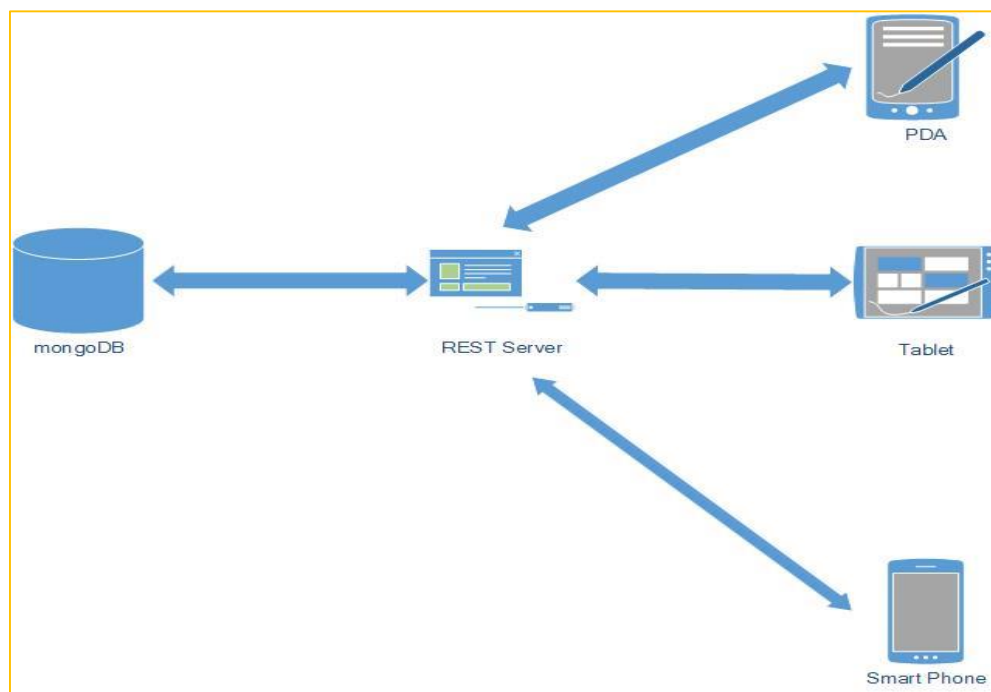


Fig: Architecture Diagram for StudentCompanion application

The architecture diagram for our application shows that it is 3-tier architecture. Application which deployed in smart phones, PDA's and Tablet uses the REST services for interacting with the database for storing and retrieval of required information from the mongoDB.

Project plan

The proposed project plan is outlined the by the screenshot from the ZenHub tool. The project is divided into four milestones. Each iteration has several states namely future tasks, new issues, to do, development in progress, testing in progress, done and closed.

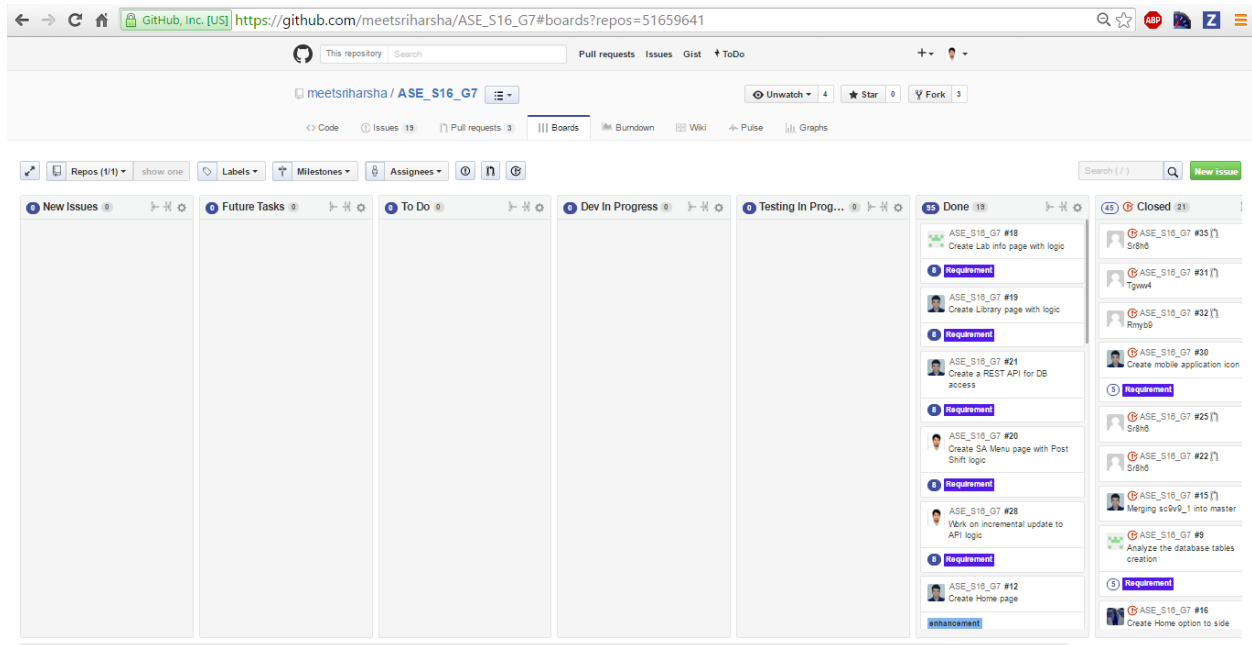


Fig: ZenHub Board showing the project plan and current tasks.

Milestone 4:

This milestone mainly deals with the designing the end to end functionality of the system. The tasks of this phase mainly focuses six tasks.

First, the development of REST API which performs the communication between Client application and database.

Second, development of Profile page and display the profile of the user which is stored in the mongoDB. Developed the functionalities for register user, edit profile and edit password.

Third, development of Lab Information page and display the Lab name and lab details.

Fourth, development of Reserve Study Room page and display the Library information, study rooms which are reserved by the user and available study rooms and the details of resources present in it and cancellation of reserved study room.

Fifth, development SA Menu page and display the SA Shifts of the user and available shifts on a selected date. Developed the functionality for taking the available substitutions.

Sixth. Implemented the toast functionality for the final application.

The results of this milestone contains the screenshots of the application and the related class, sequence and state chart diagrams.

Fourth Increment Report

This document contains the report of fourth increment work done on the Student Companion application. This document emphasizes the final end to end implementation of the application using different technologies such as REST API, Amazon Web Services, Ionic framework and mongoDB. We're using the HTML5, CSS ,Node.js, , ExpressJS and Angular JS for the end to end implementation.

We have created REST API which host on the Amazon Web Services through which communication between client application and database.

We have created the Profile, Register, Edit Profile, Lab Information, Reserve Study Room, SA Menu, Contact Us pages. We have also checked the work so far by deploying the application in the mobile and manual testing is done.

The detail development in fourth increment include the enhancement of Profile, Lab Information, Reserve Study Room, SA Menu, Contact Us pages and development of Register and Edit Profile pages. Developed an icon for the application.

Class diagram for the high level design of the application:

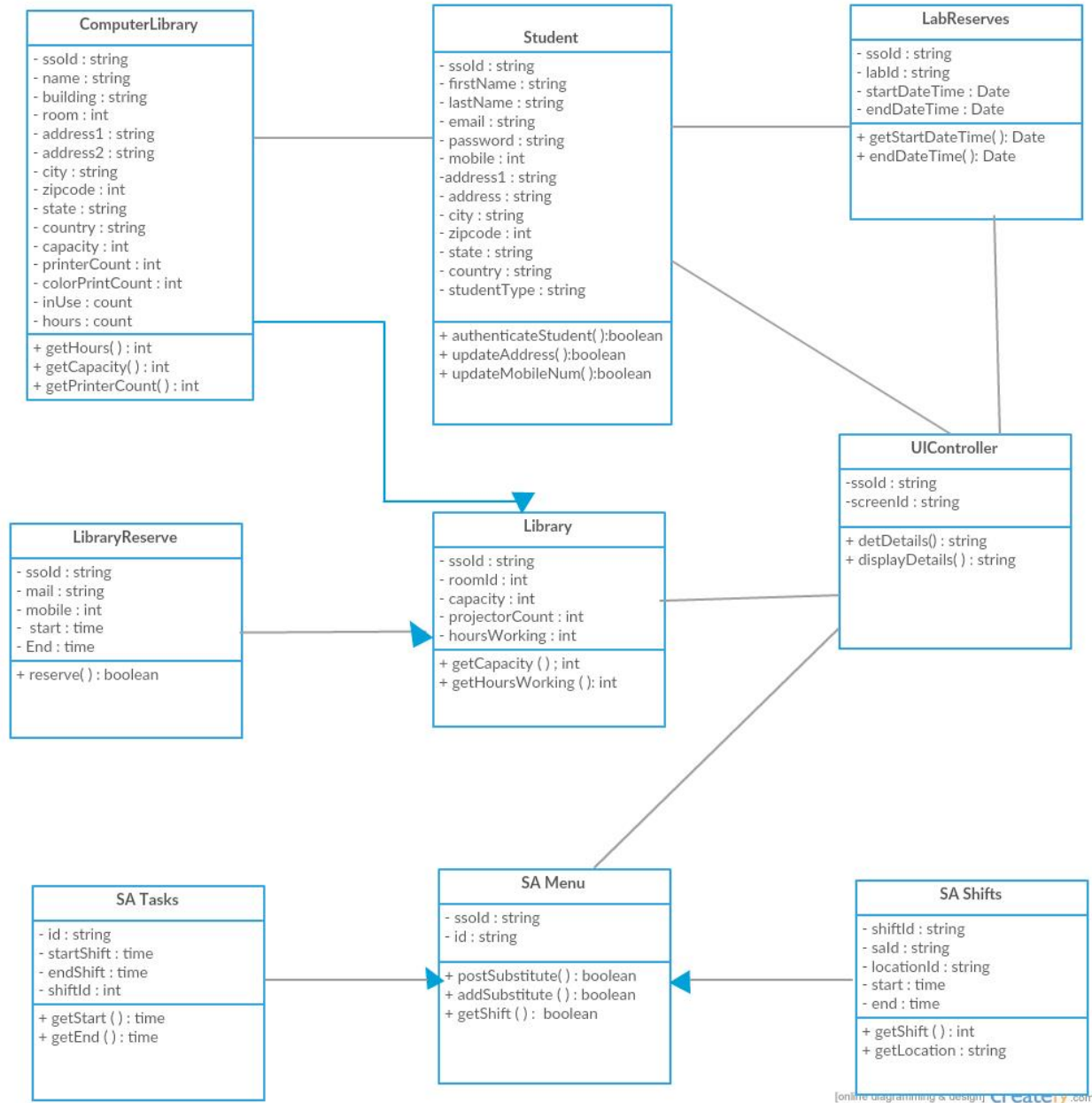


Fig: Demonstrates a class diagram of high level design of application

Sequence diagrams for the high level design of the application:

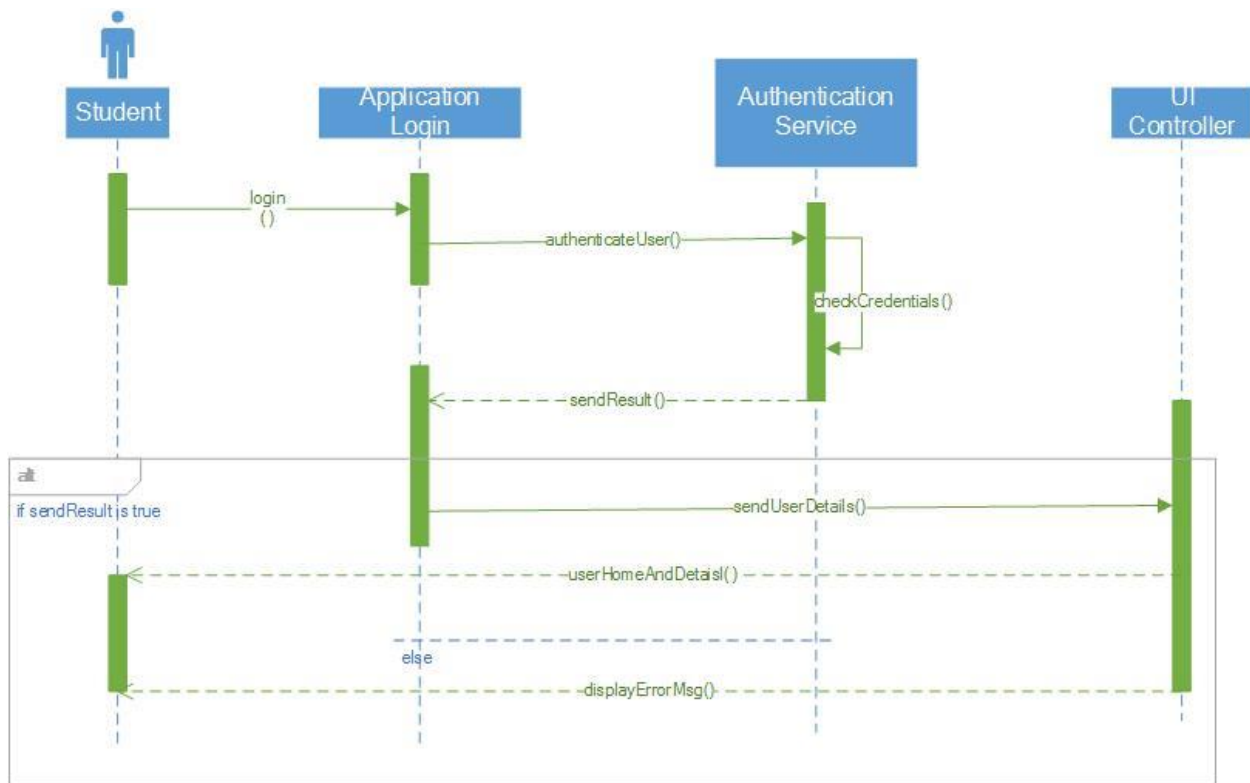


Fig: Sequence diagram for student login activity

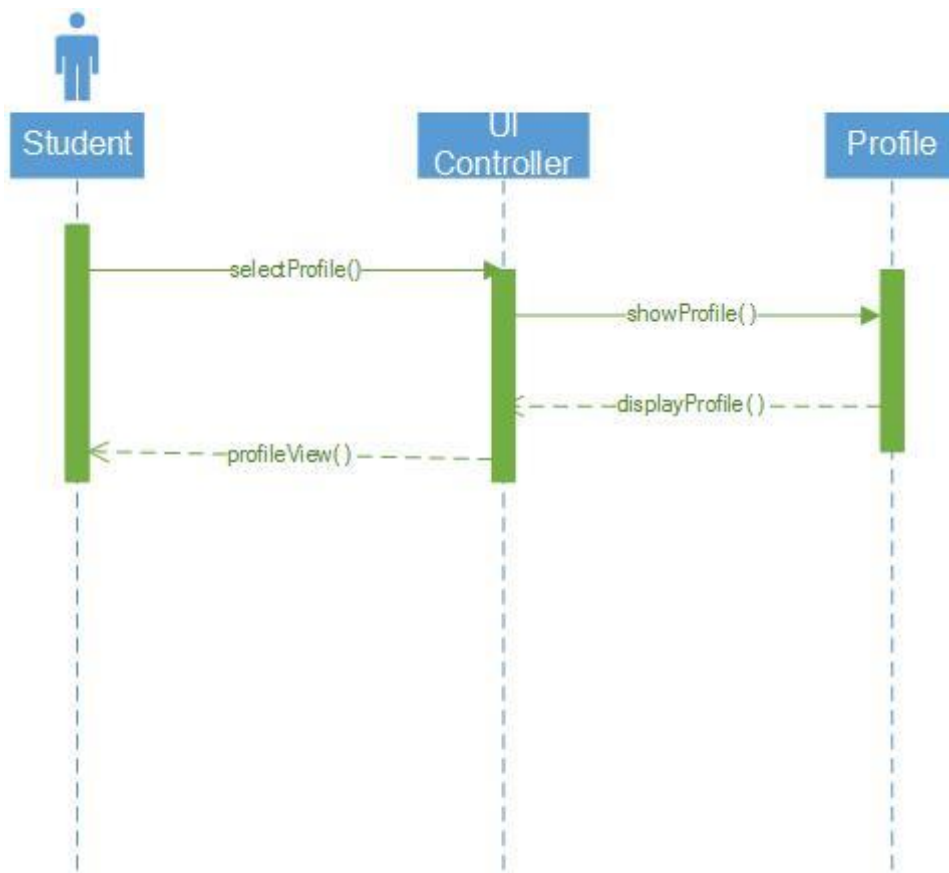


Fig: Sequence diagram shows the control flow for “view user profile” task

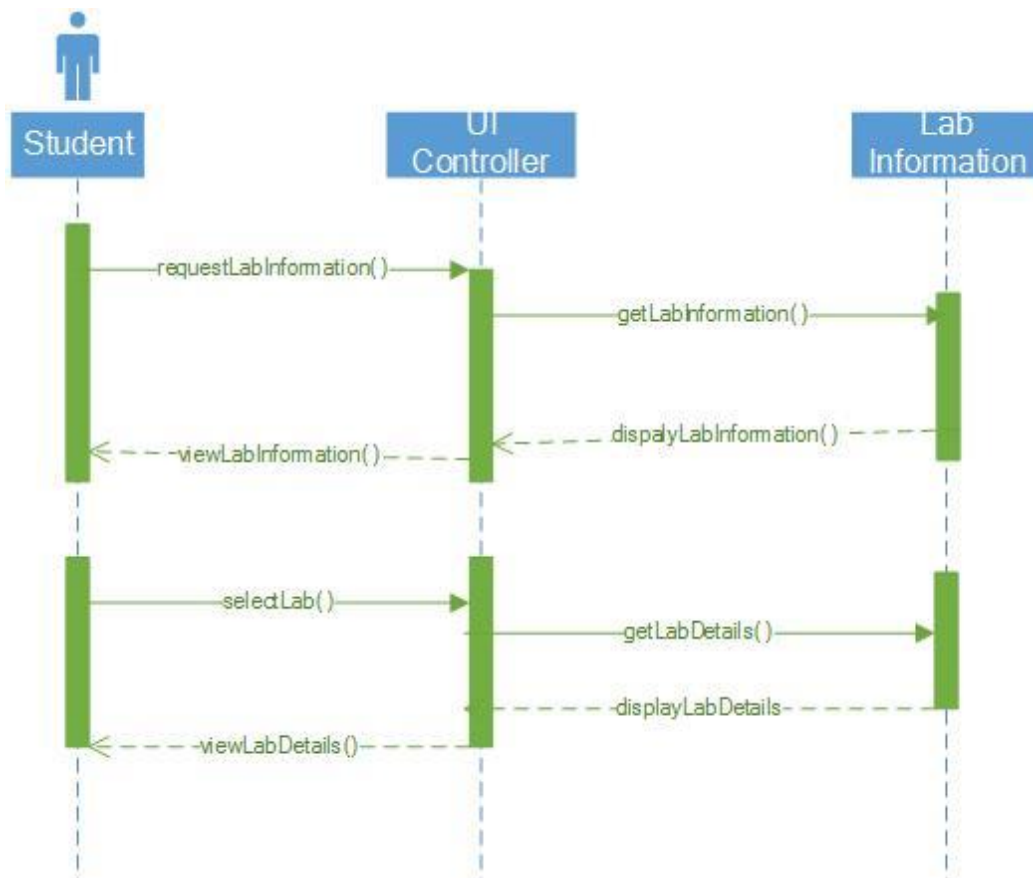


Fig: Sequence diagram for "View lab information" activity

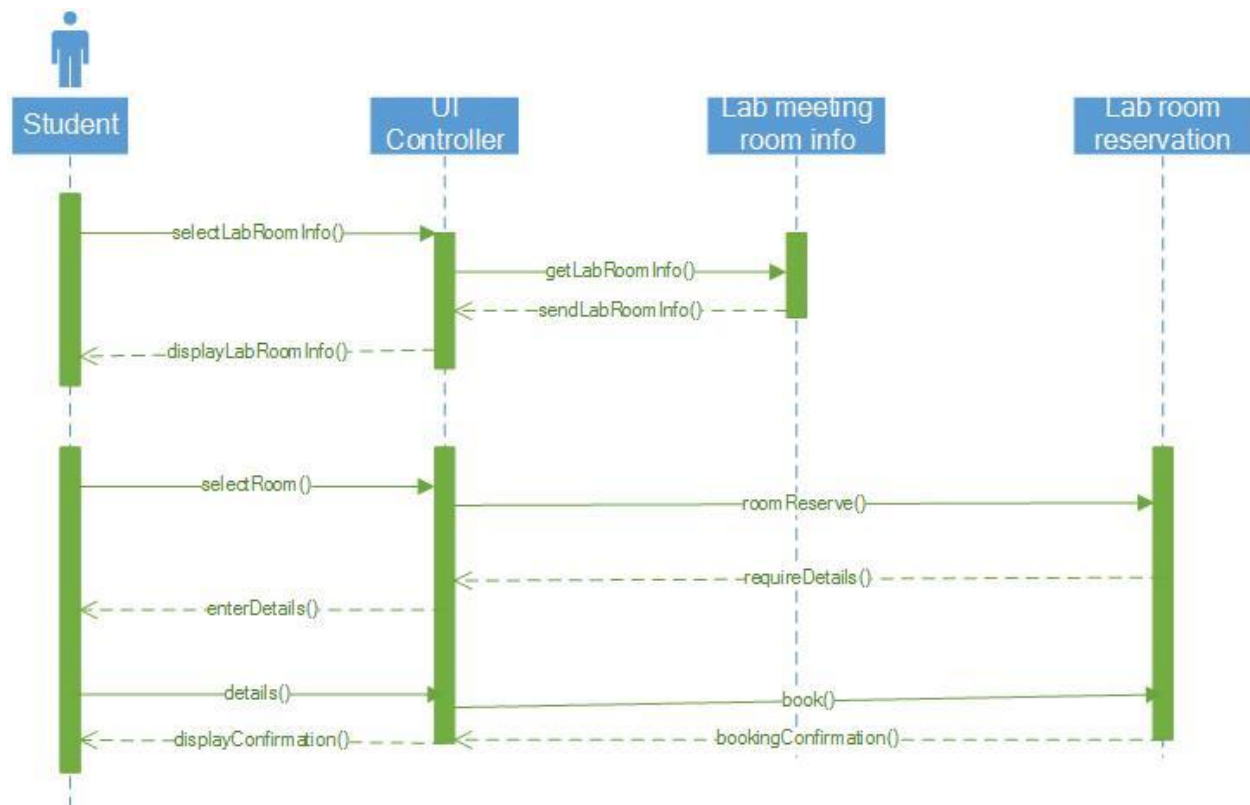


Fig: Sequence diagram for reserving library study room activity

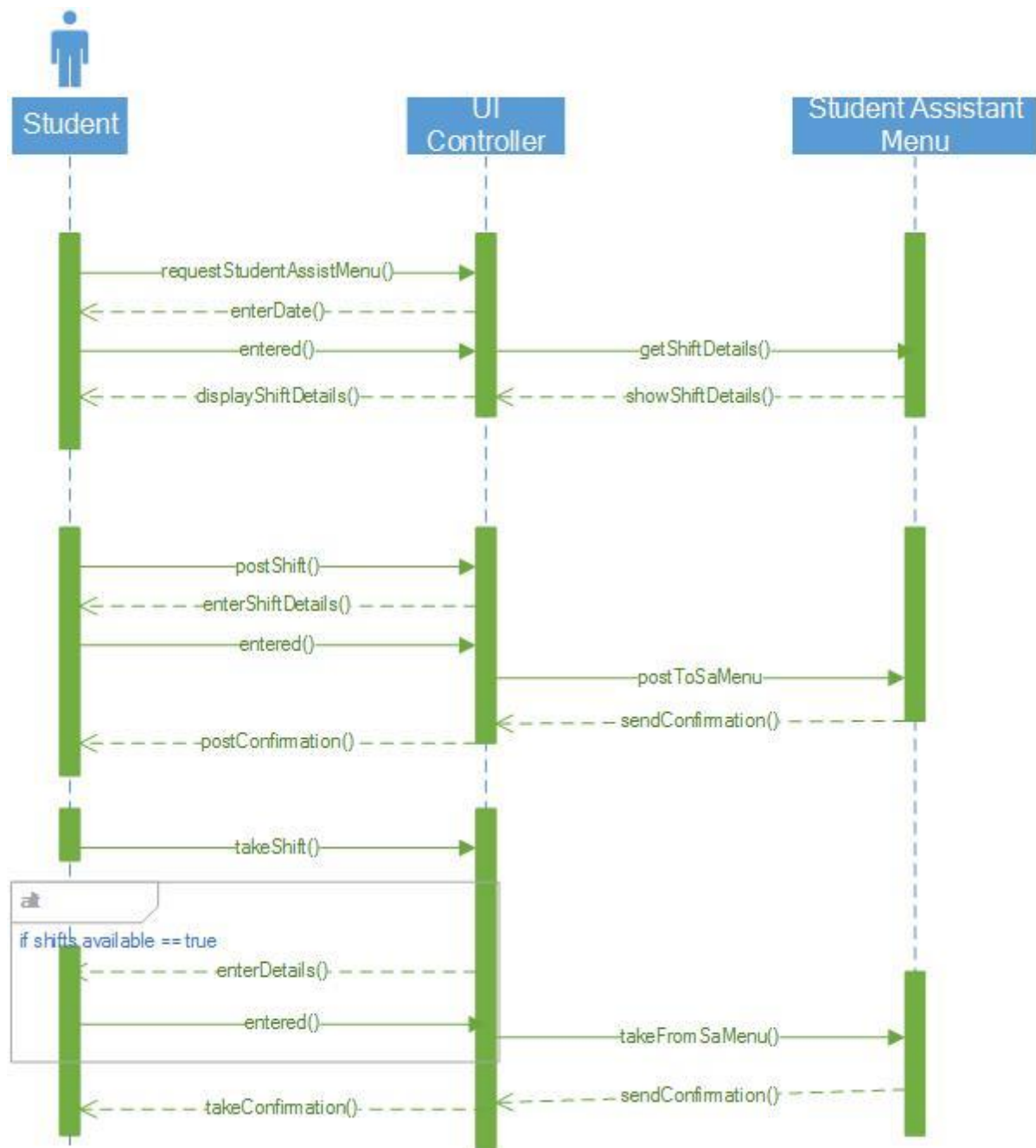


Fig: Sequence diagram for student assistant activities like post or take shifts.

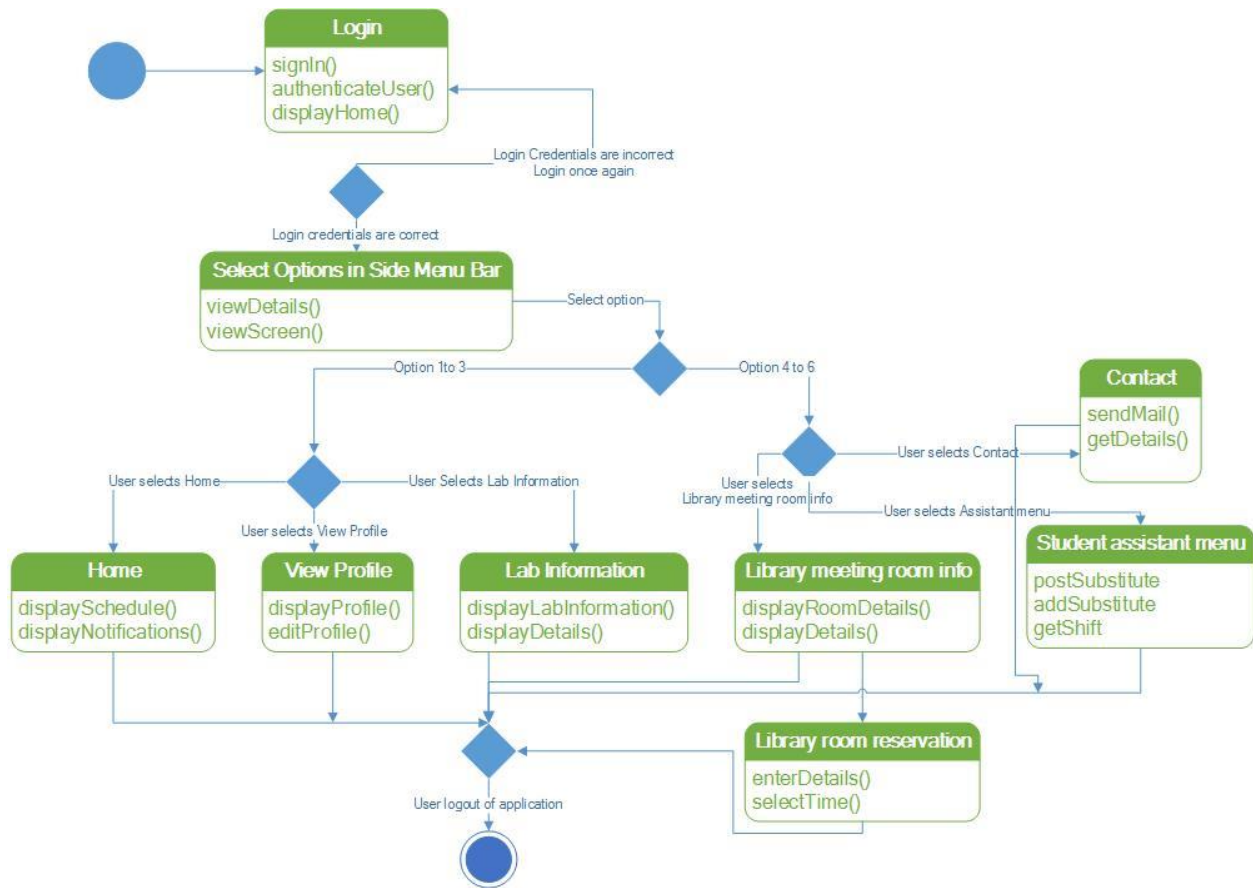


Fig: State chart diagram for the application modules.

Wireframes of the application:

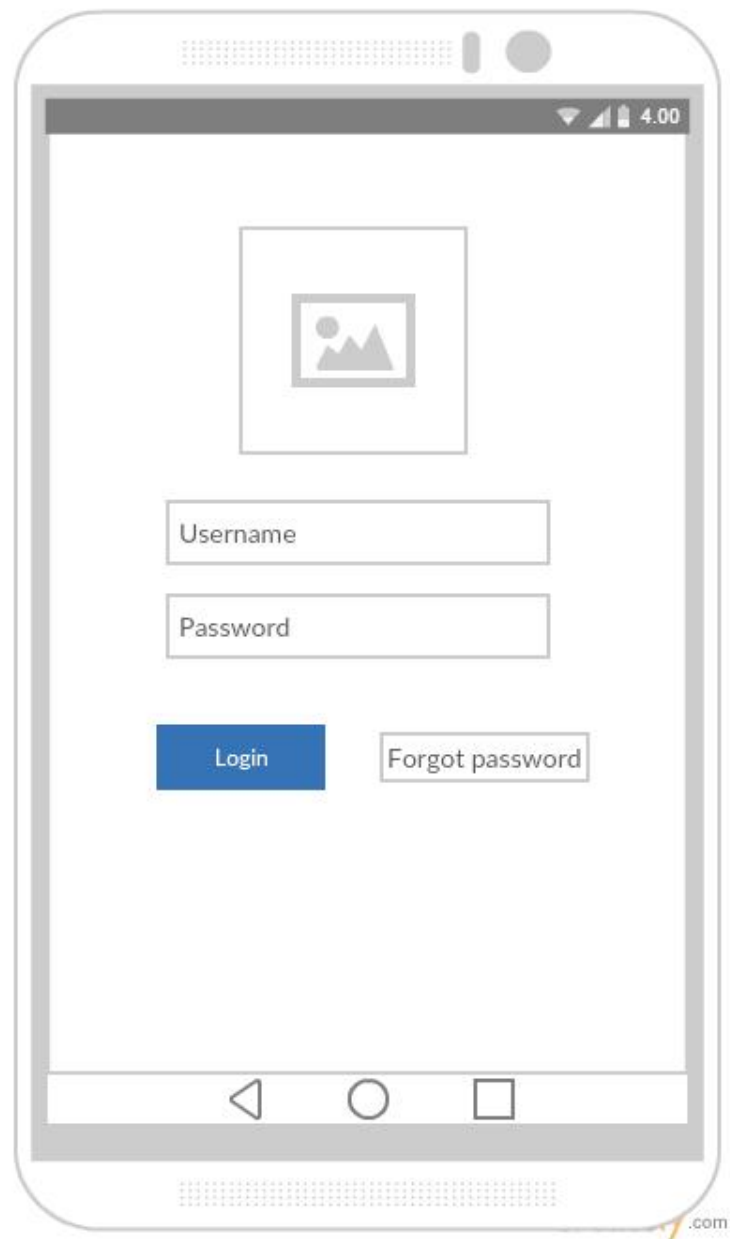


Fig: Login screen

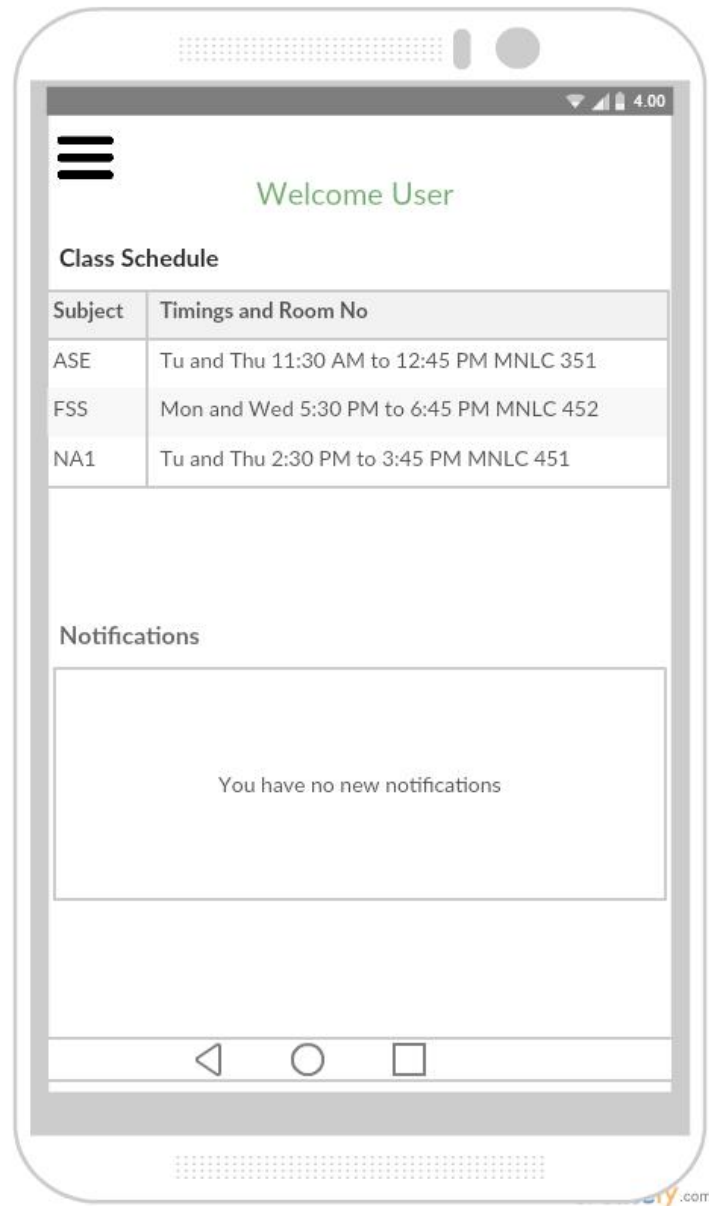


Fig: Main Home page

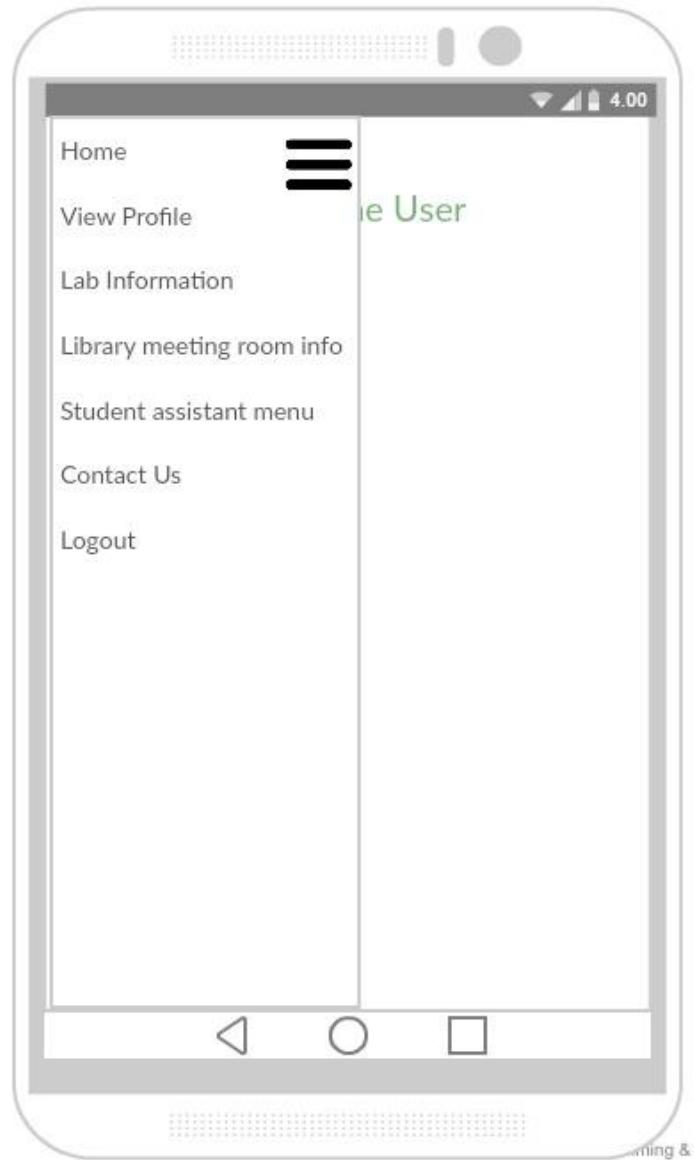


Fig: Side menu bar

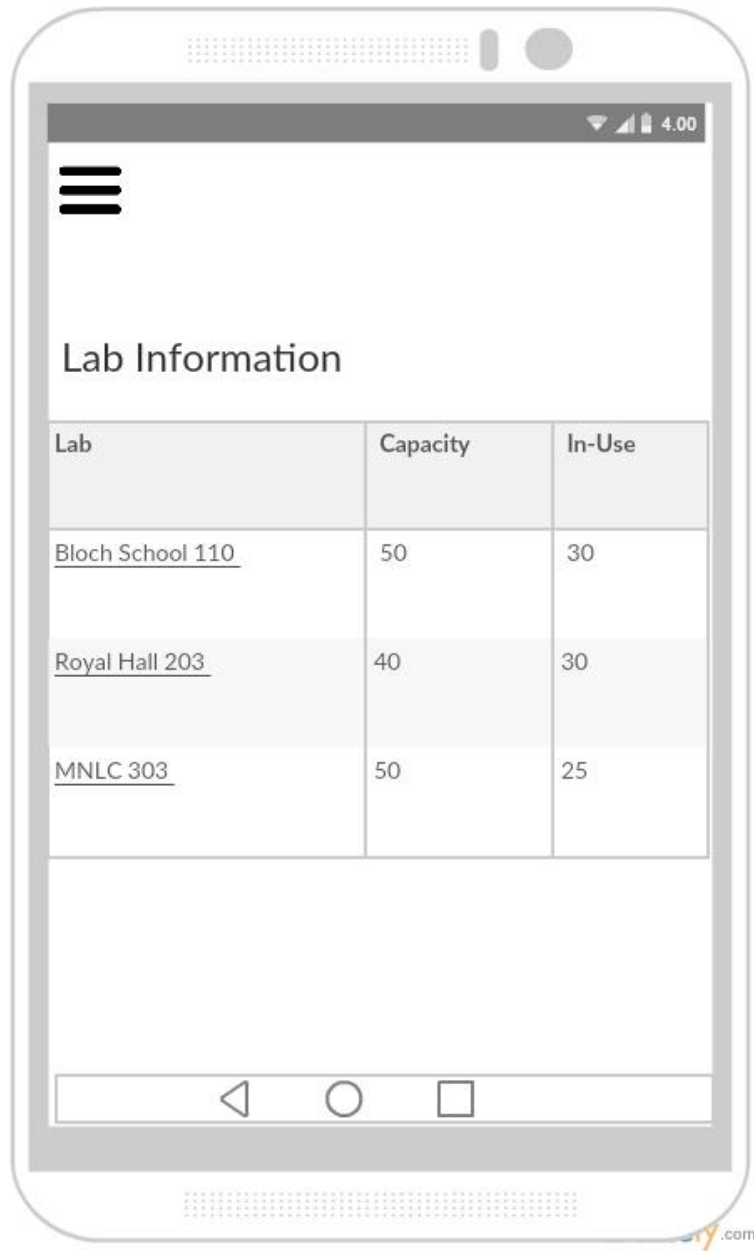


Fig: Computer Labs information page

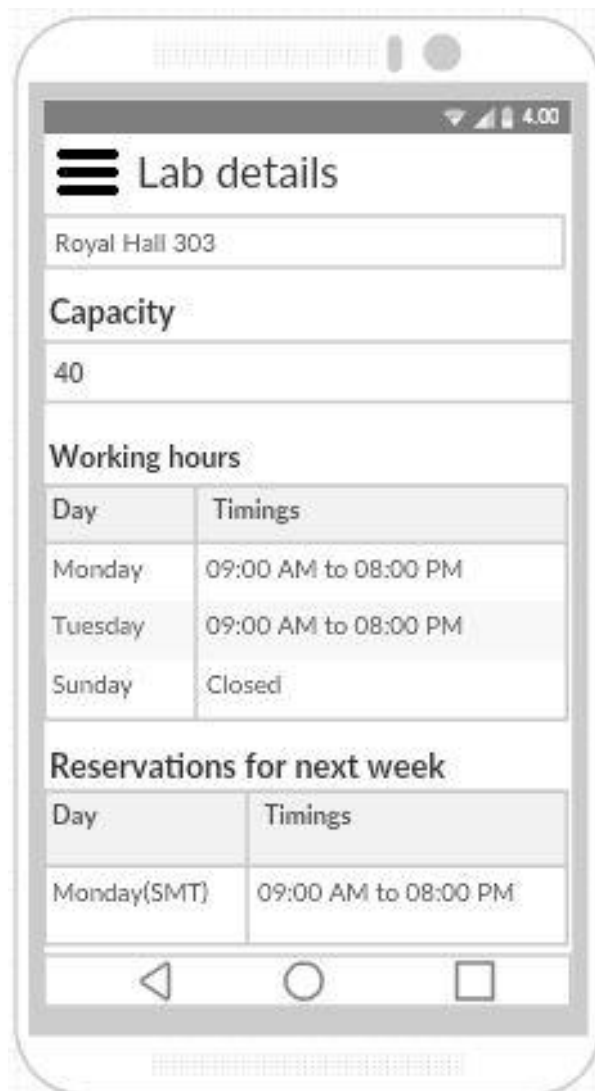


Fig: Detailed information of a computer lab

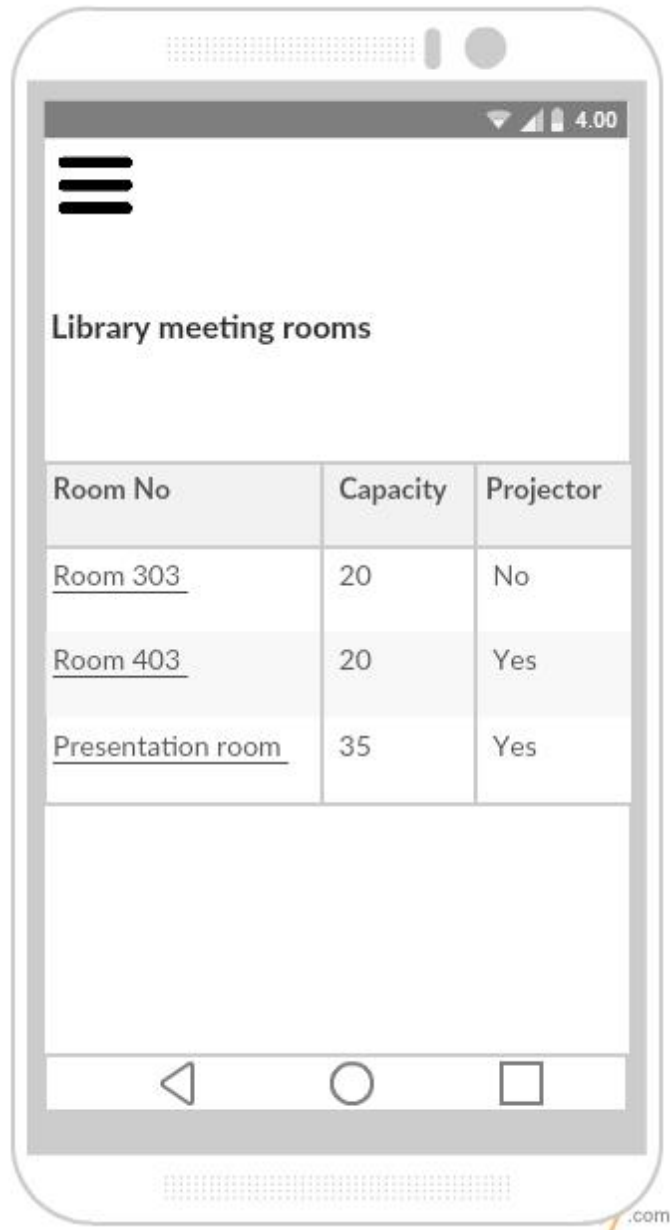


Fig: Library study room information

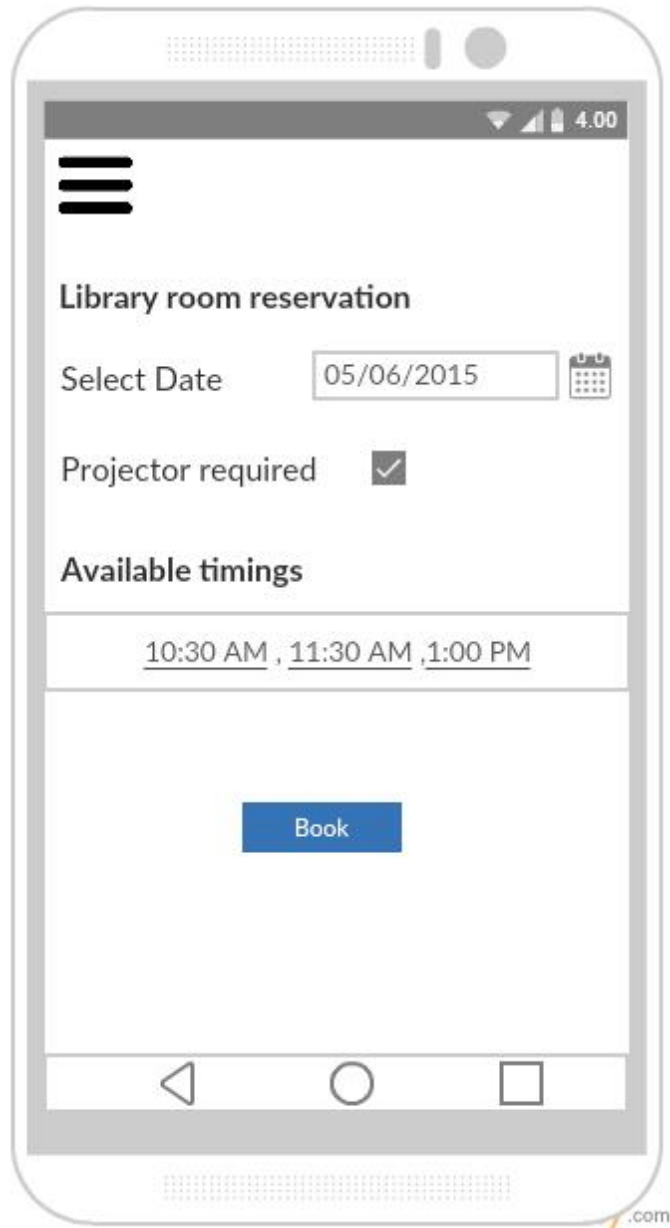


Fig: Library room reservation page

Confirmation

Teja garidepally

tgww4@mail.umkc.edu

+1 361-522-3979

Submit

Fig: Library room reservation form

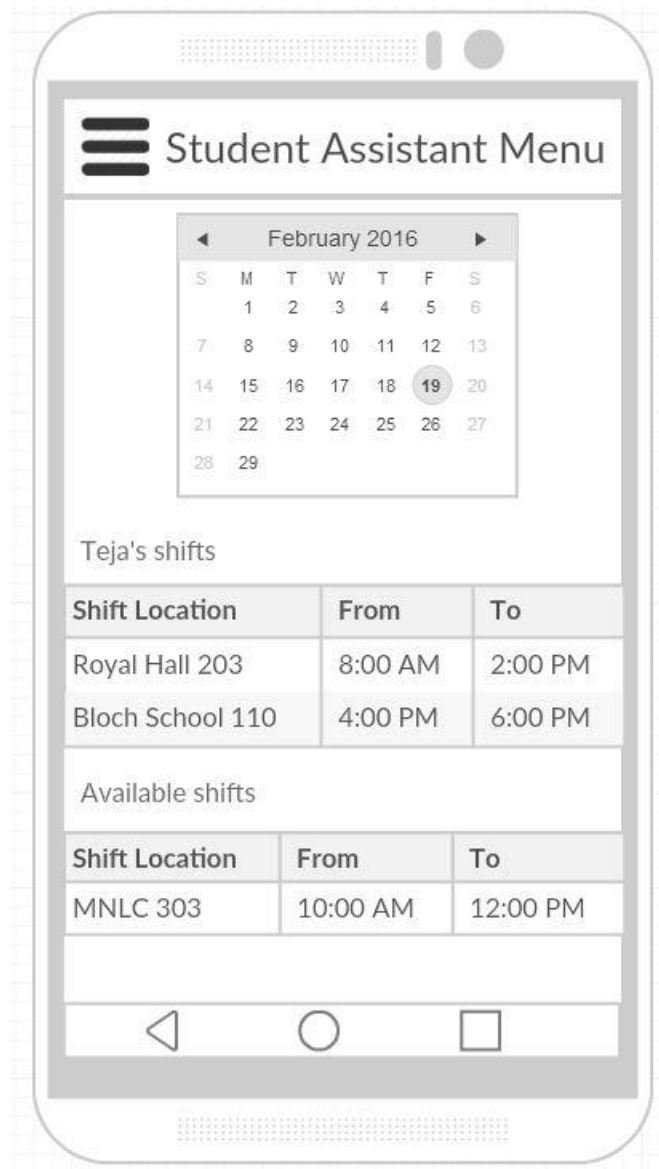


Fig: Student Assistant menu page

The image shows a mobile application interface for a 'Student Assistant Menu'. At the top, there is a hamburger menu icon and the title 'Student Assistant Menu'. Below this is a section titled 'Take Shift' with a horizontal underline. The text 'Location : Royal Hall 203' and 'Timings : 8:00 AM - 2:00 PM' is displayed. Under the timings, there are two labels 'From :' and 'To :'. Below each label is a dropdown menu showing 'HH' with a downward arrow. A blue 'Confirm' button is centered below these dropdowns. The bottom of the screen features a standard Android navigation bar with back, home, and recent apps icons.

Student Assistant Menu

Take Shift

Location : Royal Hall 203

Timings : 8:00 AM - 2:00 PM

From : To :

HH ▾ HH ▾

Confirm

Fig: Taking a Student Assistant shift

The image shows a mobile application interface for posting a student assistant shift. At the top, there is a header bar with a hamburger menu icon and the text "Student Assistant Menu". Below this, the title "Post Shift" is centered and underlined. The form contains the following fields and controls:

- Location :** MNLC 303
- Timings :** 10:00 AM - 12:00 PM
- From :** A dropdown menu showing "HH" with a downward arrow.
- To :** A dropdown menu showing "HH" with a downward arrow.
- Post** button: A blue rectangular button with the text "Post" in white.

The interface is displayed on a smartphone screen with a standard Android navigation bar at the bottom.

Fig: Posting a Student Assistant shift

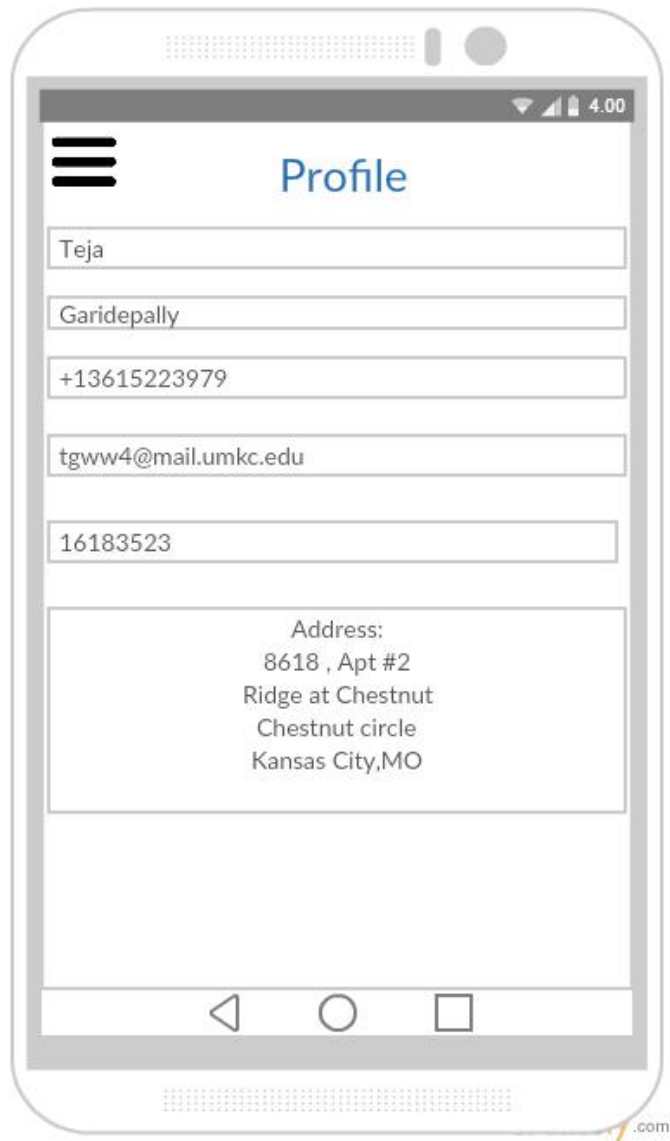


Fig: Student profile page

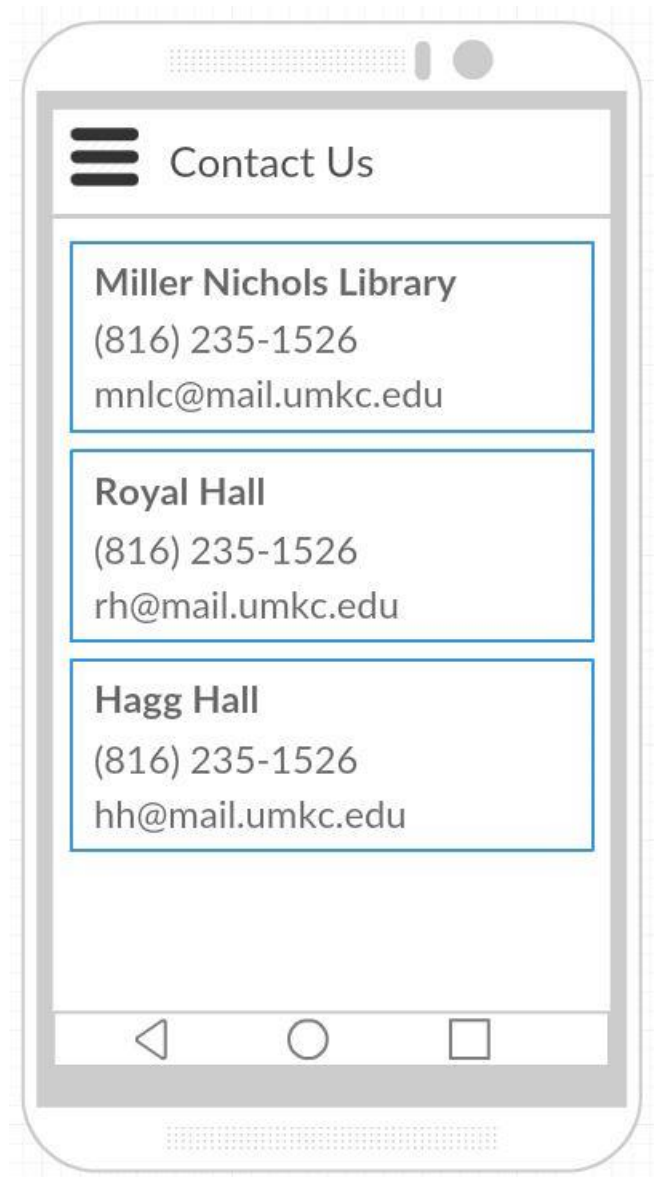


Fig: Contact Us information page

User Stories:

- As a User, I can see the UI of StudentCompanion App.
- As a user, I can see the Login Screen.
- As a user, I can enter my Details and Login to the App.
- As a user, I can see the Side menu bar on Home Page with side menu options like Profile, Lab Information, Reserve Study Room, and SA Menu.
- As a User, I can see my Profile.
- As a User, I can see the Lab Information of specified lab.

- As a User, I can Reserve Study Room.
- As a User, I can choose the SA Menu option
- As a User, I can utilize the options in SA Menu.

As a user, I can Sign-out from the Application.

Testing

We've used *YSlow* - a Google Chrome extension to test the performance of our application. It shows the requests and their weights in a graphical manner. This helped us to tweak our code to improve the application overall performance.

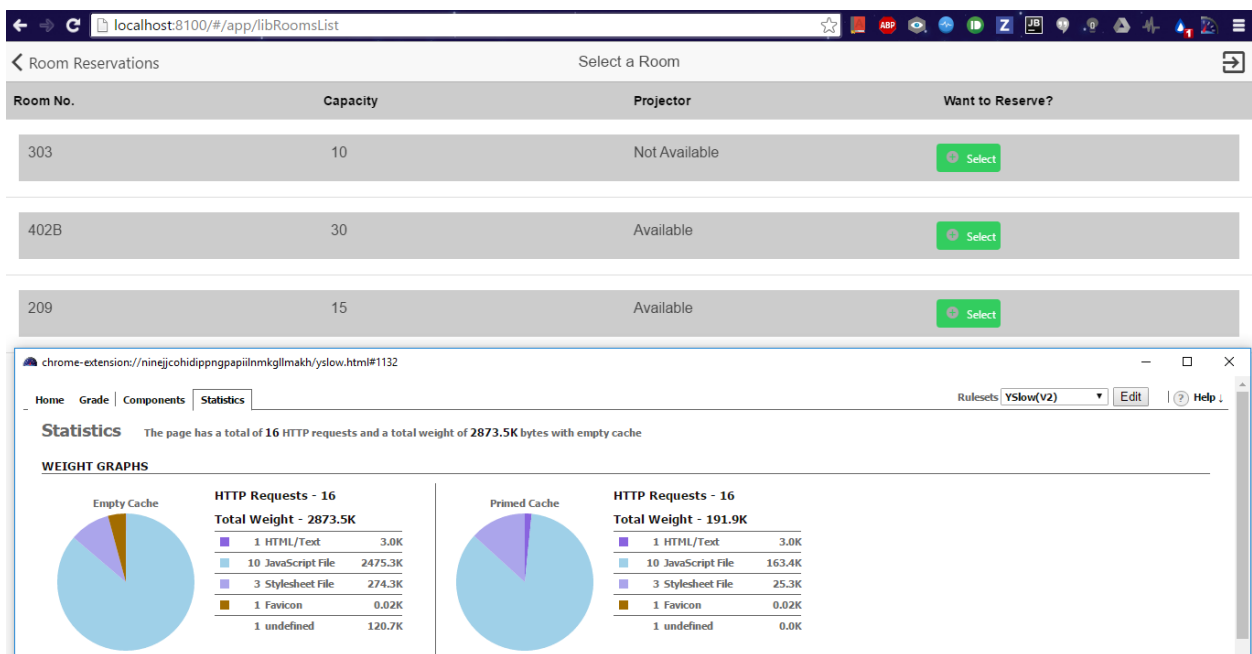
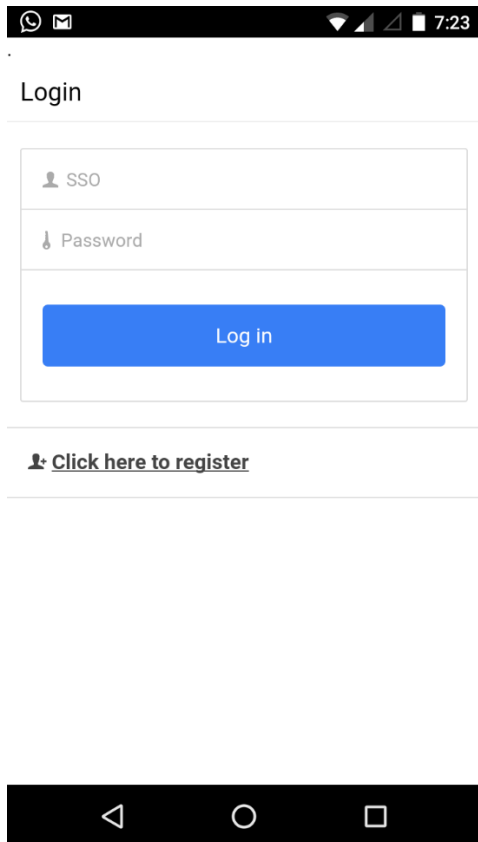


Fig: YSlow statistic of "Room Reservation" page

Deployment

Deployment of application to Mobile phone.

Screen Shots:



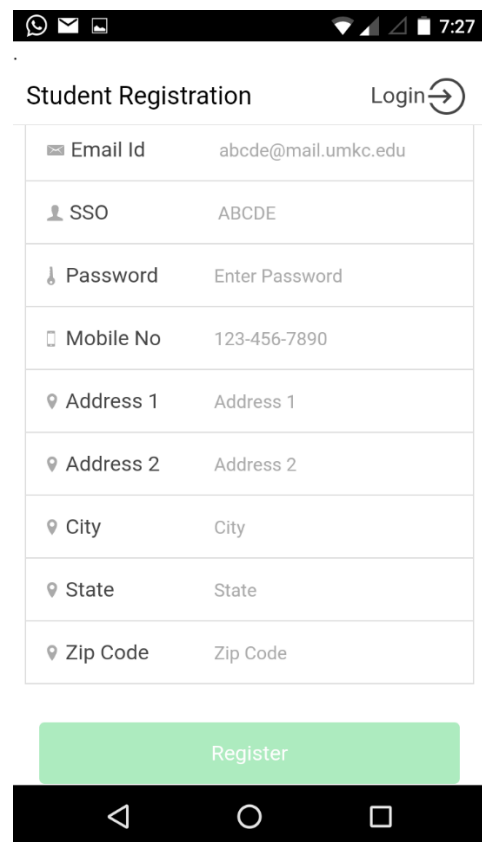
Login

SSO	
Password	

Log in

[Click here to register](#)

Fig: Login



Student Registration [Login](#)

Email Id	abcde@mail.umkc.edu
SSO	ABCDE
Password	Enter Password
Mobile No	123-456-7890
Address 1	Address 1
Address 2	Address 2
City	City
State	State
Zip Code	Zip Code

Register

Fig: Register User

Student Registration Login →

Email Id	smith.will@yahoo.com
SSO	WSTH8
Password
Mobile No	816-859-1434
Address 1	816 Fremont
Address 2	Apt #2
City	Las Angeles
State	California
Zip Code	81234

Register

Fig: User Details

Login

SSO

Password

Alert

User created successfully

OK

Fig: User Registered

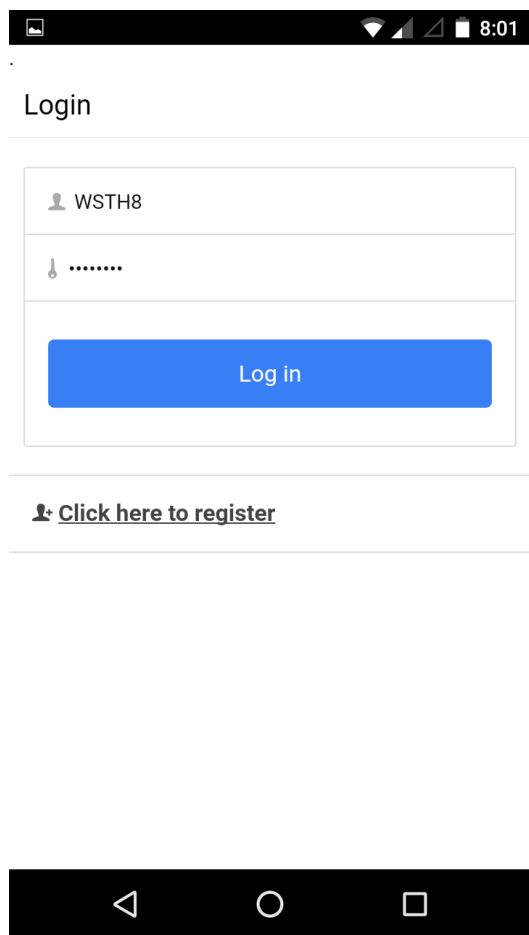


Fig: Login Success

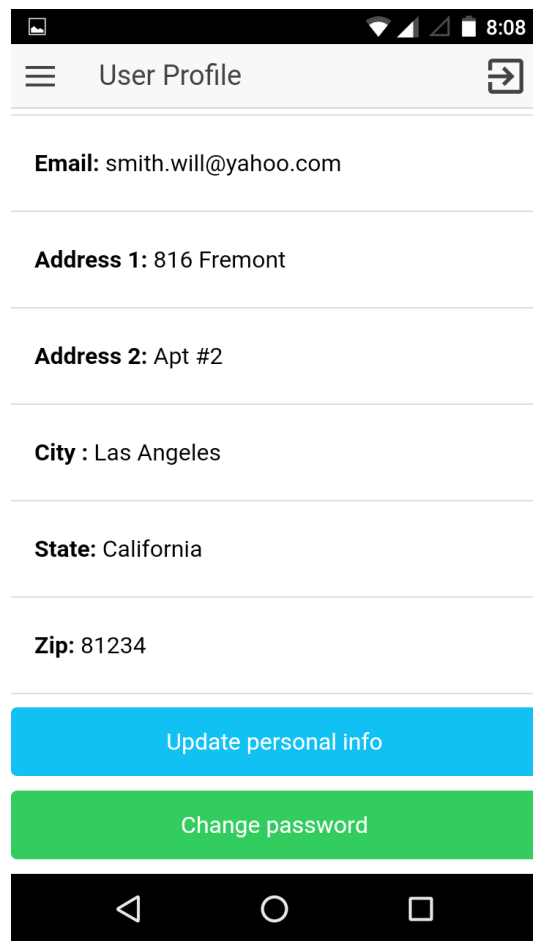


Fig: User Profile

8:10

← Edit Profile →

816-859-1919

8168 Chestnut Circle

Apt #2

Kansas City

Missouri

64131

Update profile



Fig: Initial Details

8:08

← Edit Profile →

816-859-1434

816 Fremont

Apt #2

Las Angeles

California

81234

Update profile



Fig: Updated Fields

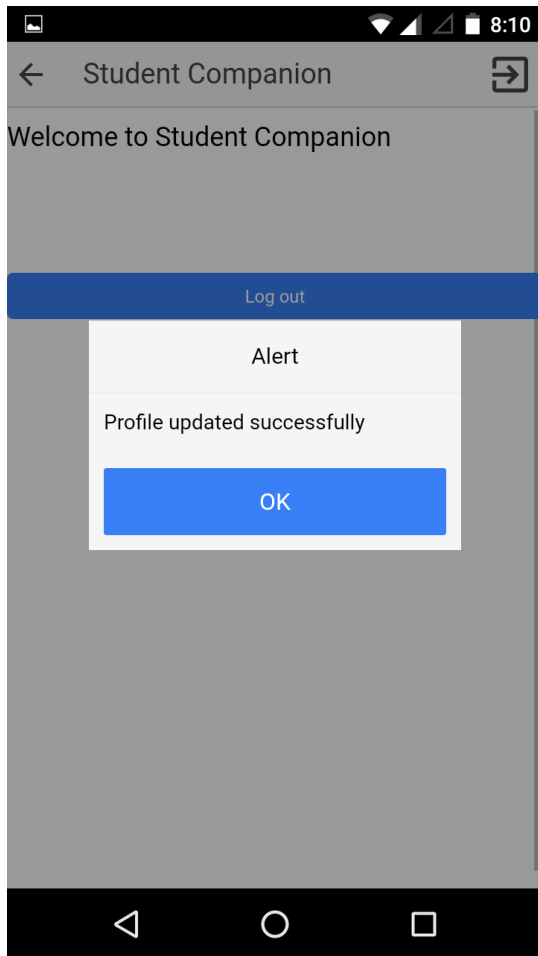


Fig: Profile Updated

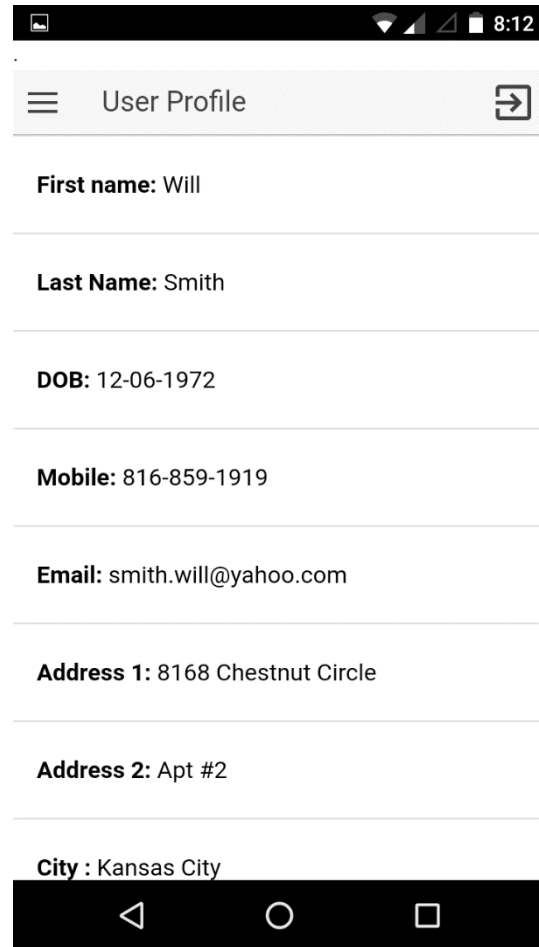


Fig: Updated Profile

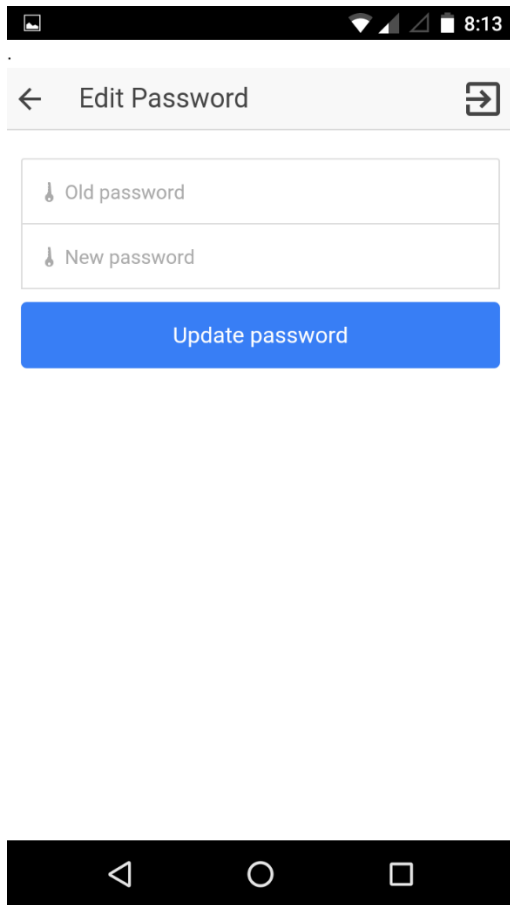


Fig Edit Password

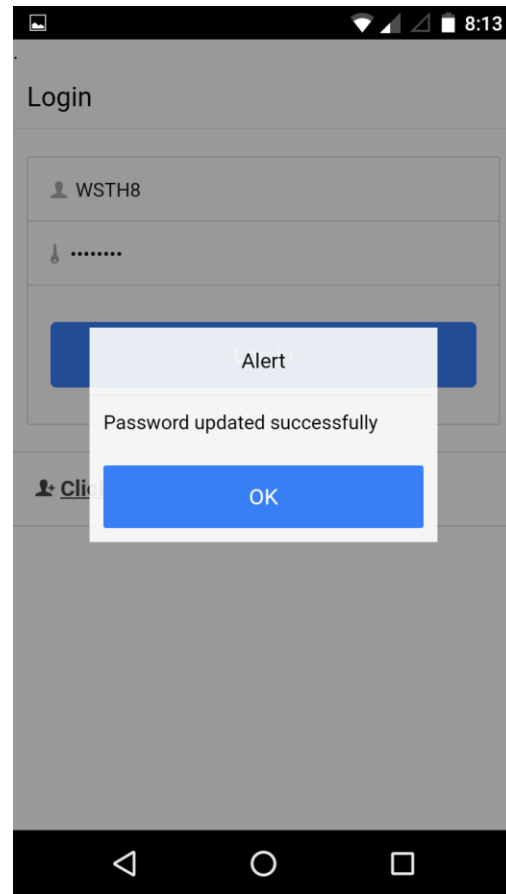


Fig: Password Updated

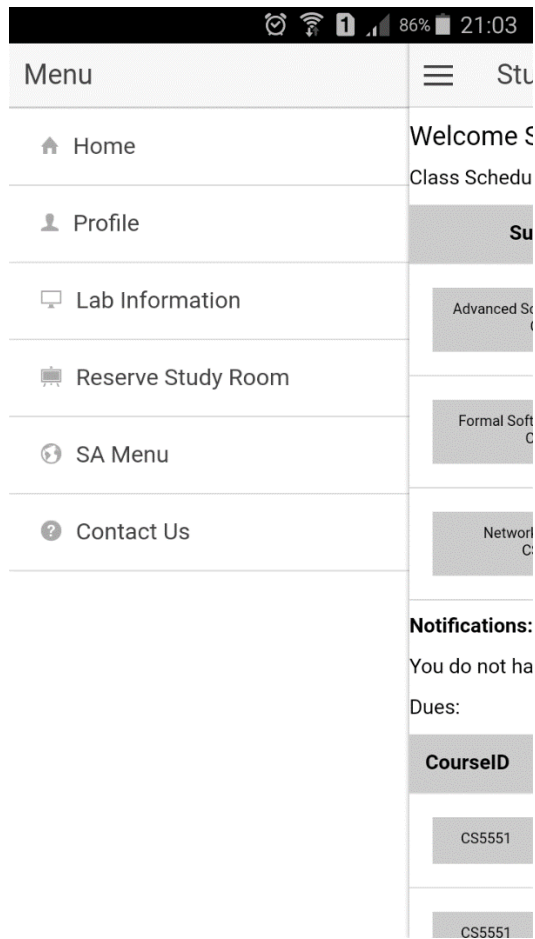


Fig: Side Menu

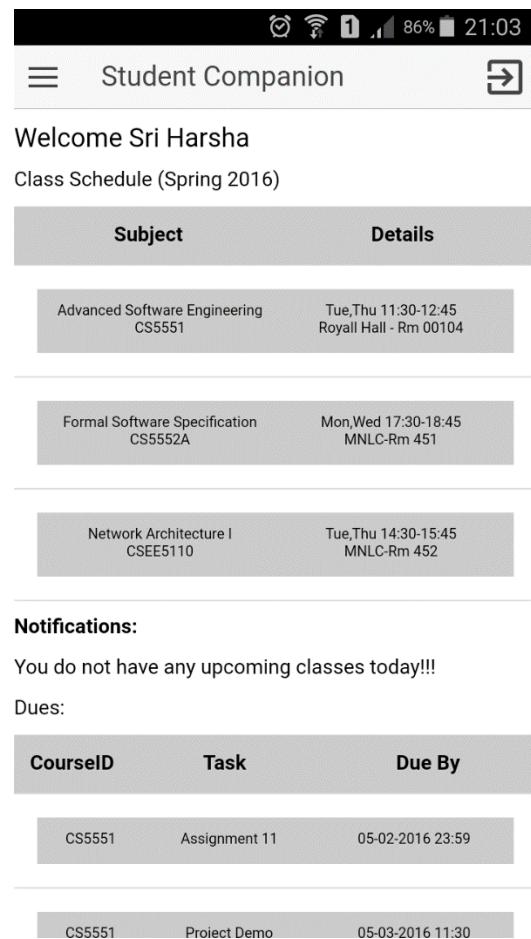


Fig: Home Page

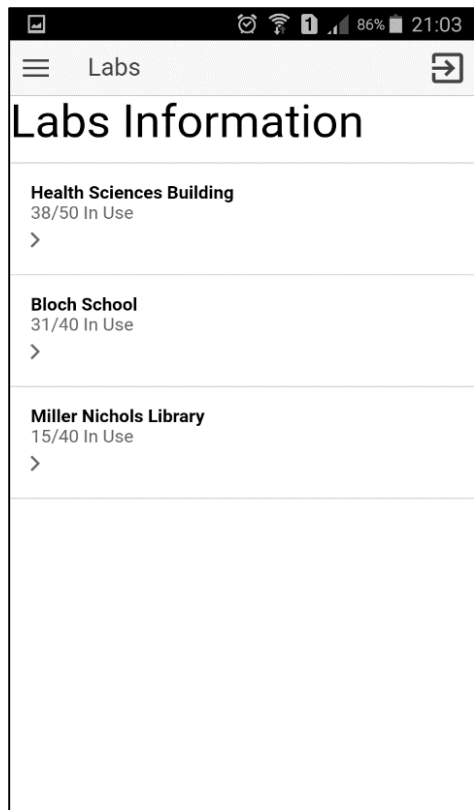


Fig: Lab Information

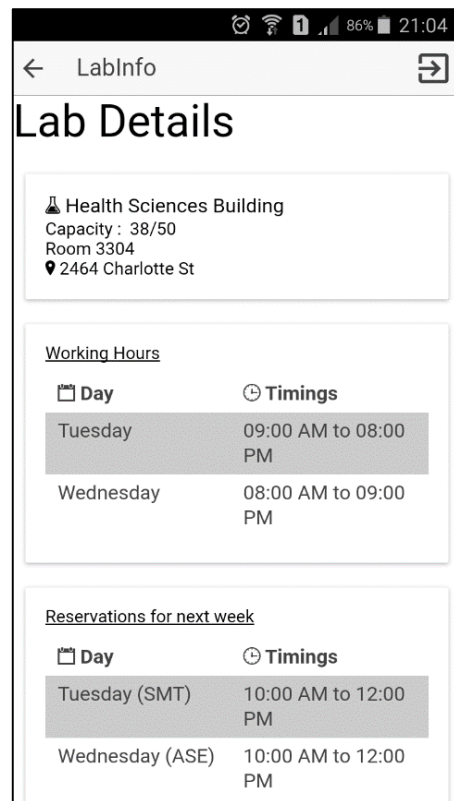


Fig: Lab Details

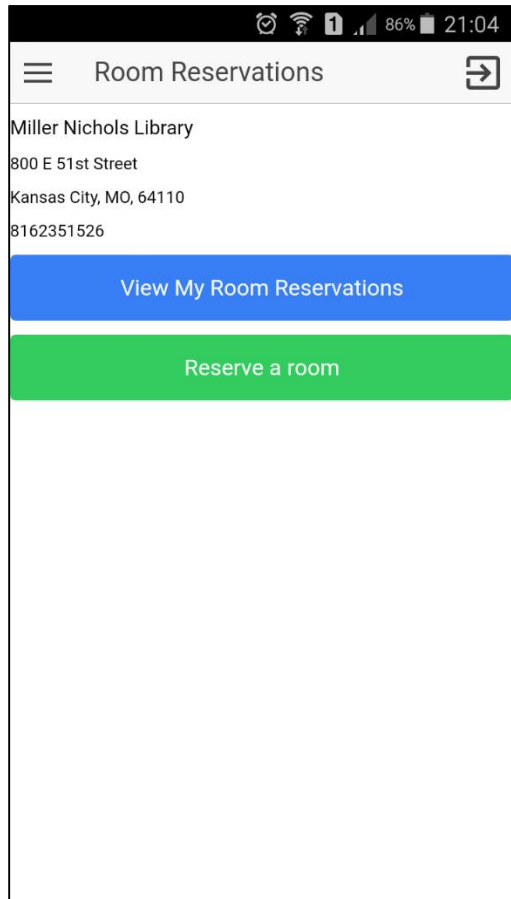


Fig: Room Reservation

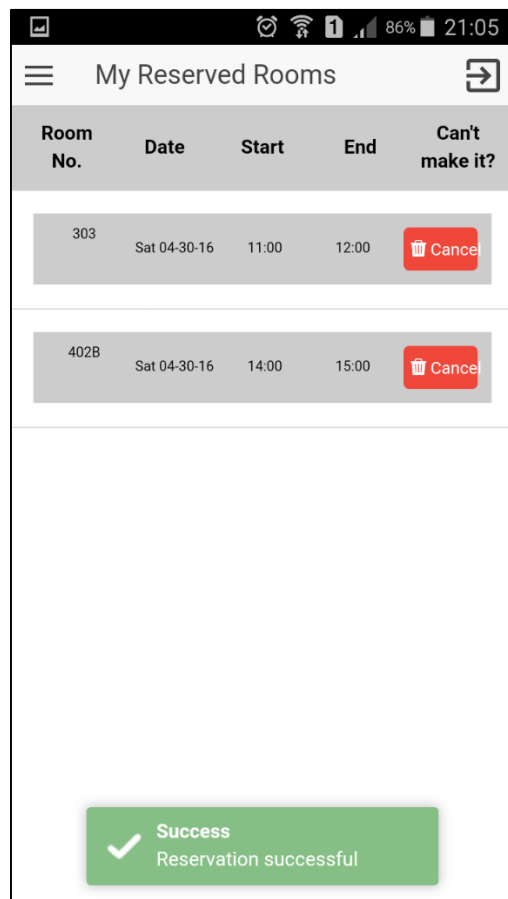


Fig: View My Reservations

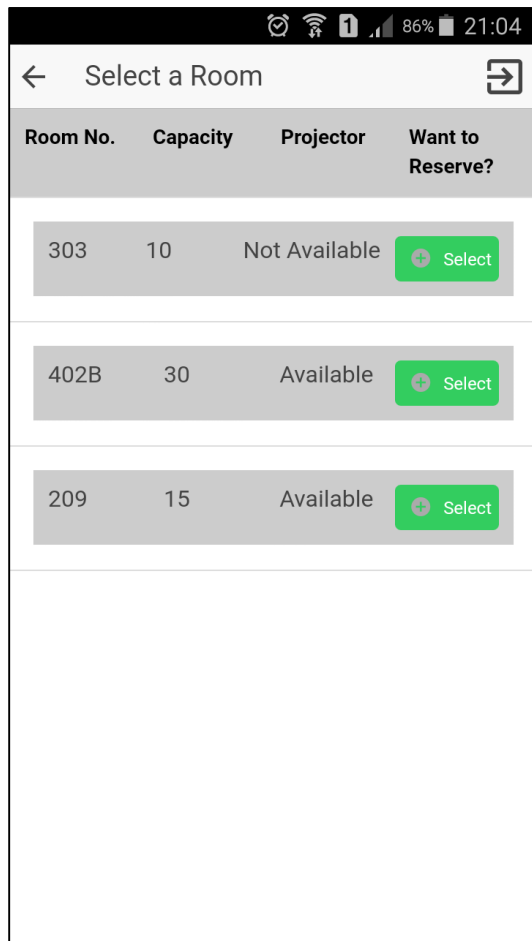


Fig: Select a Room

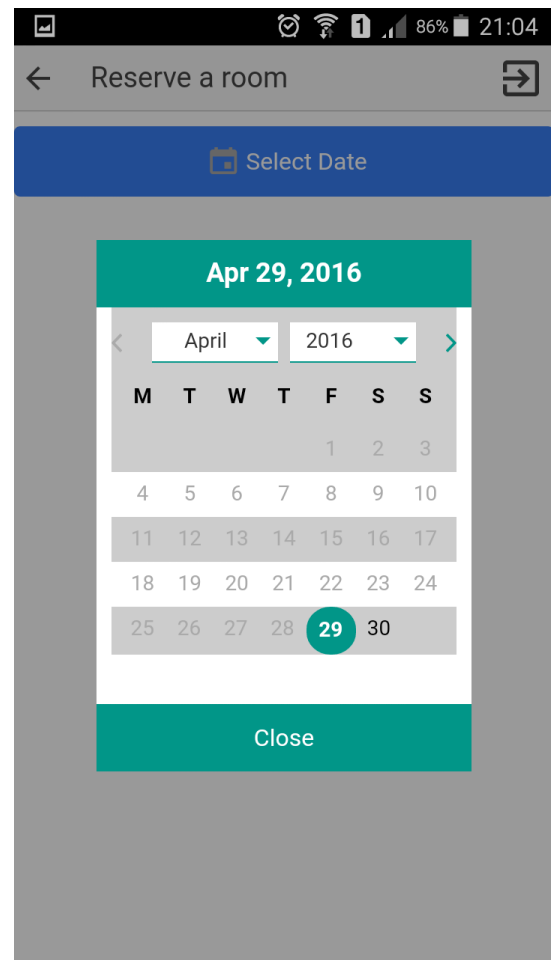


Fig: Select Date

← Reserve a room

Select Date

Room Number	Date	Slot	Want it?
402B	04-30-2016	11:00 - 12:00	
402B	04-30-2016	12:00 - 13:00	
402B	04-30-2016	13:00 - 14:00	
402B	04-30-2016	14:00 - 15:00	
402B	04-30-2016	15:00 - 16:00	

Fig: Select a Reservation Slot

← Confirmation

Room Number: 402B
 Reservation Date: 04-30-2016
 Start Time: 14:00
 End Time: 15:00

Below details are required for future communication with respect to the reserved room.

Sri Harsha Chennavajjala

@ sc9v9@mail.umkc.edu

816-772-3746

Fig: Room Reserve Confirmation

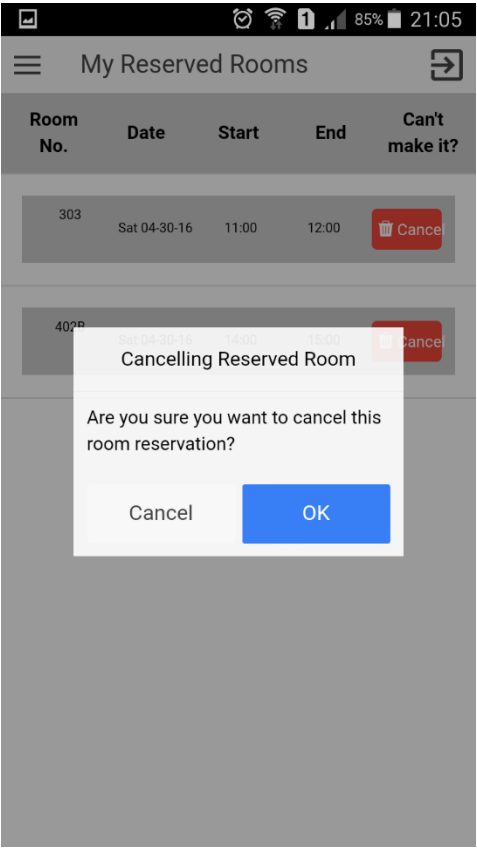


Fig: Room Cancellation

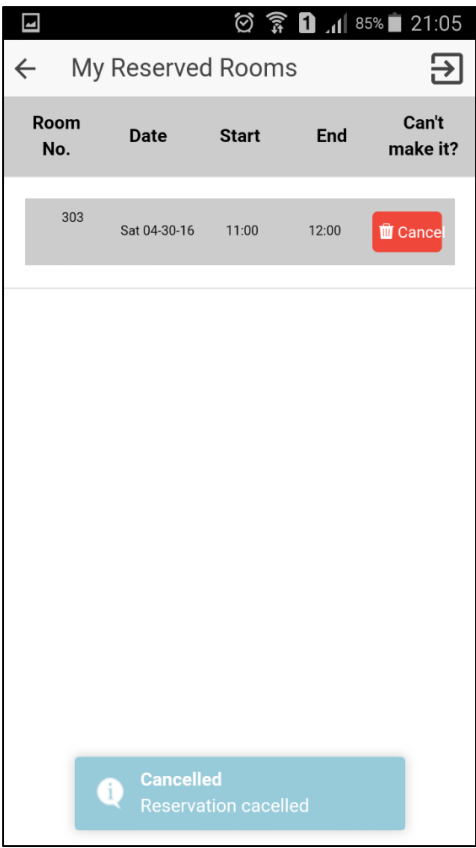


Fig: Room Cancellation

Student Assistant Menu

Select Date

My Shifts

Date	Start	End	Location
05-10-2016	14:00	16:00	HSB 3304
05-10-2016	9:00	10:00	HSB 3304

Available Shifts

Profile ID	Date	Start	End	Location
RMYB9	05-10-2016	08:00	9:00	HSB 3304
RMYB9	05-10-2016	10:00	13:00	HSB 3304

Fig: View Shifts

Take SA Shift

Shift Location: HSB 3304
Shift Date: 05-10-2016
Shift Timings: 10:00 - 13:00
Shift Posted By: RMYB9

From: 10 ▾
To: 11 ▾

Confirm

Fig: Take Shift

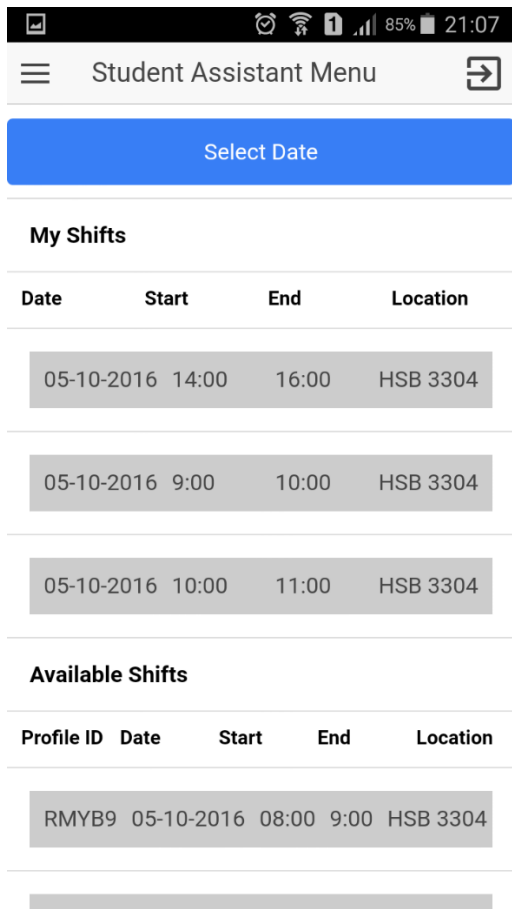


Fig: After Take Shift

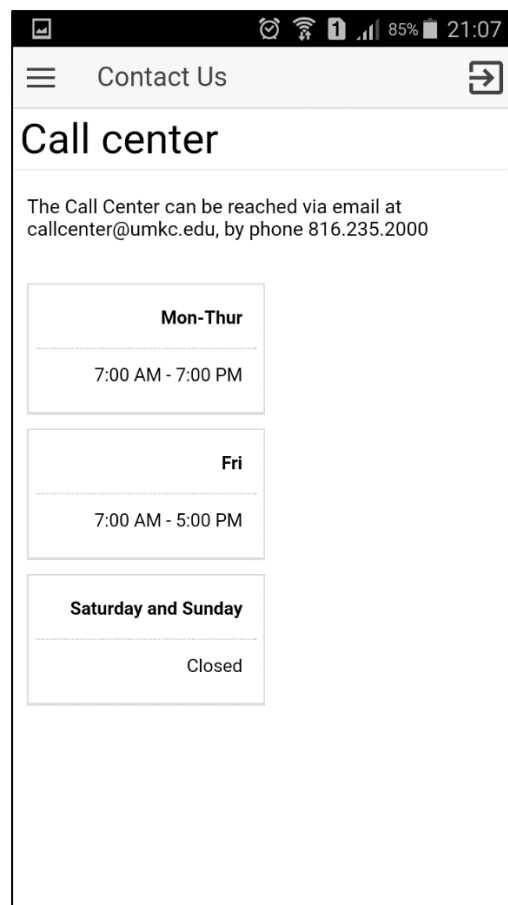
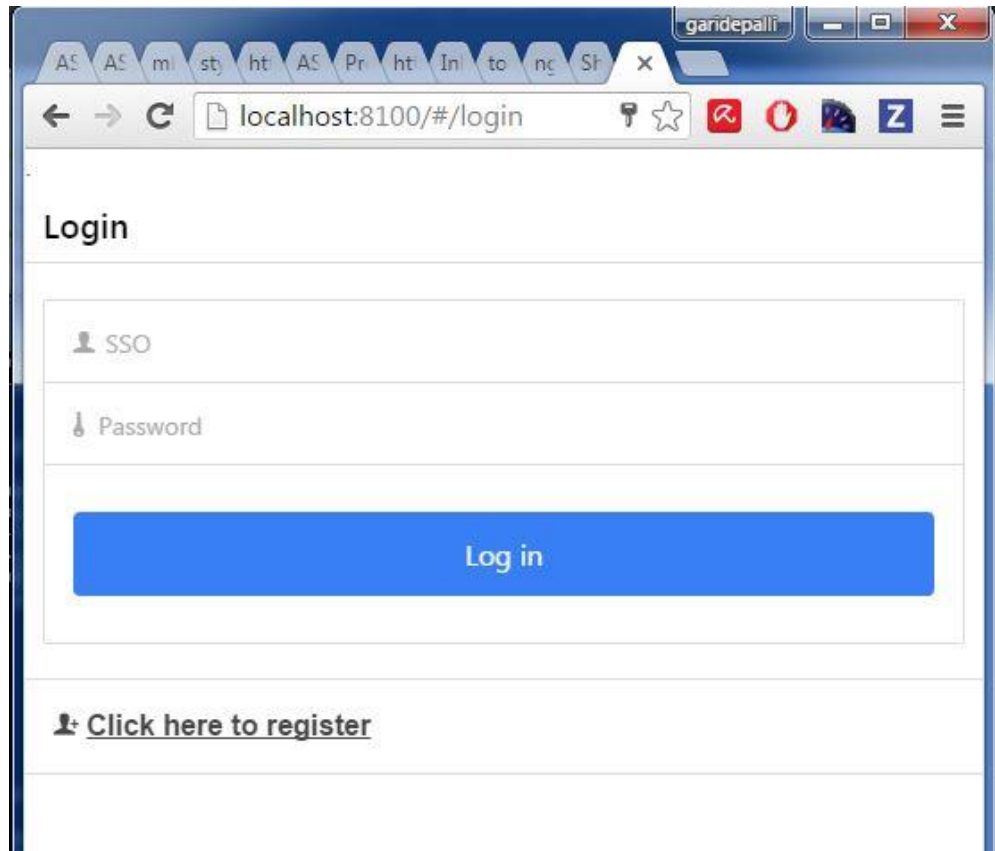


Fig: Contact Us

Web Application Views:



A screenshot of a web browser window displaying a login page. The browser's address bar shows the URL `localhost:8100/#/login`. The page has a title "Login". Below the title, there are two input fields: the first is labeled "SSO" with a person icon, and the second is labeled "Password" with a key icon. Below these fields is a large blue button labeled "Log in". At the bottom of the page, there is a link that says "Click here to register" with a person icon.

Fig: Login

Student Registration [Login](#)

Date of Birth	MM-DD-YYYY
Email Id	abcde@mail.umkc.edu
SSO	ABCDE
Password	Enter Password
Mobile No	123-456-7890
Address 1	Address 1
Address 2	Address 2
City	City
State	State
Zip Code	Zip Code

[Register](#)

Fig: Registration

Student Registration [Login](#)

Email Id	balak@mail.umkc.edu
SSO	BALAK
Password
Mobile No	816-123-6789
Address 1	5311 Apt#2
Address 2	Rockhill Road
City	Kansas City
State	MO
Zip Code	64131

[Register](#)

Fig: Student Registration

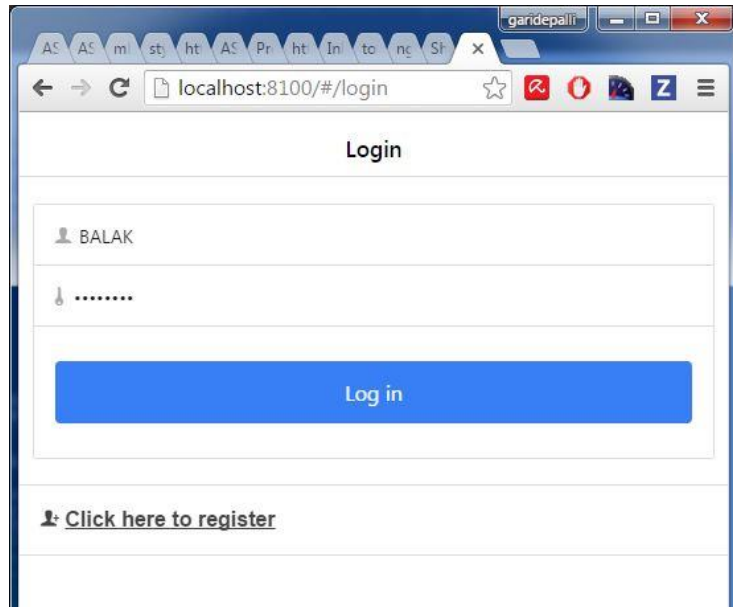


Fig: Registered User Login

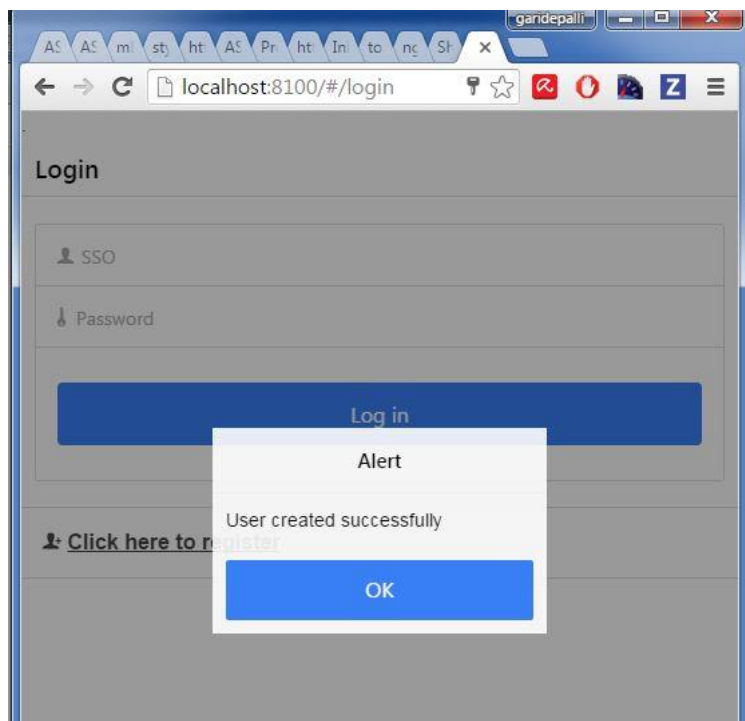


Fig: Login Success

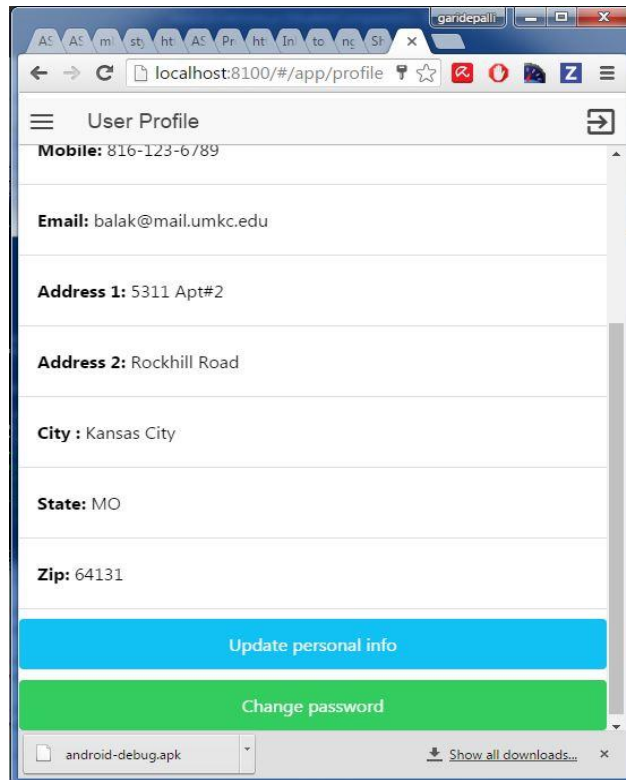


Fig: View Profile

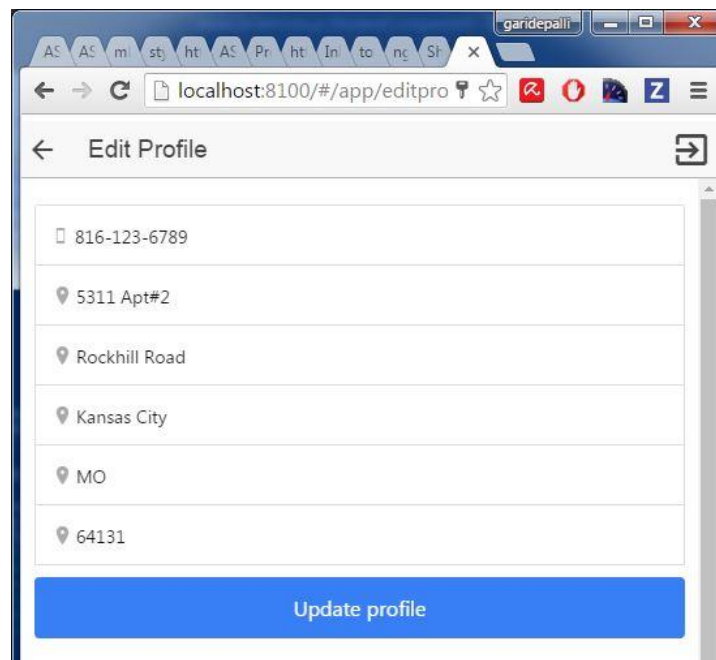


Fig: Edit Profile

garidepalli

localhost:8100/#/app/editpro

Edit Profile

816-123-3456

5311 Apt#2

Rockhill Road

Kansas City

Missouri

64131

Update profile

Fig: Profile Updated

garidepalli

localhost:8100/#/app/profile

User Profile

Last Name: Krishna

DOB: 12-03-1993

Mobile: 816-123-3456

Email: balak@mail.umkc.edu

Address 1: 5311 Apt#2

Address 2: Rockhill Road

City : Kansas City

State: Missouri

Fig: Updated View

garidepalli

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localhost:8100/#/app/editpassword

< User Profile Edit Password

Old password

New password

Update password

Fig: Edit Password

garidepalli

AS AS mi sty ht AS Pr ht In to nc St x

localhost:8100/#/app/editpassword

< User Profile Edit Password

Old password

New password

Update password

Fig: Updated Password

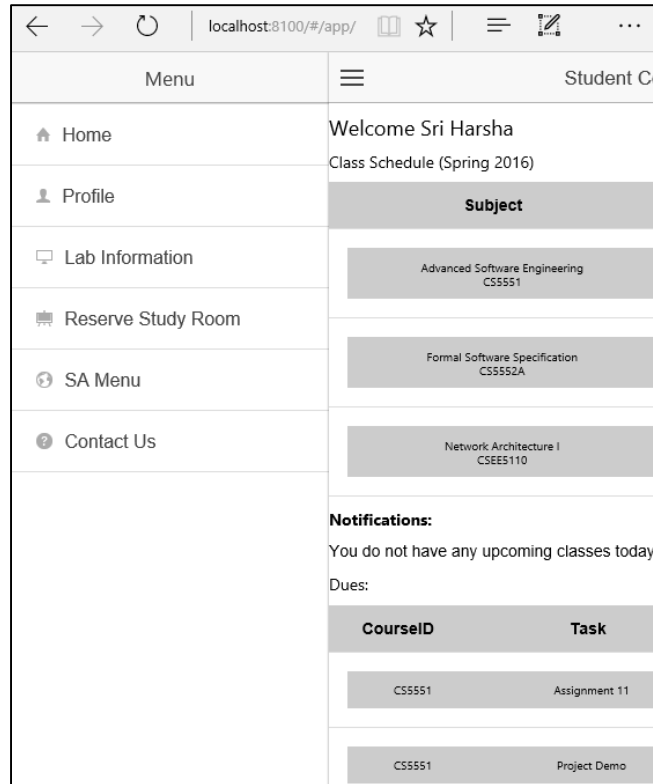


Fig: Side Menu

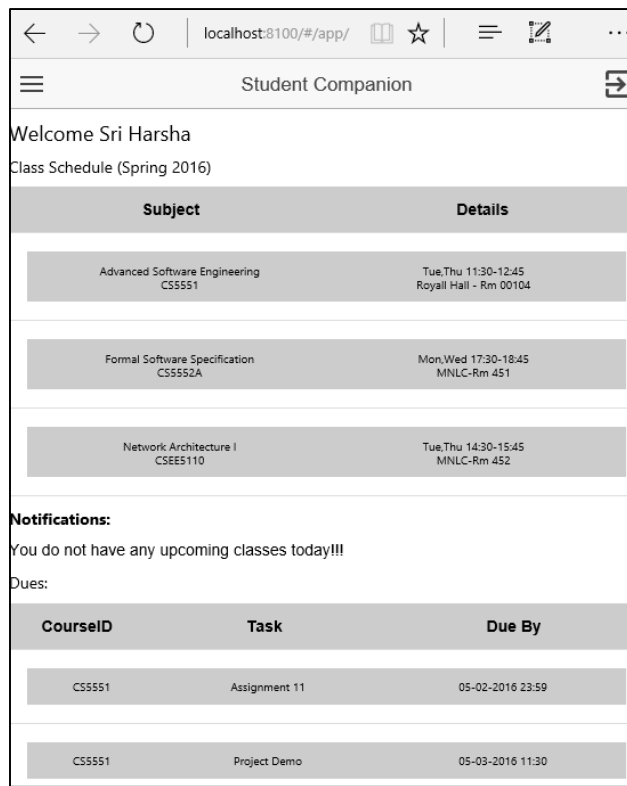
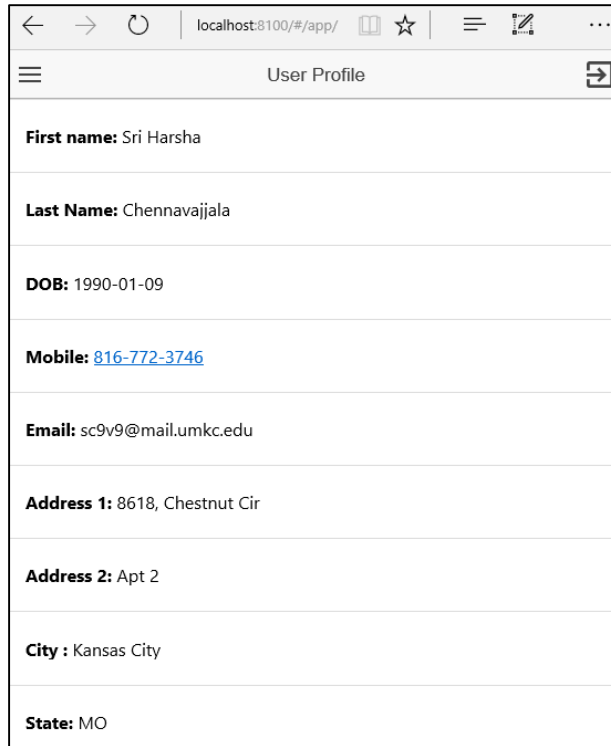


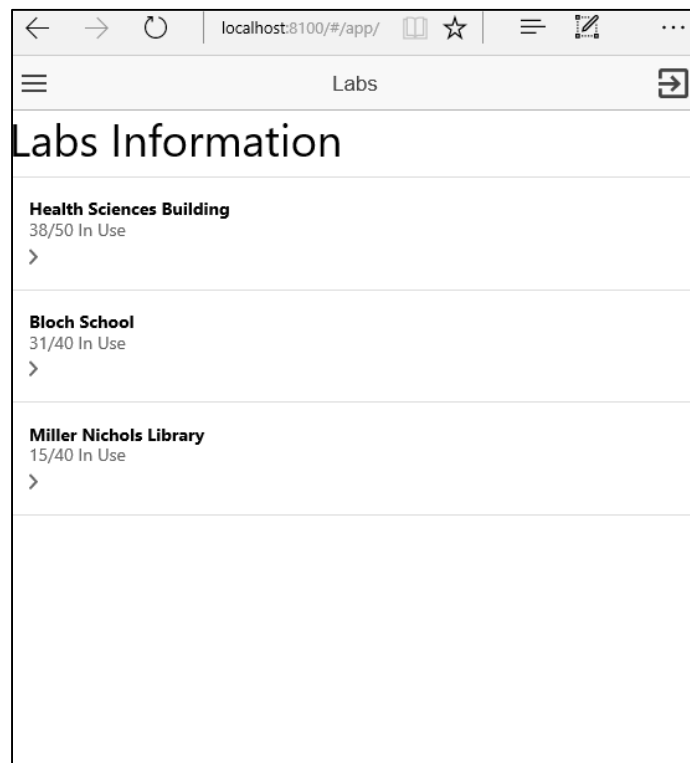
Fig: Home Page



A screenshot of a web browser displaying a 'User Profile' form. The browser's address bar shows 'localhost:8100/#/app/'. The form has a header bar with a hamburger menu icon on the left, the text 'User Profile' in the center, and a share icon on the right. Below the header, the form contains several input fields, each with a label and a value: 'First name: Sri Harsha', 'Last Name: Chennavajjala', 'DOB: 1990-01-09', 'Mobile: 816-772-3746' (with a blue link icon), 'Email: sc9v9@mail.umkc.edu', 'Address 1: 8618, Chestnut Cir', 'Address 2: Apt 2', 'City : Kansas City', and 'State: MO'.

First name: Sri Harsha
Last Name: Chennavajjala
DOB: 1990-01-09
Mobile: 816-772-3746
Email: sc9v9@mail.umkc.edu
Address 1: 8618, Chestnut Cir
Address 2: Apt 2
City : Kansas City
State: MO

Fig: Profile



A screenshot of a web browser displaying a 'Labs' page. The browser's address bar shows 'localhost:8100/#/app/'. The page has a header bar with a hamburger menu icon on the left, the text 'Labs' in the center, and a share icon on the right. Below the header, the page features a large title 'Labs Information' followed by a list of three lab entries. Each entry consists of a bold title, a subtitle indicating usage, and a right-pointing chevron icon: 'Health Sciences Building' (38/50 In Use), 'Bloch School' (31/40 In Use), and 'Miller Nichols Library' (15/40 In Use).

Labs Information	
Health Sciences Building 38/50 In Use	>
Bloch School 31/40 In Use	>
Miller Nichols Library 15/40 In Use	>

Fig: Lab Information

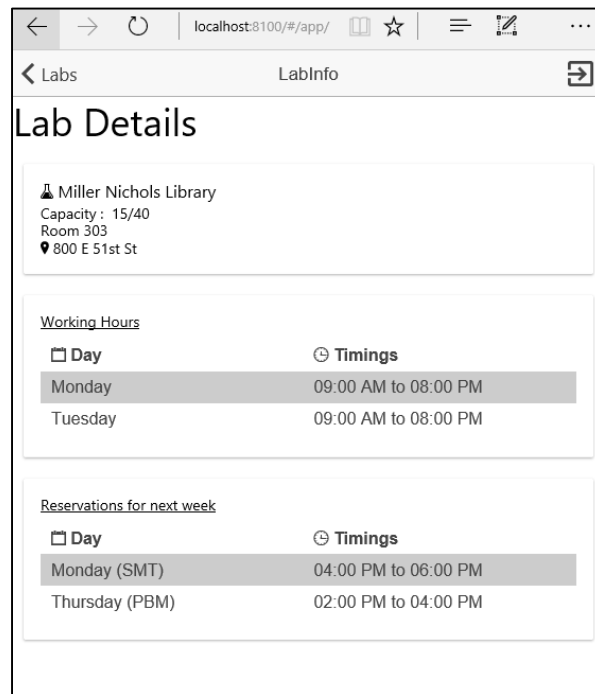


Fig: Lab Details

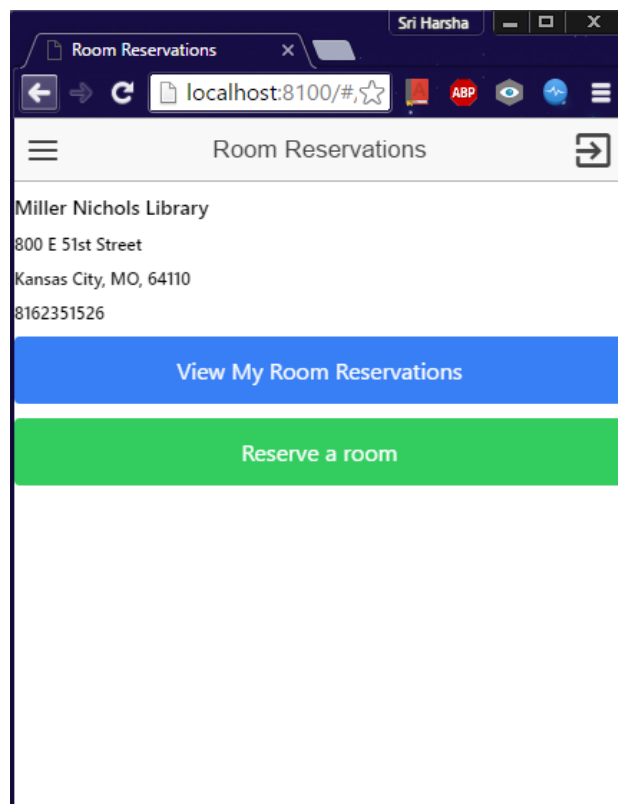


Fig: Room Reservation

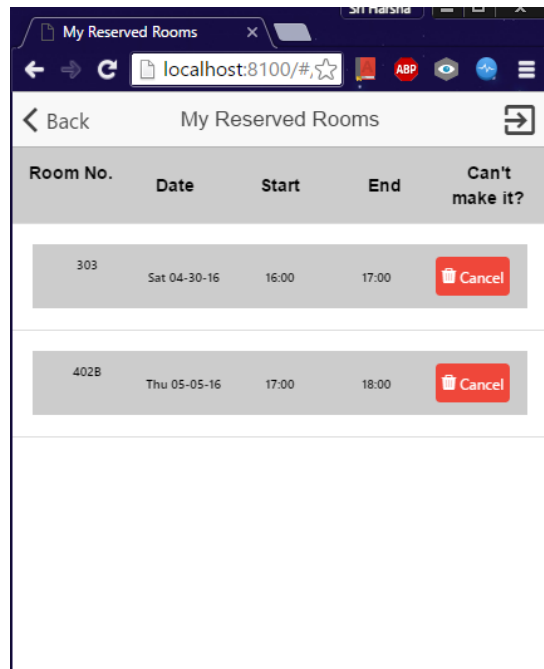


Fig: View Reserved Rooms

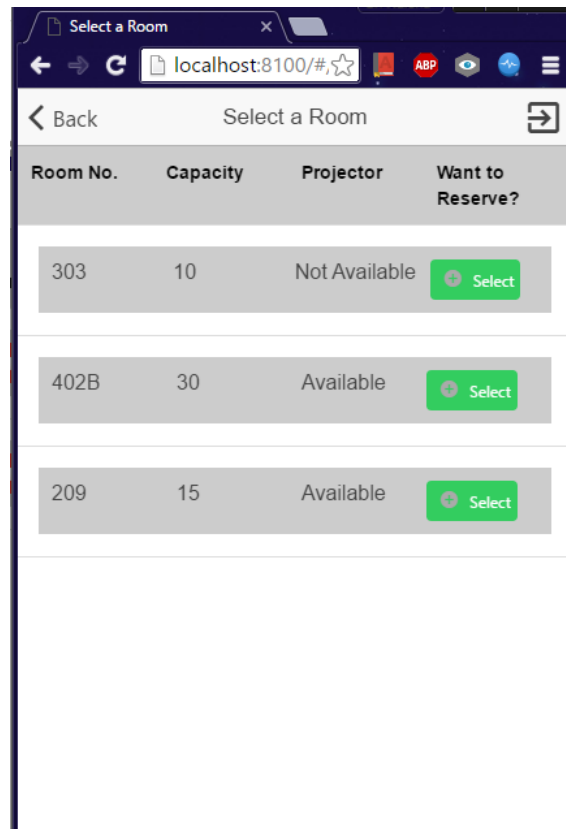


Fig: Available Rooms

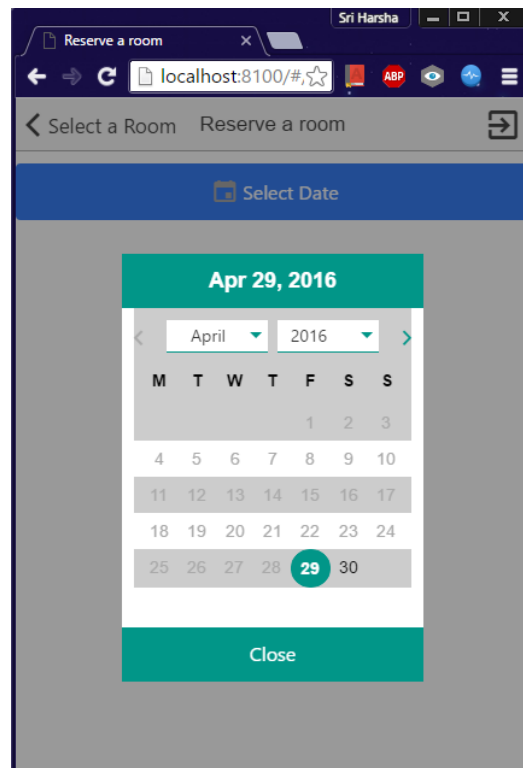


Fig: Select Date

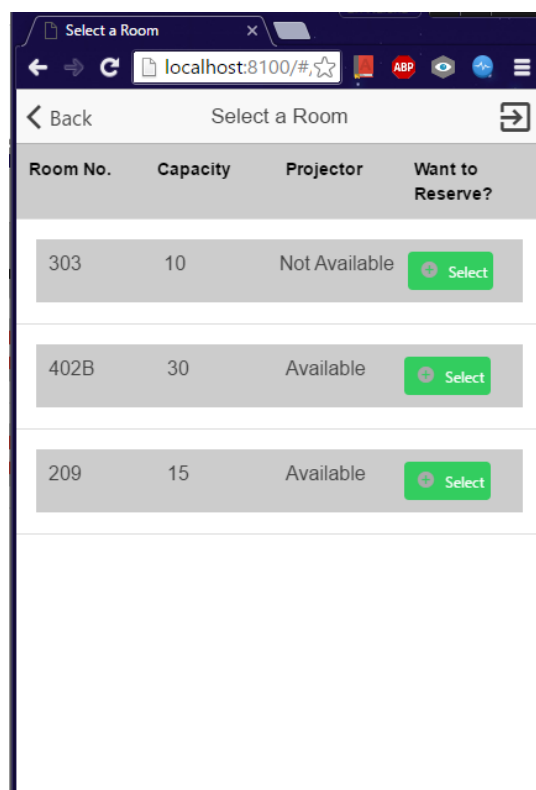


Fig: Available Rooms

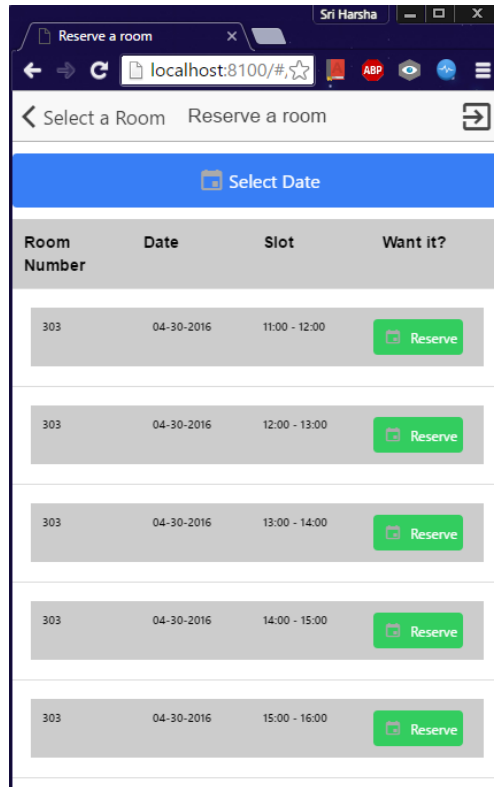


Fig: Available Slots

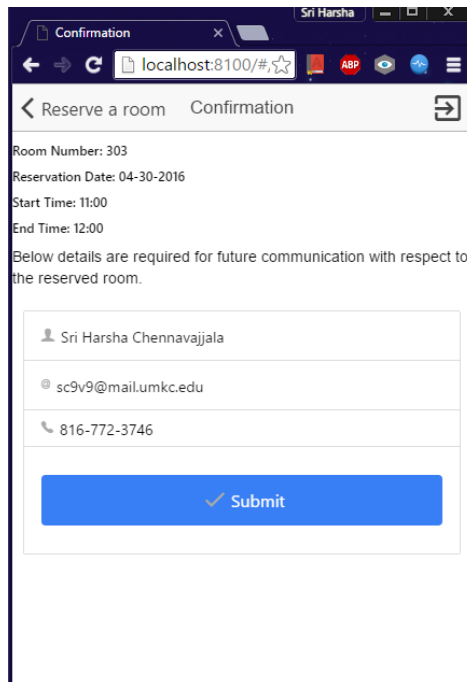


Fig: Confirm Reservation

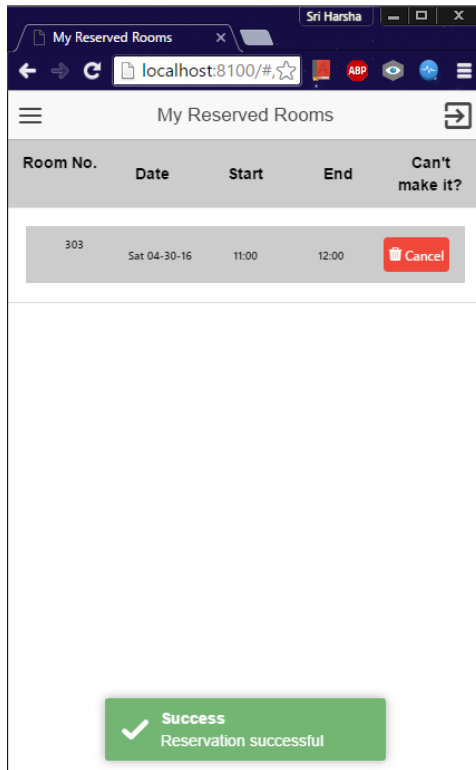


Fig: Room Confirmation Toast

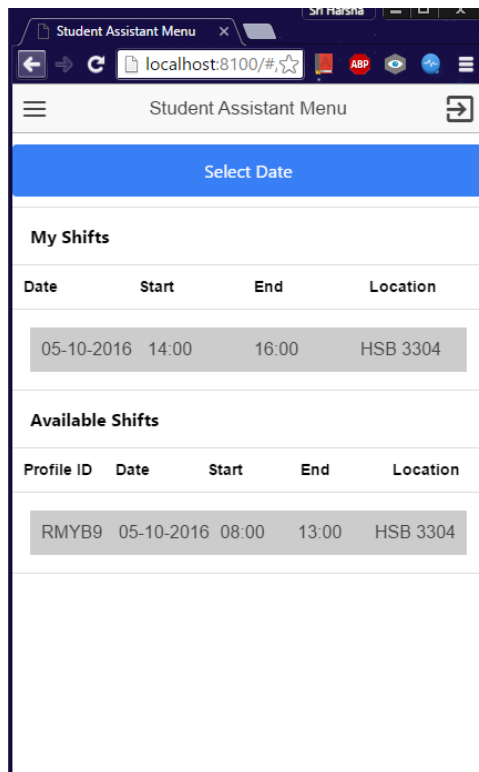


Fig: SA Menu

A screenshot of a web browser showing a form titled "Take SA Shift". The browser's address bar shows "localhost:8100/#". The form has a header with a back arrow and the title. Below the header, the following text is displayed: "Shift Location: HSB 3304", "Shift Date: 05-10-2016", "Shift Timings: 08:00 - 13:00", and "Shift Posted By: RMYB9". There are two dropdown menus: "From:" with the value "9" and "To:" with the value "10". A purple "Confirm" button is located below the dropdowns.

Fig: Take Shift

A screenshot of a web browser showing a page titled "Student Assistant Menu". The browser's address bar shows "localhost:8100/#". The page has a header with a menu icon and the title. Below the header is a blue bar with the text "Select Date". The main content area is divided into two sections: "My Shifts" and "Available Shifts".

Date	Start	End	Location
05-10-2016	14:00	16:00	HSB 3304
05-10-2016	9:00	10:00	HSB 3304

Available Shifts

Profile ID	Date	Start	End	Location
RMYB9	05-10-2016	08:00	9:00	HSB 3304
RMYB9	05-10-2016	10:00	13:00	HSB 3304

Fig: After Take Shift

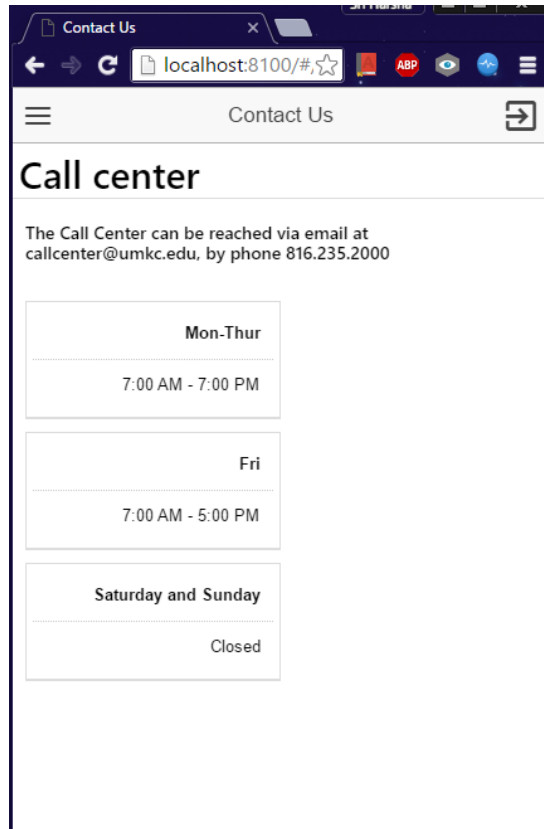


Fig: Contact Us

Project URL:

https://github.com/meetsriharsha/ASE_S16_G7/

Document URL:

https://github.com/meetsriharsha/ASE_S16_G7/Documentation

Project Management

Work Completed

In detailed analysis of the system, environment and technical requirements for the application development. Project proposal documentation, Project tasks created in ZenHub and assigned the tasks to team members. Created the Project increment 4 document. All team members are involved in this task. Total time taken is 30 hours per person. Contributions: Harsha 30%, Teja 25%, Raj 25%, Suhas 20%.

Limitations:

The data which we worked on is a static database so the test cases that we performed on the application may not be accurate or sufficient. As we used ionic frame work for the development of application we have some limitations on the core functionalities of the mobile phones.

Issues/Concerns:

Sometimes we are getting black background for the login page due to some unknown bug in ionic framework .Sometimes we are getting asynchronous results from API in Home page.

Burndown Chart for Increment 4:

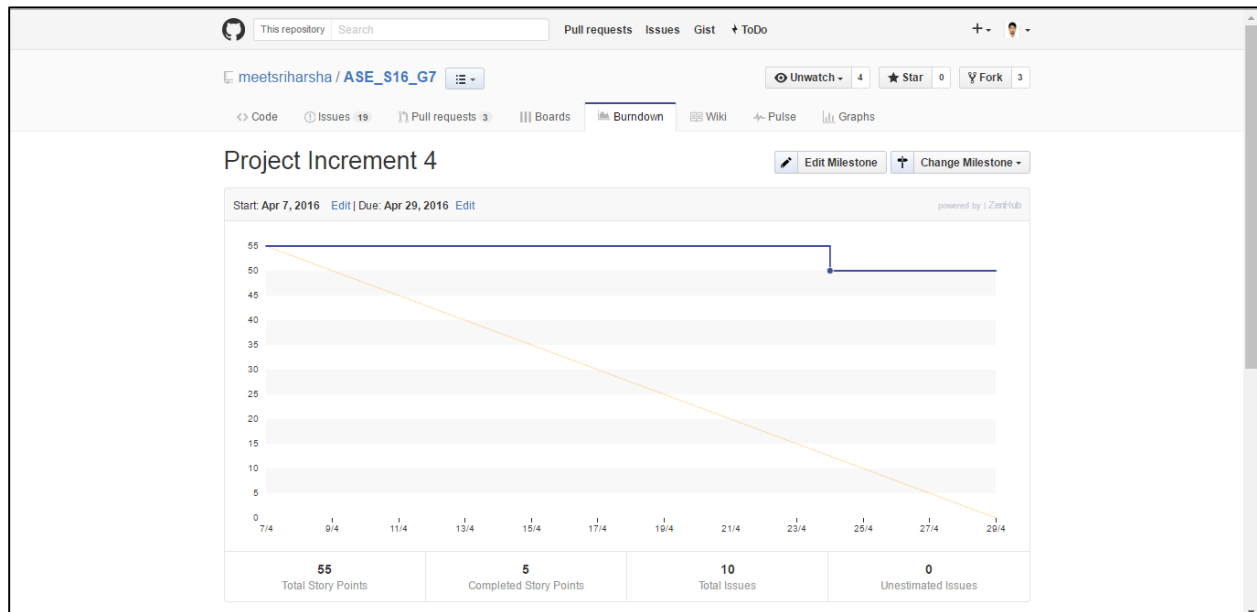


Fig: Burndown Chart

Bibliography

- University of Missouri Library - <http://library.umkc.edu/>
- UMKC IS Labs - <http://www.umkc.edu/is/labs>
- Top Library management android applications - <http://appcrawlr.com/androidapps/best-apps-library-manager>
- SFU: Student Companion - <https://play.google.com/store/apps/details?id=com.teamzeta.sfu&hl=en>
- ZenHub - Agile project management tool for GitHub - <https://www.zenhub.io>
- Ionic Framework Documentation - <http://ionicframework.com/docs/>
- AngularJS ng directives - <https://docs.angularjs.org/api/ng>
- Bootstrap CSS - <http://getbootstrap.com/css/>
- Learn AngularJS - <http://www.w3schools.com/angular/>
- Ion Icons cheat sheet - <http://ionicons.com/cheatsheet.html>