

# **ULAB Resource Management System (URMS) Mobile Application**

by

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A project report submitted in partial fulfillment of the requirements for the CSE401:

System Analysis and Design of Bachelor of Science in

Computer Science and Engineering

Supervised By:

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Bangladesh.

**24, May 2022**

## **DECLARATION**

This project report is submitted to the Computer Science and Engineering, University of Liberal Arts Bangladesh in partial fulfillment of the requirements for the CSE401: System Analysis and Design of Bachelor of Science. So, I hereby, declare that this project report is based on the analysis done by me. This project report, neither in whole, nor in part, has been previously submitted for any Course.

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## CERTIFICATE OF APPROVAL

The project report entitled “ULAB Resource Management System (URMS) Mobile Application” is submitted to the **Computer Science and Engineering**, University of Liberal Arts Bangladesh, Dhaka in partial fulfillment of the requirements for the CSE401: System Analysis and Design of Bachelor of Science.

Dated: May 24, 2022

Dr. Abul Kalam Al Azad

Head of Department  
**Computer Science and Engineering**  
University of Liberal Arts Bangladesh

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Signature & Date

Dr. Farhana Sarker

Supervisor Name  
**Computer Science and Engineering**  
University of Liberal Arts Bangladesh

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Signature & Date

## **ABSTRACT/SUMMARY**

ULAB Resource Management System (URMS) is a UI designing-based project where I will be developing a prototype of the URMS mobile application. My objective is to develop a URMS mobile application and that is why I have taken up this project so that I can implement the mobile application based on this prototype. There are several reasons behind taking up this project:

1. There is no existing URMS mobile application for both the ULAB students and faculties as well.
2. There is only a URMS web application for all the ULABians which is not appropriate for the mobile users because when we go to the URMS web application using our mobiles, the height, width, and window size do not seem user friendly since it was developed considering the PC users only. Mobile users need to zoom in and out frequently to use the web application of URMS which is not user-friendly and quite uncomfortable.
3. It seems to me that there is some lack of features in our URMS such as Bus Schedule, Course Listing, and Academic Calendar, Report a problem while using the application as a user, etc.

## LIST OF FIGURES

<b>Figure 1:</b> Mobile View of URMS Web Application.....	9
<b>Figure 2:</b> Methodology Flowchart.....	10
<b>Figure 3:</b> Gantt chart for URMS Mobile App.....	12
<b>Figure 4:</b> Context Level DFD for URMS.....	16
<b>Figure 5:</b> Level 1 DFD for URMS.....	18
<b>Figure 6:</b> Use case diagram for Student.....	18
<b>Figure 7:</b> Use case diagram for Faculty.....	19
<b>Figure 8:</b> Use case diagram for Other Staff.....	19
<b>Figure 9:</b> Activity diagram of URMS mobile application.....	20
<b>Figure 10:</b> Class diagram of URMS mobile application.....	20
<b>Figure 11:</b> Class diagram of URMS mobile application.....	22
<b>Figure 12:</b> User Interfaces (UI) of URMS.....	23

DECLARATION.....	2
CERTIFICATE OF APPROVAL.....	3
ABSTRACT/SUMMARY.....	4
LIST OF FIGURES.....	5
1. INTRODUCTION.....	8
1.1 Abstract.....	8
1.2 Objective.....	8
1.3 Motivation.....	8
1.4 Intended User.....	9
2. METHODOLOGY.....	9
3. FEASIBILITY ANALYSIS.....	11
3.1 Technical Feasibility Analysis.....	11
3.2 Economic Feasibility Analysis.....	11
3.3 Operational Feasibility Analysis.....	11
3.4 Scheduling Feasibility Analysis.....	12
4. REQUIREMENT ANALYSIS.....	12
4.1 External Interface Requirements.....	12
4.2 Functional Requirements.....	13
4.3 Non-functional Requirements.....	14
4.3.1 Security.....	14
4.3.2 Scalability.....	15
4.3.3 Reliability.....	15
4.3.4 Usability.....	15
4.3.5 Availability.....	15
4.3.6 Correctness.....	15
4.3.7 Performance.....	15

<b>5.</b>	<b>DIAGRAMS.....</b>	<b>15</b>
5.1	Data Flow Diagram (DFD).....	15
5.1.1	Context Level DFD.....	16
5.1.2	Level 1 DFD.....	16
5.2	Use Case Diagram.....	18
5.2.1	Use Case Diagram for Student.....	18
5.2.2	Use Case Diagram for Faculty.....	19
5.2.3	Use Case Diagram for Other Staff.....	19
5.3	Activity Diagram.....	20
5.4	Class Diagram.....	20
5.5	ER Diagram.....	21
<b>6.</b>	<b>UI DESIGN.....</b>	<b>22</b>
<b>7.</b>	<b>CONCLUSION.....</b>	<b>30</b>

# 1. INTRODUCTION

## 1.1 Abstract

ULAB Resource Management System (URMS) is a UI designing-based project where I will be developing a prototype of the URMS mobile application for the students of ULAB so that they can manage their important resources more efficiently and effectively through mobile application.

## 1.2 Objective

My primary objective is to develop a URMS mobile application and that is why I have taken up this project so that I can implement the mobile application in near future based on this prototype. The secondary objectives of this project are given below:

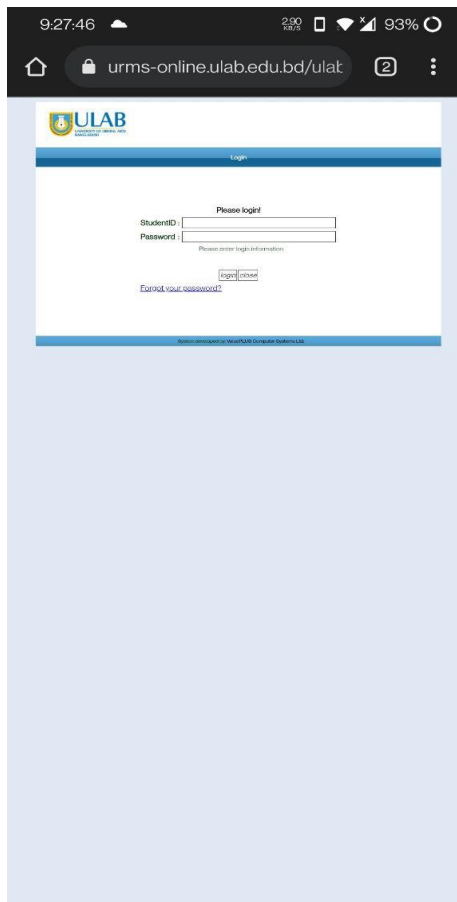
1. Making the **Preregistration** process faster, more efficient and user friendly
2. Integrating all sorts of **Schedule** within one application
3. Making the **Result** and **Billing** window more user friendly
4. Making the **Evaluation** process faster, more efficient and user friendly
5. Integrating the most important and necessary **Emails** of the ULAB officials within the application
6. Introducing a **User Feedback** window for future update

## 1.3 Motivation

There are several reasons behind taking up this project:

1. There is no existing URMS mobile application for both the ULAB students and faculties as well.
2. There is only a URMS web application for all the ULABians which is not user friendly for the mobile users because when we go to the URMS web application using our mobiles, the height, width, and window size do not seem user friendly since it was developed considering the PC users only. Mobile users need to zoom in and out frequently to use the web application of URMS which is not user-friendly and quite uncomfortable.
3. It seems to me that there is some lack of features in our URMS such as Bus Schedule, Course Listing, and Academic Calendar, Report a problem while using the application as a user, etc.





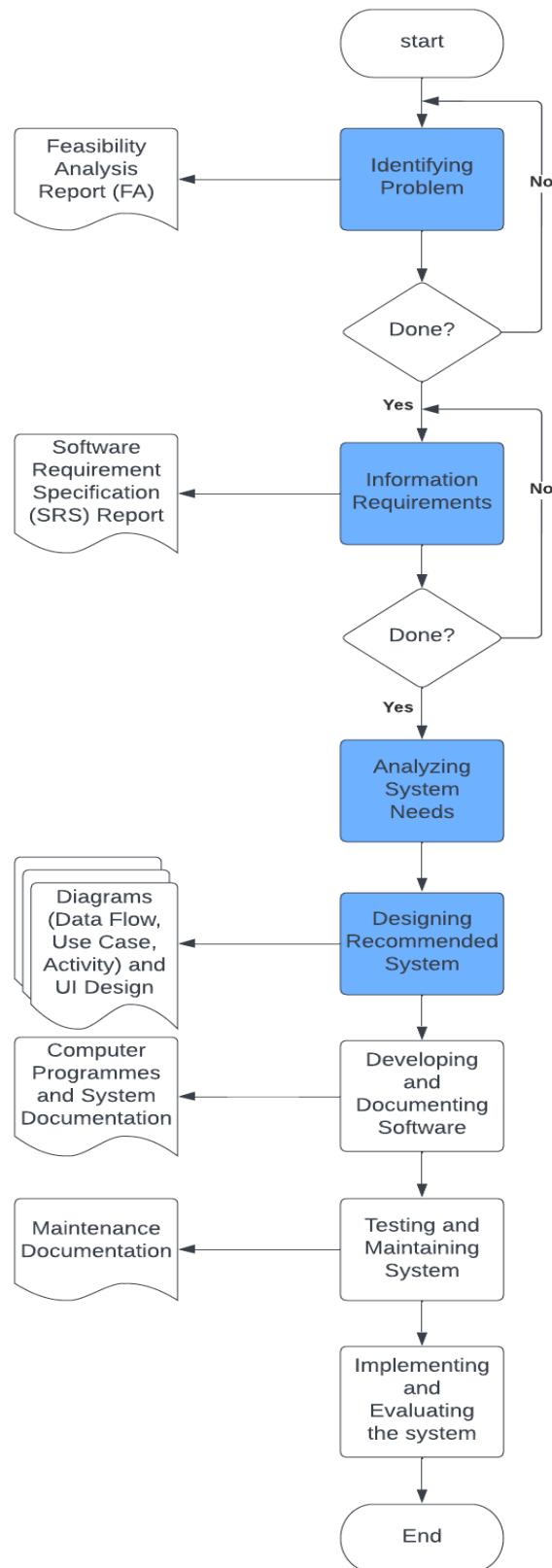
**Figure 1:** Mobile View of URMS Web Application

#### **1.4 Intended User**

All the current students of all departments of ULAB, especially those who do not have any desktop or laptop and even if have, who cannot carry their desktop or laptop on campus premises or anywhere else, faculty members and other staff (e.g. Registrar office, Accounts office etc.) will be the user of this mobile app.

## **2. METHODOLOGY**

I have followed Traditional System Development Life Cycle also known as Waterfall model to develop this project. There are total 7 number of steps in this development model but since this is a UI designing-based project, I have accomplished only 1st four steps in this project. However, all the steps of Waterfall model are given below as a flowchart and the accomplished steps are marked with Malibu (Hex code: #6db1ff) color:



**Figure 2:** Methodology Flowchart

### 3. FEASIBILITY ANALYSIS

#### 3.1 Technical Feasibility Analysis

The technologies that are required for the proposed project are given below:

1. **Android Studio** will be used for cross platform programming (Dart Programming and flutter framework)
2. **Figma** will be used for designing the User Interface
3. **Adobe Illustrator** will be used for designing Logo
4. **MySQL** will be used for designing the database to store and retrieve data
5. **Marshmallow** will be the minimum required android operating system

The mentioned technologies that will be used to develop the mobile app are compatible and promptly available in the market. Also the skills and human resources that are required to operate the technologies are available and so this project can be considered as technically feasible.

#### 3.2 Economic Feasibility Analysis

The required employees and budget for the development of this mobile app are given below:

**Table 1:** Required employees and budget

Sl.	Employee Description	Quantity	Working Hour	Per Hour Cost (BDT)	Total Cost
<i>Project Development Cost</i>					
1	Programmers	1	240	1,000	2,40,000
2	System Analyst	1	720	1,400	10,08,000
3	Database Administrator	2	168	1,000	3,36,000
4	UI Designer	1	720	1,200	8,64,000
5	Data Entry Specialist	10	168	500	8,40,000
6	Application Tester	1	360	1,000	3,60,000
<b>Grand Total</b>					<b>36,48,000</b>

The software we will be needing for this project, are free of cost and so we just need to pay the employees depending on their working hour and cost per hour. In 2022, the cost of a mobile application based on app type, design, platforms, features and number of windows can be \$10,000 to \$50,000. Whereas, this project will cost almost \$43,000 (36, 48,000 BDT) only. So, this project can be considered as economically feasible also.

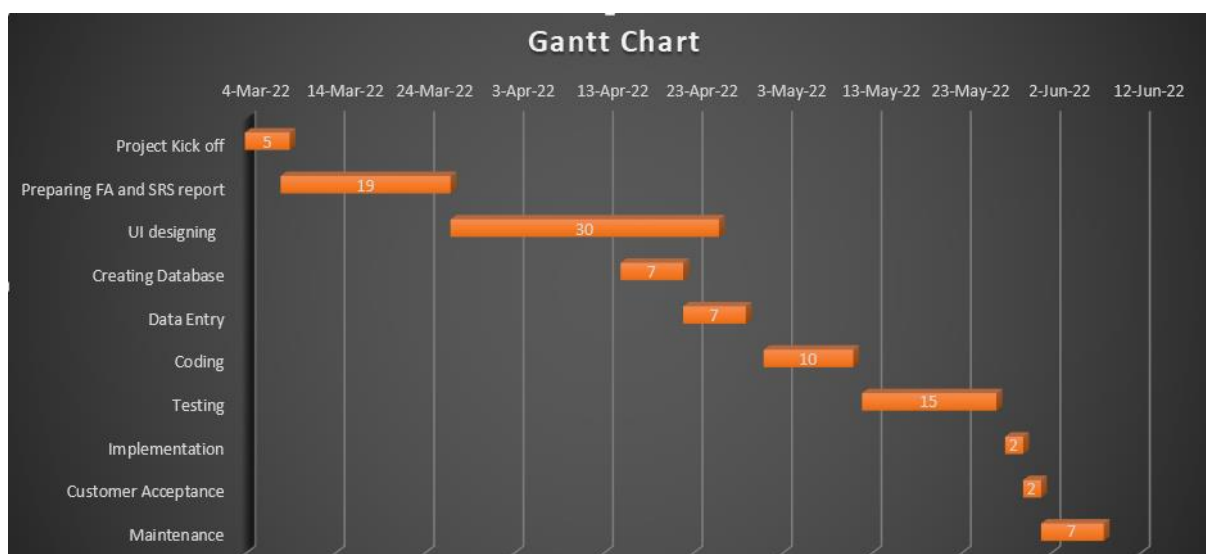
#### 3.3 Operational Feasibility Analysis

A project can be considered as operationally feasible if human resources are available and the target users can use it easily once it has been installed. This URMS mobile app will be very easy to use because of the simple and friendly user interface. The usage procedure of this mobile app is quite hustle free and can be downloaded very easily from the official website of ULAB. Nowadays, almost all the students have a mobile phone with at least minimum features

who will be able to use this app very easily and without any complexity. The most important part is all the students are already known to URMS web application and so we do not need train them hands-on for using this app. Thus, this project can be considered as operationally feasible also.

### 3.4 Scheduling Feasibility Analysis

The development of URMS mobile app project will be finished within 4 months starting from the project kick off to maintenance which is very practical and standard time length. So, this project will be feasible in terms of scheduling also. The below Gantt chart can be used to represent the estimated deadlines to develop the URMS mobile app:



**Figure 3:** Gantt chart for URMS Mobile App

## 4. REQUIREMENT ANALYSIS

### 4.1 External Interface Requirements

#### 1. User Interface:

- Front-end Development: HTML, CSS, and Javascript
- Back-end Development: Dart Programming Language

#### 2. Hardware Interface:

- A standard desktop or laptop
- Keyboard and mouse
- At least 8 GB of RAM
- At least 1 TB of ROM
- Up-to-date processor

### 3. Software Interface:

- a. Android Studio for development
- b. Figma for designing UI
- c. Adobe Illustrator for designing logo
- d. Lucidchart for designing diagram
- e. MySQL for creating database
- f. Windows 10 operating system as it is more familiar to adapt
- g. A browser that supports CGI, HTML and Javascript

### 4. Communication Interface:

- a. The project will be applicable for both android-based and iOS-based users

## 4.2 Functional Requirements

1. **Splash Window:** A splash window will be appeared initially while launching the application
2. **Login/Exit:** A user can login into the app using verified student ID and password or directly exit. However, the user can check in remember password so that he/she can directly access to the app without entering password for further use and also a user can use the forget password option if he/she forgets the password
3. **Home Window:** The home window will be the student profile where some important information of a student will be displayed
4. **Menu/Services:** There will be a drop down menu from where a student can access any window directly
5. **Result:** There will be a result window which will be splitted into two sub-window:
  - a) **General Queries:** The information of CGPA, total completed credit hours, semester-wise result and type wise number of completed courses will be in this window.
  - b) **Completed Courses:** The information of semester-wise completed courses and grades will be in this window.
6. **Billing:** There will be a billing window which will be splitted into three sub-window:
  - a) **Total payable:** The information of how much money and for what reason a user has to pay will be in this window.
  - b) **Paid Till Now:** The information of how much money a user has already paid will be in this window.

- c) **Make payment:** The information of how a user will pay his fees will be in this window.
- 7. **Schedule:** There will be a schedule window which will be splitted into three sub-window:
  - a) **Class Schedule:** Class schedule of the running semester will be in this window.
  - b) **Bus Schedule:** The information of ULAB Shuttle service will be in this window.
  - c) **Academic Calendar:** Academic calendar of the running semester will be in this window.
- 8. **Preregistration:** Student will do their preregistration using this window
- 9. **Evaluation:** There will be an evaluation window which will be splitted into two sub-window:
  - a) **Teacher Evaluation:** Students will evaluate their respected course teacher using this window.
  - b) **Course Evaluation:** Students will evaluate their course using this window.
- 10. **Course Listing:** There will be a course listing window which will be splitted into five sub-window:
  - a) **CSE:** All the CSE courses will be listed in this window based on subject area.
  - b) **EEE:** All the EEE courses will be listed in this window based on subject area.
  - c) **BBA:** All the BBA courses will be listed in this window based on subject area.
  - d) **MSJ:** All the MSJ courses will be listed in this window based on subject area.
  - e) **DEH:** All the CSE courses will be listed in this window based on subject area.
- 11. **Important Emails:** All the necessary important emails of ULAB officials will be in this window.
- 12. **Change Password:** Users will be able to change their URMS password using this window.
- 13. **Report a Problem:** Users will be able to report any issue attaching snapshot or video while using the app.
- 14. **Logout:** User will be able to logout using this window

### 4.3 Non-functional Requirements

#### 4.3.1 Security

1. The system will keep proper backup of data (login details, preregistration, etc.)
2. The suggestion of using a strong password

#### **4.3.2 Scalability**

1. Splitting services (Splitting the Schedule section into two different subsections such as Class Schedule and Bus Schedule)

#### **4.3.3 Reliability**

1. Solving inappropriate window size for URMS mobile users
2. Removing unnecessary information (due vat and adjust vat in the Billing section, number of courses completed in this semester in Result section)
3. Optimization (optimized code for quick and consistent loading)

#### **4.3.4 Usability**

1. User-friendly drop-down menus

#### **4.3.5 Availability**

1. The app will be open for all ULABians which can be downloaded from the official website of ULAB.

#### **4.3.6 Correctness**

1. The database of the app will contain all the necessary information

#### **4.3.7 Performance**

The app will be less complex and user-friendly so that it can be run faster even in a minimum featured mobile phone.

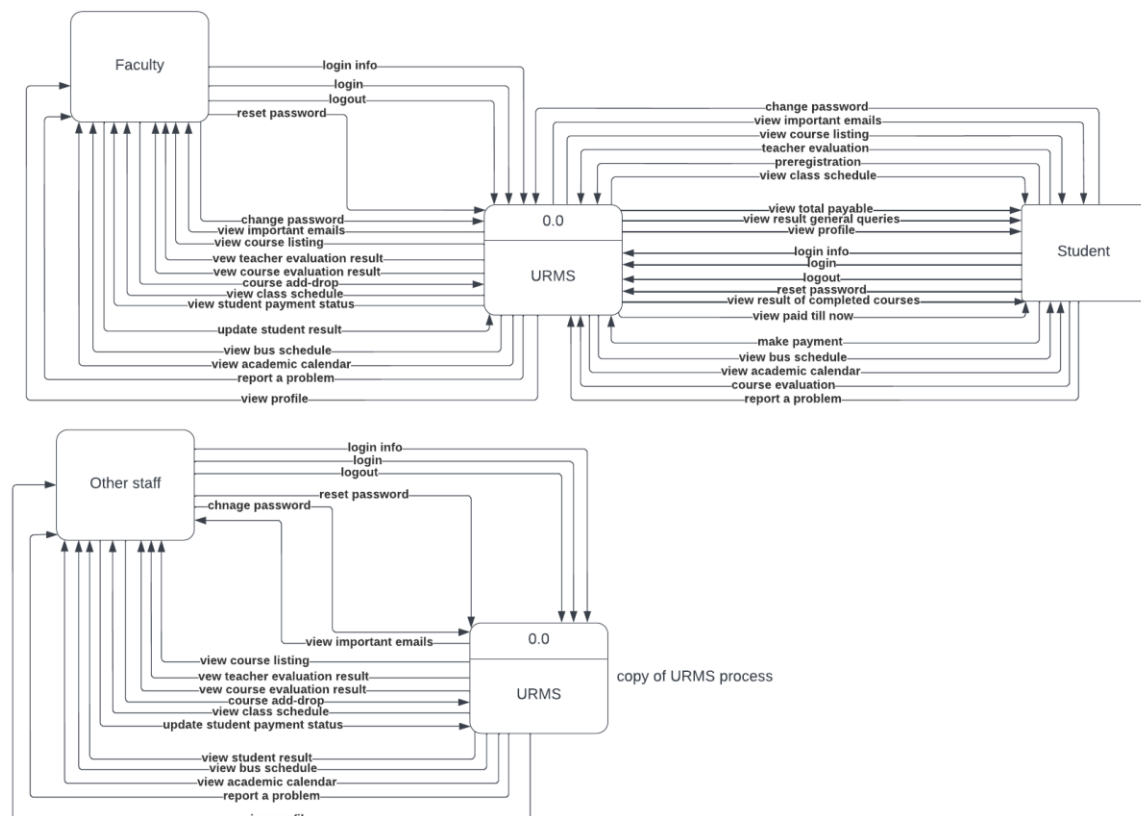
### **5. DIAGRAMS**

#### **5.1 Data Flow Diagram (DFD)**

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated. With a data flow diagram, users are able to visualize how the system will operate, what the system will accomplish, and how the system will be implemented. The old system's data flow diagrams can be drawn up and compared with the new system's data flow diagrams to draw comparisons to implement a more efficient system. Data flow diagrams can be used to provide the end user with a physical idea of where the data they input ultimately has an effect upon the structure of the whole system from order to dispatch to report.

### 5.1.1 Context Level DFD

Context Level DFD is also called Level 0 DFD. It's a basic overview of the whole system or process being analyzed or modeled. It's designed to be an at-a-glance view, showing the system as a single high-level process, with its relationship to external entities. It should be easily understood by a wide audience, including stakeholders, business analysts, data analysts and developers. The Context Level DFD for the URMS project is given below:



**Figure 4:** Context Level DFD for URMS

### 5.1.2 Level 1 DFD

The Context Level DFD is broken down into more specific, Level 1 DFD. Level 1 DFD depicts basic modules in the system and flow of data among various modules. Level 1 DFD also mentions basic processes and sources of information.

The main processes of the URMS projects are:

1. Giving login info
2. Login
3. Logout
4. Reset password



5. Viewing Profile
6. Viewing general queries of result
7. Viewing result of completed courses
8. Viewing total payable
9. Viewing paid till now
10. Making payment
11. Viewing class schedule
12. Viewing bus schedule
13. Viewing academic calendar
14. Preregistration
15. Teacher evaluation
16. Course evaluation
17. Viewing course listing
18. Viewing important emails
19. Change password
20. Report a problem

Now, we can group some of the processes into a single process so that we can draw the Level 1 DFD for URMS by using manageable number of processes (best practice is 5-7 processes).

**Process 1:** Sign up (grouping process 1, 2, 3, 4 and 19)

**Process 2:** Profile

**Process 3:** Result (grouping process 6 and 7)

**Process 4:** Billing (grouping 8, 9, and 10)

**Process 5:** Schedule (grouping 11, 12, and 13)

**Process 6:** Preregistration

**Process 7:** Evaluation (grouping 15 and 16)

**Process 8:** Course Listing

**Process 9:** Important emails

**Process 10:** Report a problem

I will be needing some data storage for storing data of some of the processes.

**Data storage 1:** password

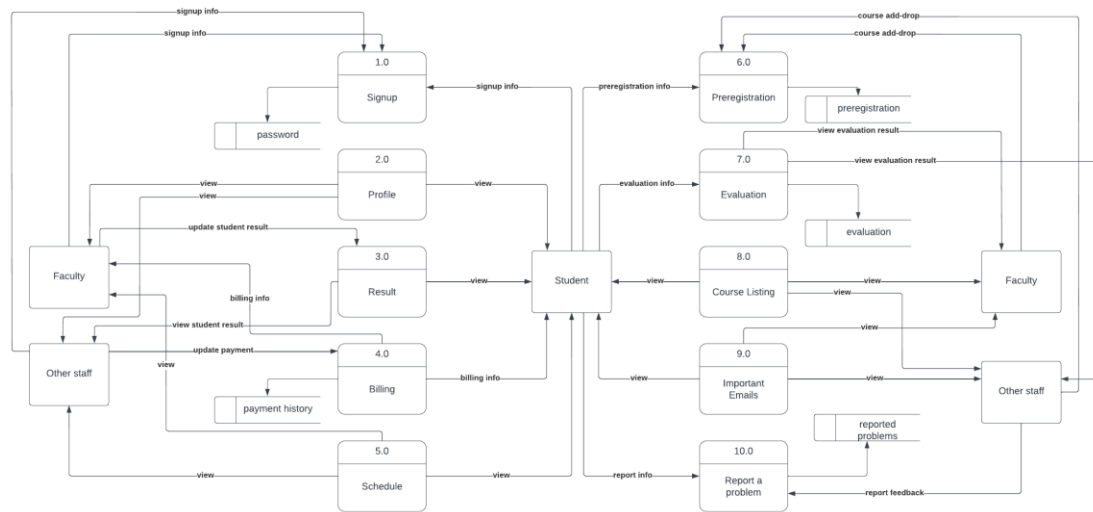
**Data storage 2:** payment history

**Data storage 3:** preregistration

**Data storage 4:** Evaluation

**Data storage 5:** Reported problems

The Level 1 DFD for the URMS project is given below:

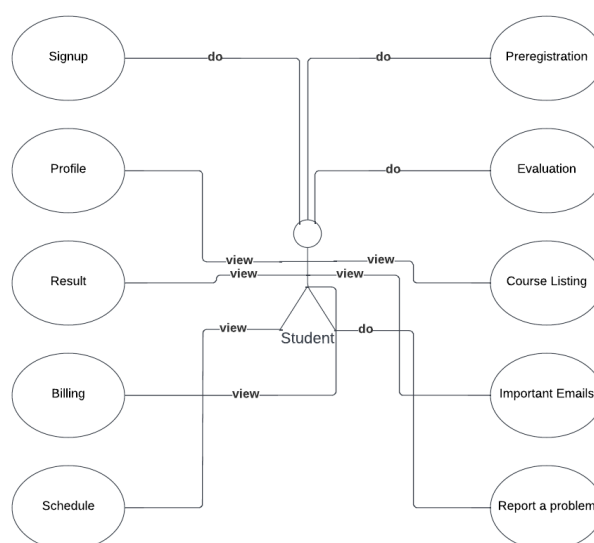


**Figure 5:** Level 1 DFD for URMS

## 5.2 Use Case Diagram

A use case diagram is a graphical depiction of a user's possible interactions with a system which is used for better and clear communication. In our URMS mobile application project, we have 10 use cases as mentioned above (10 processes in DFD) and 3 actors (student, faculty and other staff). Since this is a complex system, so the **actor wise** use case diagrams are given bellow:

### 5.2.1 Use Case Diagram for Student



**Figure 6:** Use case diagram for Student

### 5.2.2 Use Case Diagram for Faculty

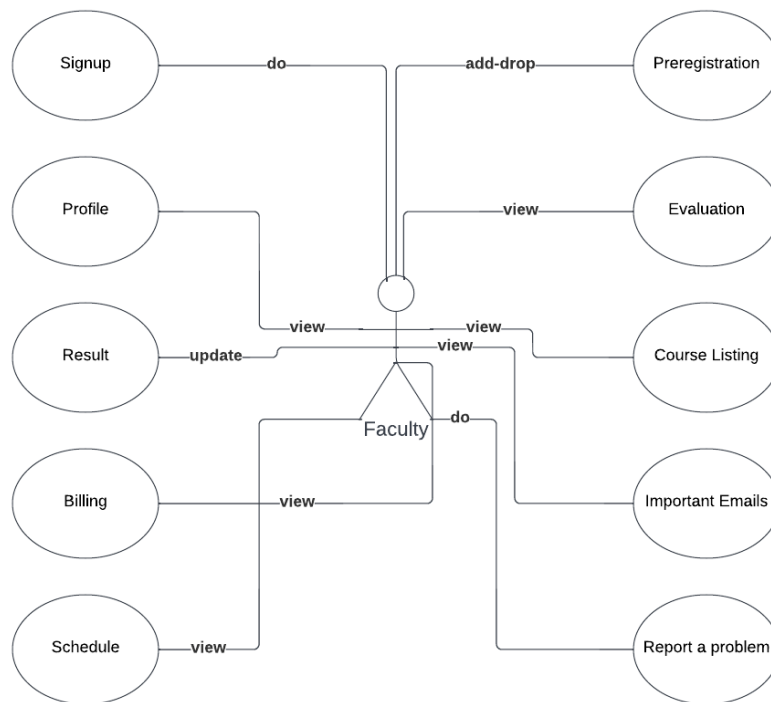


Figure 7: Use case diagram for Faculty

### 5.2.3 Use Case Diagram for Other Staff

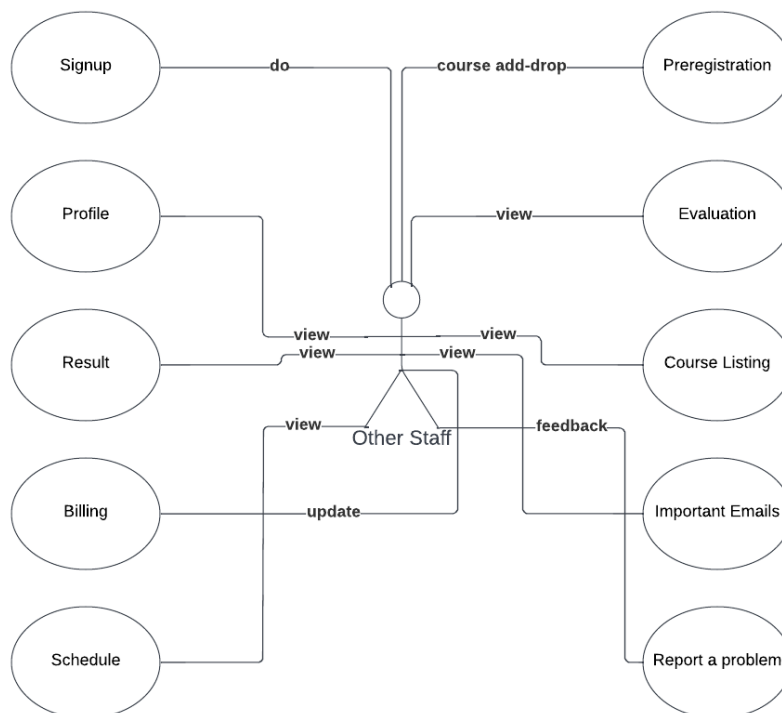
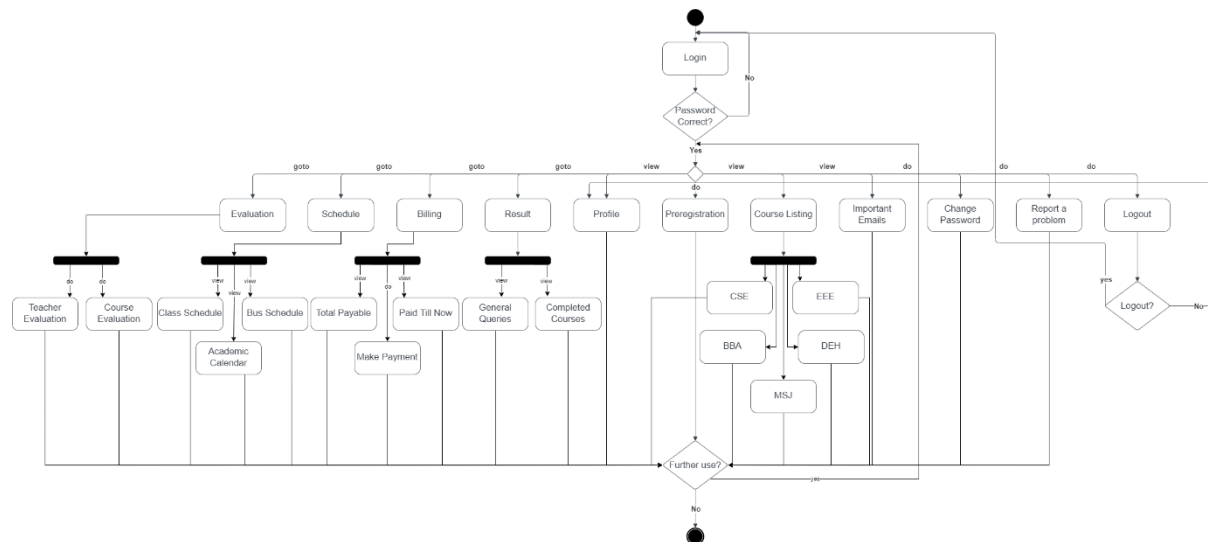


Figure 8: Use case diagram for Other Staff

### 5.3 Activity Diagram

Activity diagram is an important behavioral diagram in UML diagram to describe dynamic aspects of a system. Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity. The activity diagram of URMS mobile application is given below:

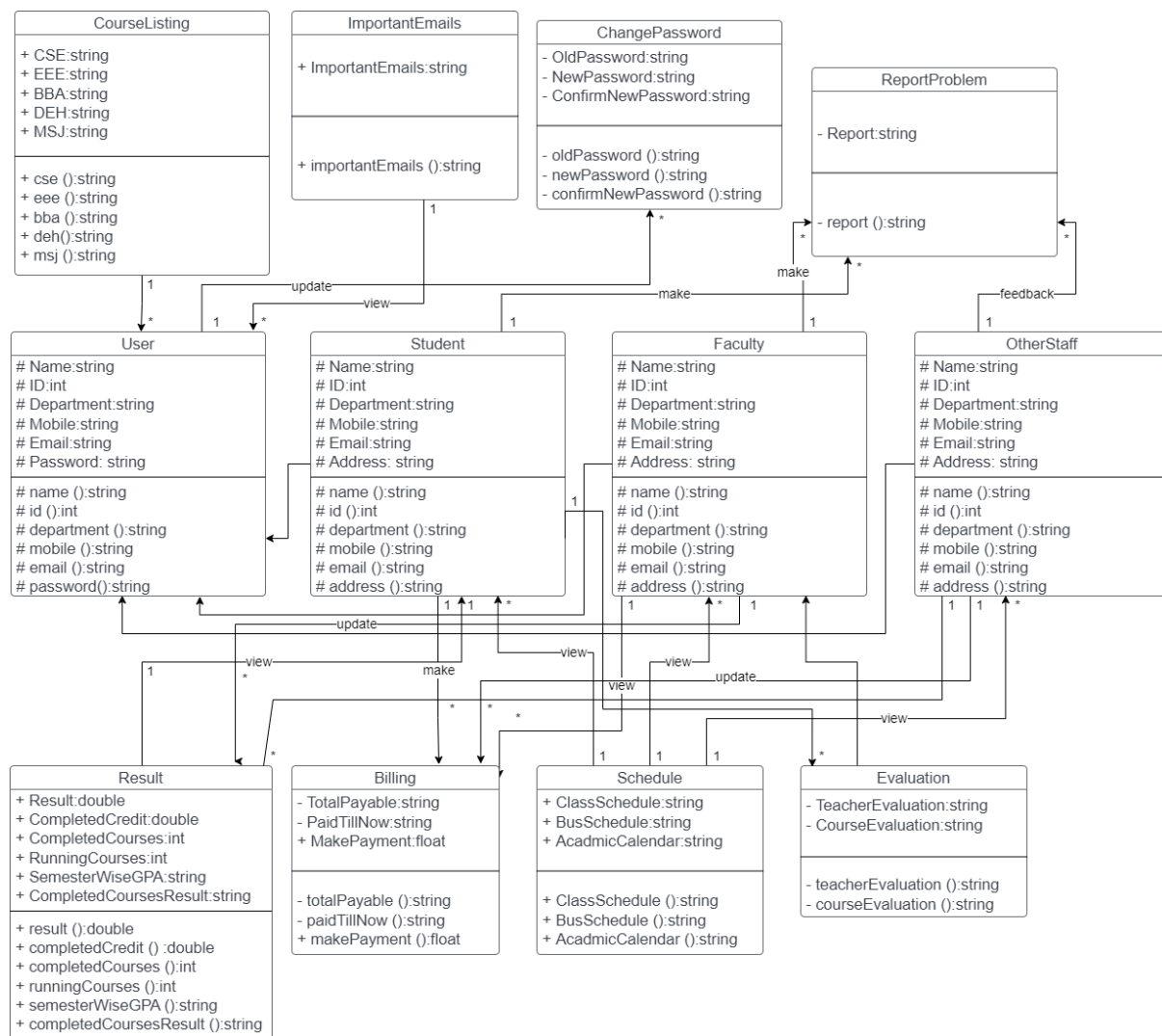


**Figure 9:** Activity diagram of URMS mobile application

### 5.4 Class Diagram

The class diagram depicts a static view of an application. It represents the types of objects residing in the system and the relationships between them. A class consists of its objects, and also it may inherit from other classes. A class diagram is used to visualize, describe, document various different aspects of the system, and also construct executable software code. It shows the attributes, classes, functions, and relationships to give an overview of the software system. It constitutes class names, attributes, and functions in a separate compartment that helps in software development. Since it is a collection of classes, interfaces, associations, collaborations, and constraints, it is termed as a structural diagram.

The class diagram of URMS mobile application is given below:

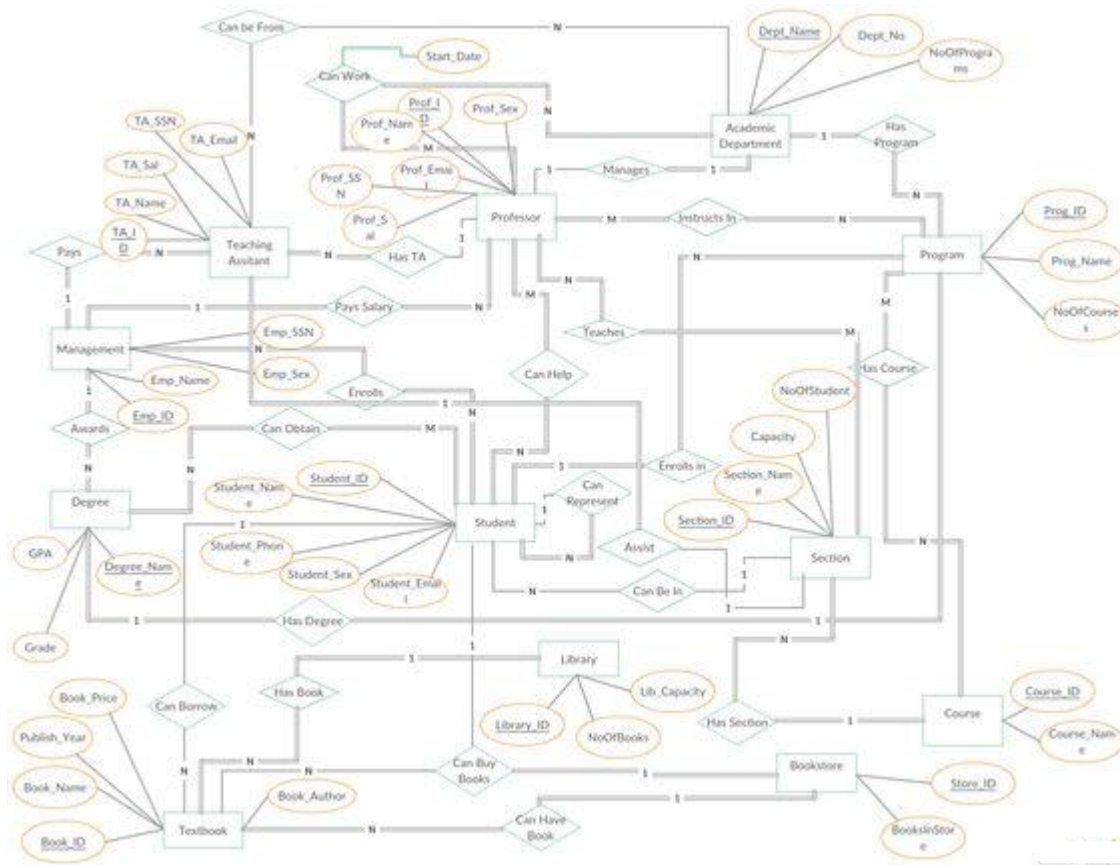


**Figure 10:** Class diagram of URMS mobile application

## 5.5 ER Diagram

An Entity–relationship model (ER model) describes the structure of a database with the help of a diagram, which is known as Entity Relationship Diagram (ER Diagram). An ER model is a design or blueprint of a database that can later be implemented as a database. The main components of E-R model are: entity set and relationship set.

The ER diagram of URMS mobile application is given below:

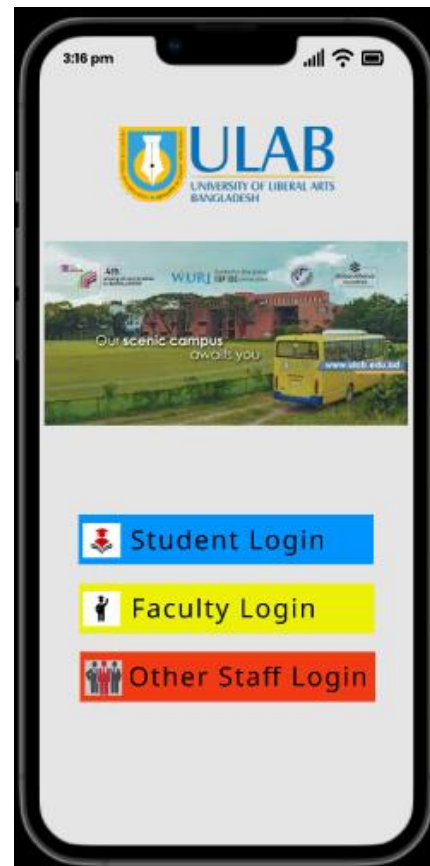


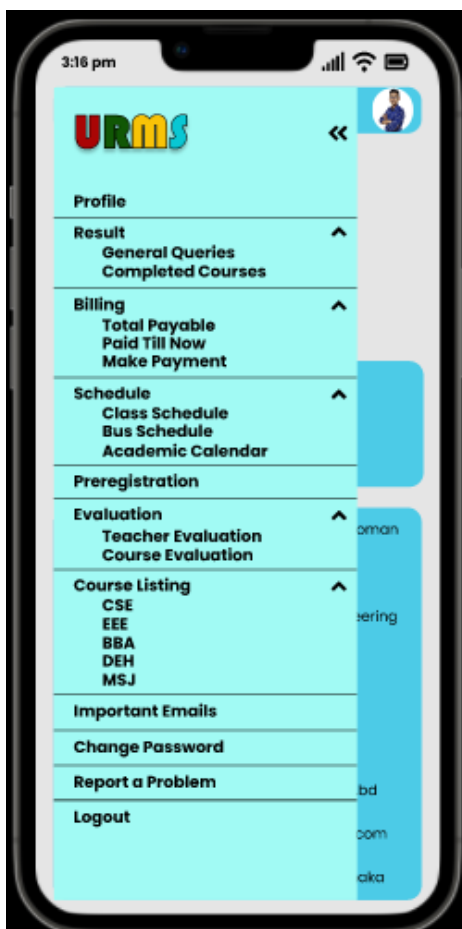
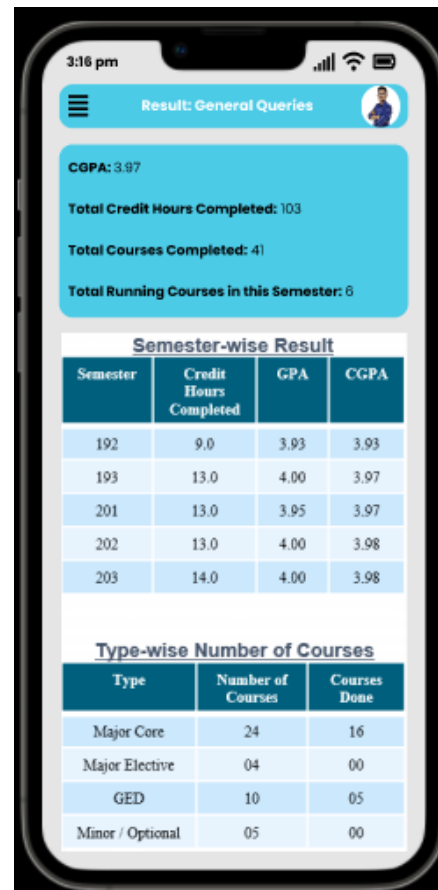
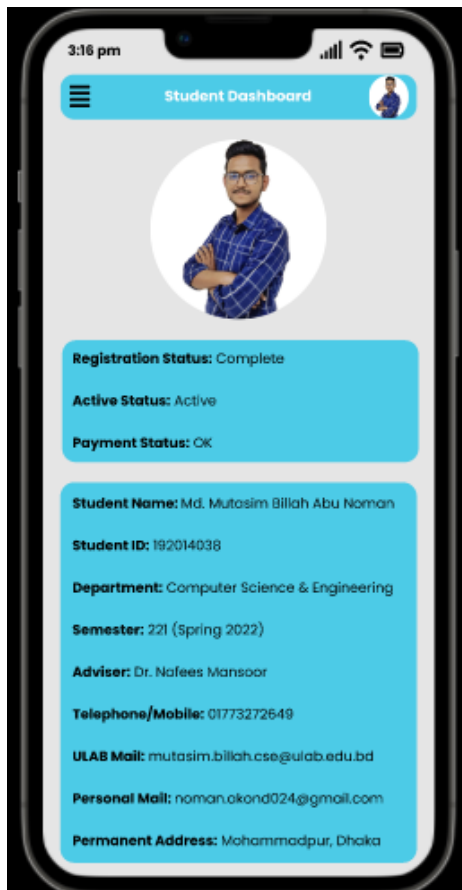
**Figure 11:** Class diagram of URMS mobile application

## 6. UI DESIGN

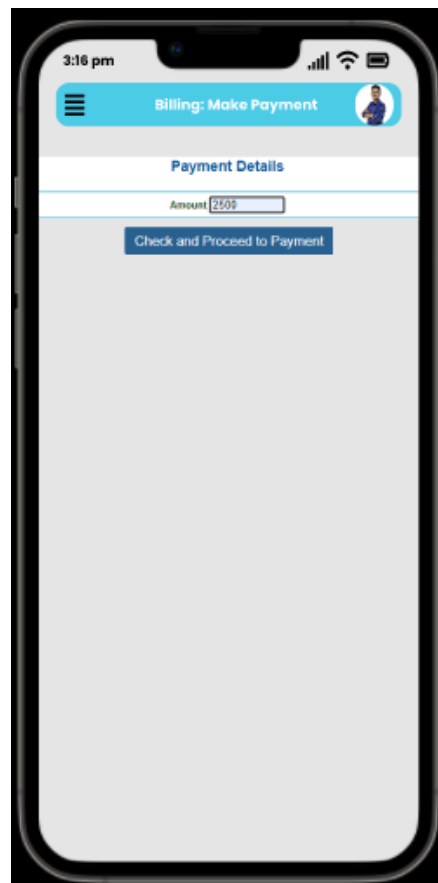
I have used **Figma** as design tool which is a cloud-based application for designing purpose. It works on any operating system that runs a web browser. Macs, Windows PCs, Linux machines, and even Chromebooks can be used with Figma. It is the only design tool of its type that does this, and in shops that use hardware running different operating systems, **everyone** can still share, open, and edit Figma files.

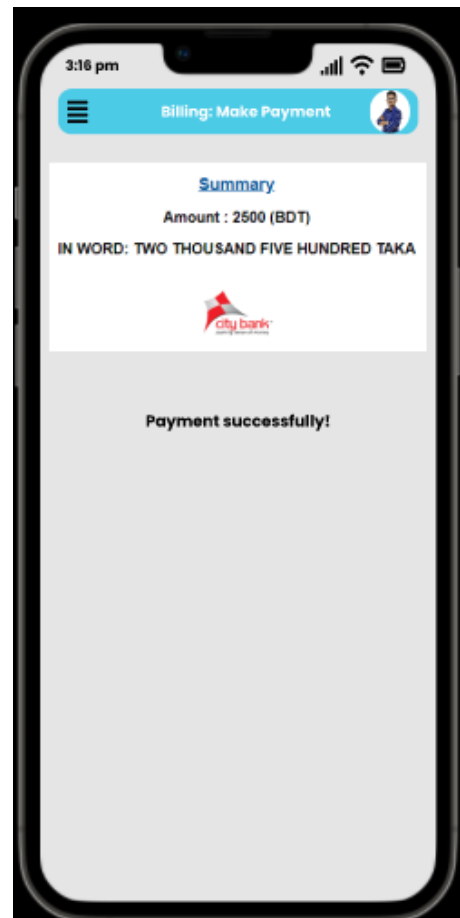
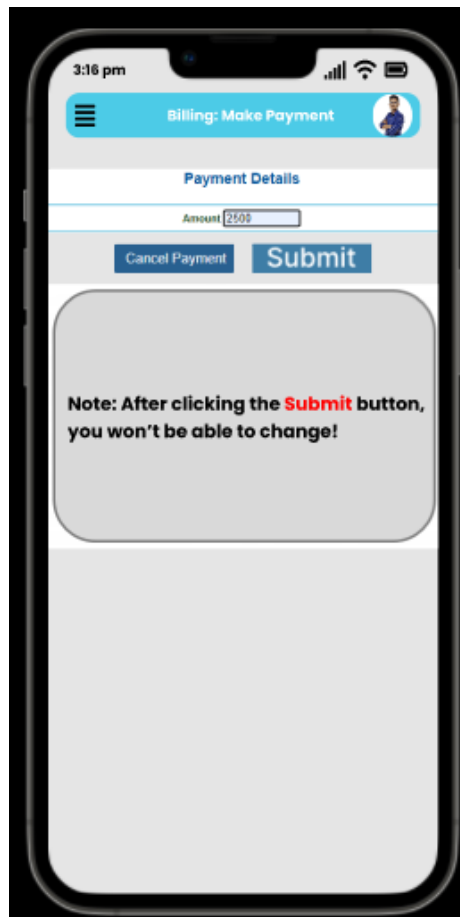
The user interfaces (UI) of URMS mobile app are given below:

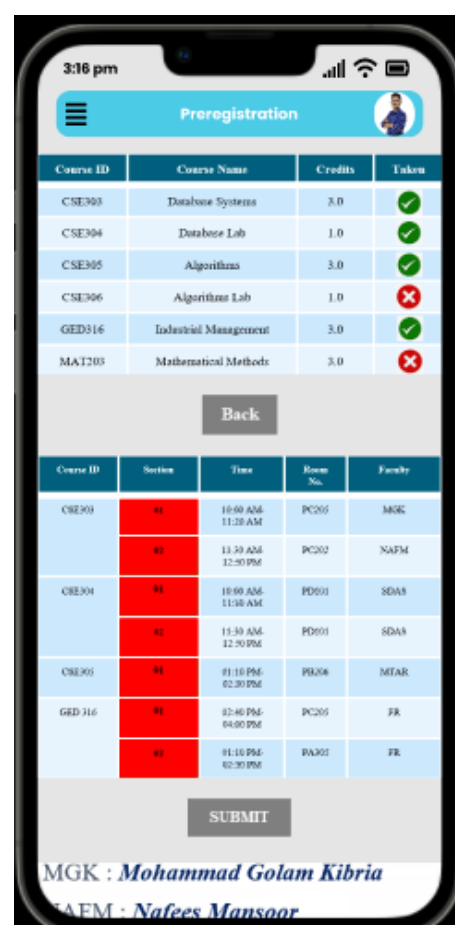
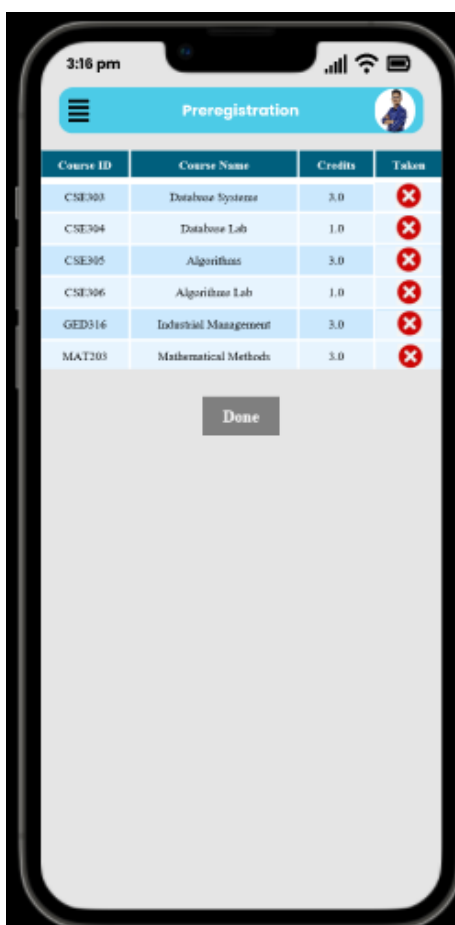
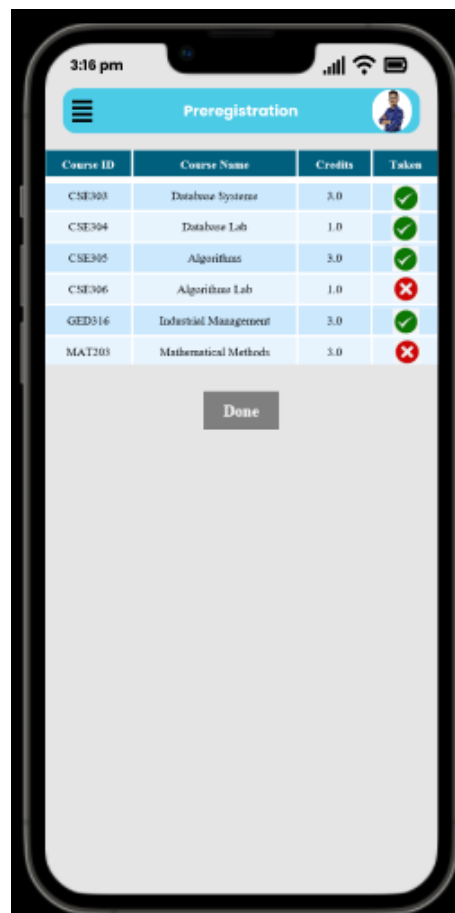












3:16 pm

Preregistration

Course ID	Course Name	Credits	Taken
CSE303	Database Systems	3.0	✓
CSE304	Database Lab	1.0	✓
CSE305	Algorithms	3.0	✓
CSE306	Algorithms Lab	1.0	✗
GED316	Industrial Management	3.0	✓
MAT203	Mathematical Methods	3.0	✗

Back

Course ID	Section	Time	Room No.	Faculty
CSE303	01	10:00 AM-11:20 AM	PC205	MGK
	02	11:30 AM-12:50 PM	PC202	NAFM
CSE304	01	10:00 AM-11:20 AM	PD051	SDAS
	02	11:30 AM-12:50 PM	PD051	SDAS
CSE305	01	01:10 PM-02:30 PM	PR006	MATAR
GED316	01	02:40 PM-04:00 PM	PC205	FR
	02	01:10 PM-02:30 PM	PA002	FR

SUBMIT

MGK : *Mohammad Golam Kibria*  
NAFM : *Nafees Mansoor*

3:16 pm

Teacher Evaluation

Course ID	Course Name	Section	Faculty
CSE303	Database Systems	01	NAFM
CSE304	Database Lab	01	SDAS
CSE305	Algorithms	01	MGK
CSE306	Algorithms Lab	01	SDAS
GED316	Industrial Management	01	FR
MAT203	Mathematical Methods	03	KRM

SUBMIT

Back

Questions	Excellent	Very Good	Good	Neutral	Poor
How was the Discussion and Interaction of the class?	✓	✗	✗	✗	✗
How was the Content of the discussion	✗	✓	✗	✗	✗
How was the Timing of the class	✓	✗	✗	✗	✗
How was the Engagement of the class	✓	✗	✗	✗	✗

3:16 pm

Teacher Evaluation

Course ID	Course Name	Section	Faculty
CSE303	Database Systems	01	NAFM
CSE304	Database Lab	01	SDAS
CSE305	Algorithms	01	MGK
CSE306	Algorithms Lab	01	SDAS
GED316	Industrial Management	01	FR
MAT203	Mathematical Methods	03	KRM

Done

Back

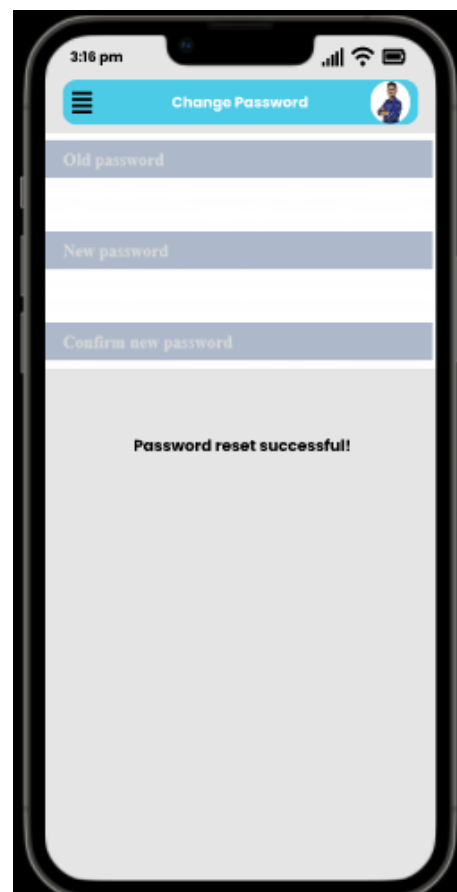
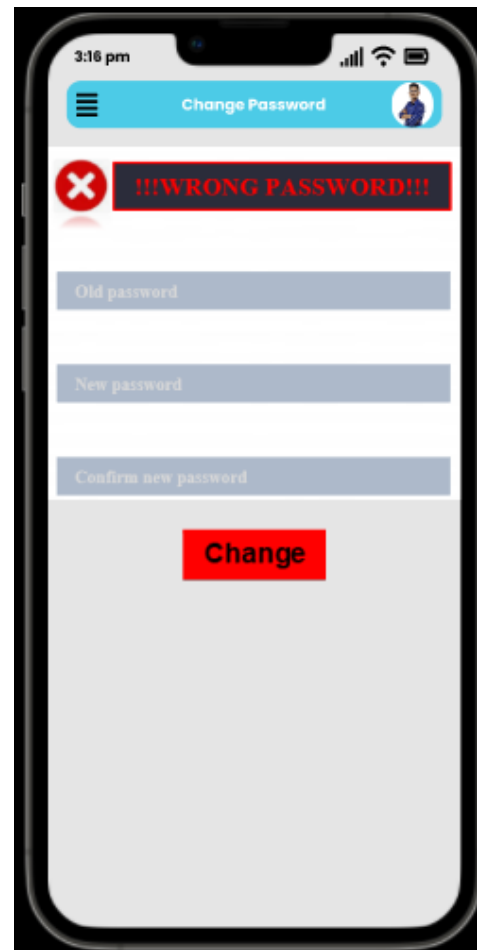
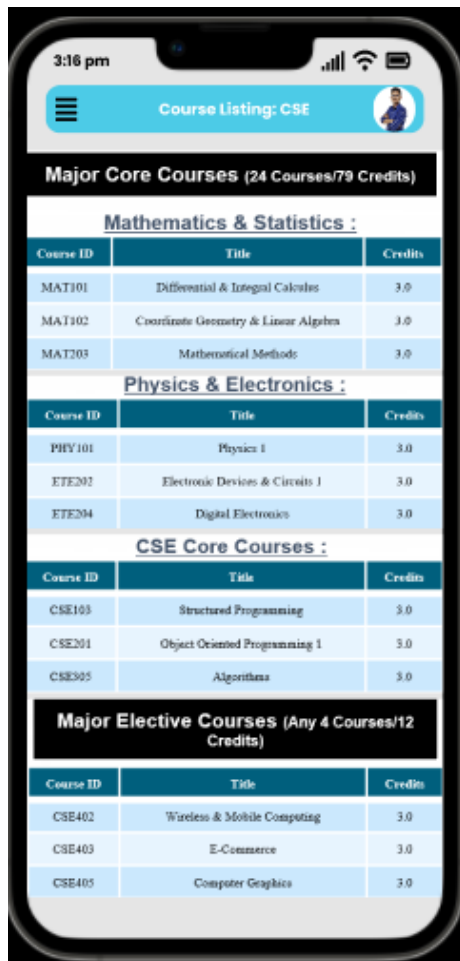
3:16 pm

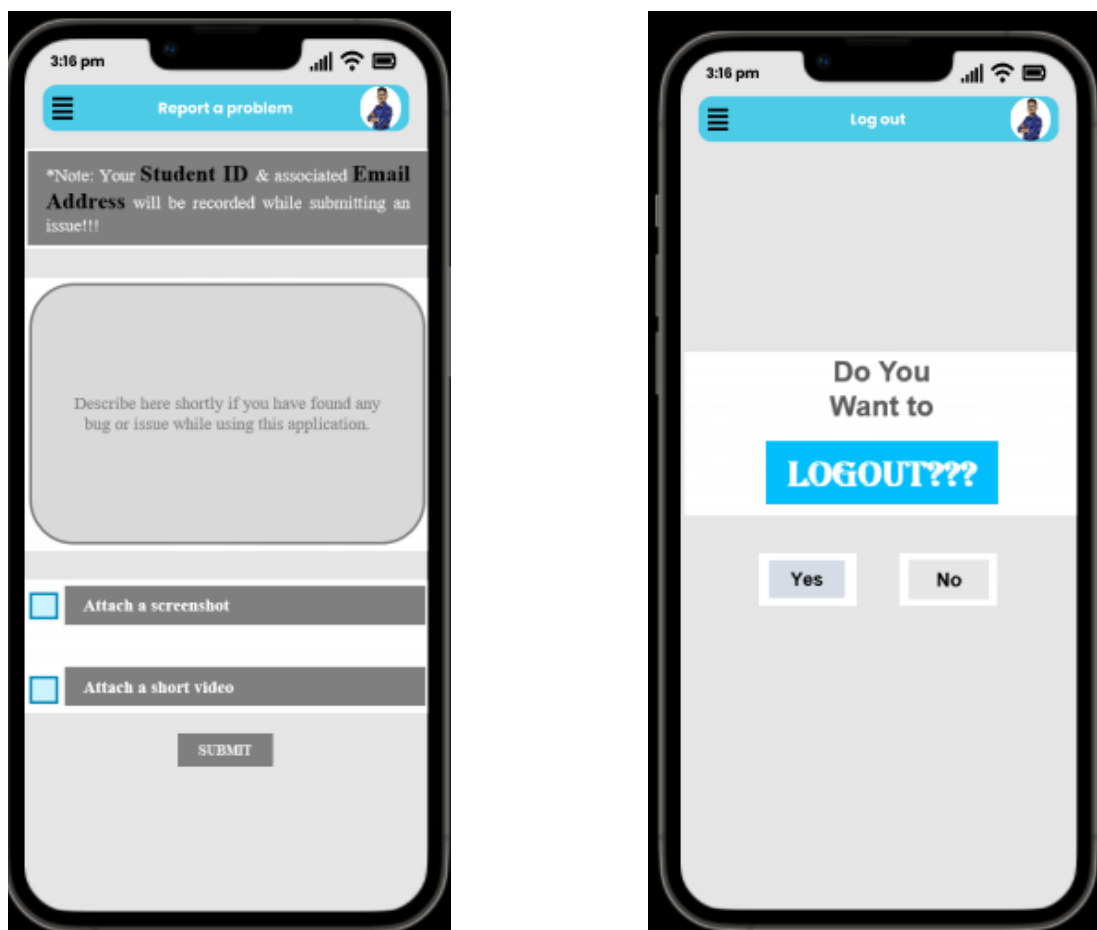
Course Evaluation

Course ID	Course Name	Section	Faculty
CSE303	Database Systems	01	NAFM
CSE304	Database Lab	01	SDAS
CSE305	Algorithms	01	MGK
CSE306	Algorithms Lab	01	SDAS
GED316	Industrial Management	01	FR
MAT203	Mathematical Methods	03	KRM

Done

Back





**Figure 12:** User Interfaces (UI) of URMS

## 7. CONCLUSION

I have designed the user interfaces and prototype of the actual URMS mobile app in this course but my main motive behind this URMS mobile app project is to develop and implement the original product based on this prototype in near future. It will be very effective, efficient and user friendly for all the students, faculty members and other staff of ULAB alongside a pride that ULAB has its own mobile app for the management purpose. I have incorporated All in One theory in this project so that every ULABian gets benefit while using the application. Besides, this project is feasible in terms of technology, economy, operation and schedule, so we may proceed further in developing the project if it is approved by both the user management and developer team.