Software Requirements Specification

for

DigiCampus

Version 1.0

Prepared by

Group #: 1 **Group Name:** Achievers

Dishay Mehta	200341	dishaymehta952@gmail.com
Abhishek Pardhi	200026	abhipardhi326@gmail.com
Samarth Arora	200849	samartharora03@gmail.com
Ankur Kumar	200140	ankurrk04@gmail.com
Shashwat Gupta	200923	guptashashwatme@gmail.com
Ananya Agrawal	200117	ananyaagrawal704@gmail.com
Girik Maskara	200387	girikmaskara552002@gmail.com
Sarthak Kohli	200886	sarthak811kohli@gmail.com
Aayush Kumar	200008	aayushk0072@gmail.com
Aryan Vora	200204	aryanvora23@gmail.com

Course: CS253

Mentor TA: *Aman*

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Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Dishay Mehta,Abhishek Pardhi,Samarth Arora,Ankur Kumar,Shashwat Gupta,Ananya Agarwal,Girik Maskara,Sarthak Kohli,Aayush Kumar,Aryan Vora	SRS Document created.	01/02/22

1 Introduction

1.1 Product Scope

DigiCampus is an application designed to be used by IITK students. It allows two main functionalities, a digitalized system to track entry and exit from hall gates, and a digital register that keeps track of the extras that can be bought at the mess.
The application aims to make hall entry and exit smoother, faster, and hassle-free, while also bringing transparency to the system that is currently in place in the hall messes.
DigiCampus will have three profile classes, students, security guards, and mess managers. These profiles will get access to relevant information and features.

1.2 Intended Audience and Document Overview

This document is mainly intended for developers who might want to add additional functionalities, optimize the current ones, or re-use these functionalities in their own projects. It can also be used by testers and users to understand how to use the system correctly, and in what situations the system is to be used.
It is important to first understand what the system does, and so it is recommended that the audience first reads the Overall Description of the system and then proceed to the Specific Requirements.

The system is currently intended for the IIT Kanpur campus population.

1.3 Definitions, Acronyms and Abbreviations

- **CC ID**: Computer Centre ID
- **ID**: Identity
- **SIS Guards**: Security Guards in the IIT Kanpur campus.

1.4 Document Conventions

Formatting Conventions:

- Using black, Arial with a font size of 11 for text.
- Using white, bolded Arial with a font size of 18 and a grey background for headings.
- Using black, bolded Arial with a font size of 14 for subheadings.
- Using black, bolded Arial with a font size of 11 for sub subheadings.
- Using black, filled bullets to form bulleted lists.

Naming Conventions:

- Use Case Models named as U#
- Functional Requirements named as F#

1.5 References and Acknowledgments

- https://app.creately.com/diagram: Used to make the diagrams used in the document
- https://www.figma.com/files/recent?fuid=1070397452285589933: for UI design

2 Overall Description

2.1 Product Overview

Origin of the Product:

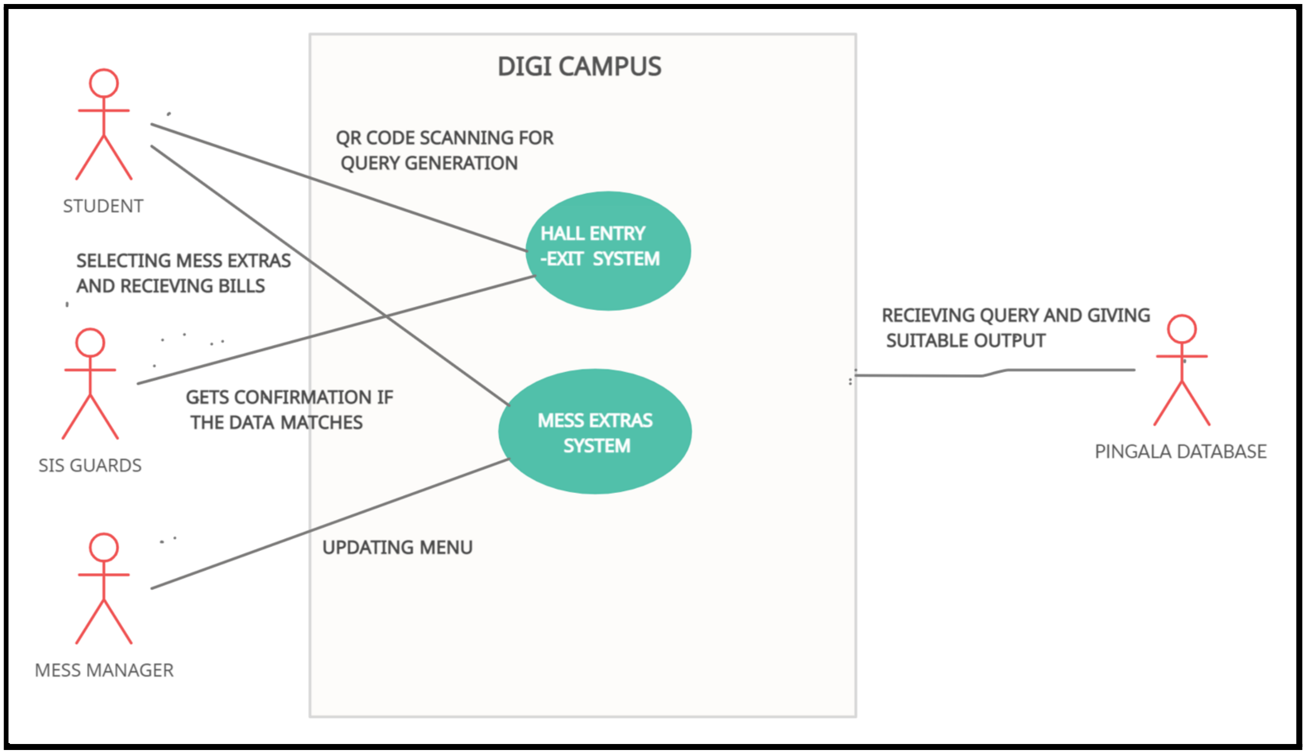
(a) Hall Entry and Exit:

The current system for students entering into Halls is to submit their ID cards and manually enter their details into the Hall entry register. The issue with this system is false data entry and crowd gathering at Hall closing time. Our software replaces the current system with a digital database entry to provide a contactless and hassle-free movement between halls.

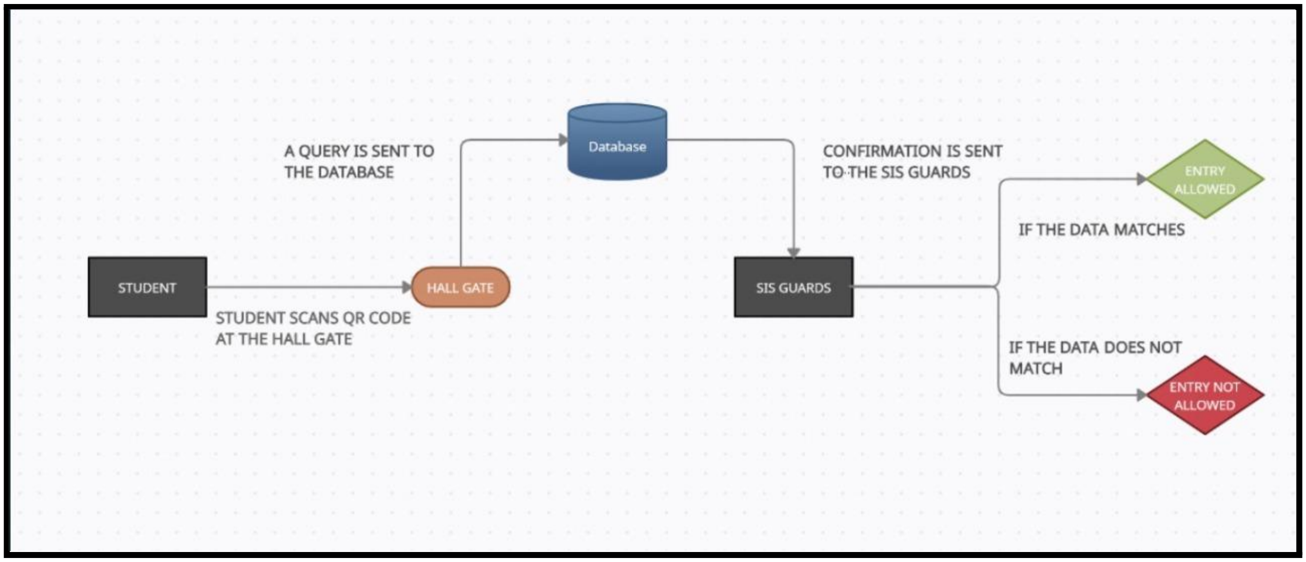
(B) Mess Extras:

In the mess, two types of items are served: Regulars and Extras. The Extras are optional and their value is added to the mess bill. Currently, the way to obtain these extras is by making an entry at their respective counters. The issue with this system is there is no guarantee that the student has entered the correct details and there is no transparency/record the student has of the items he/she has ordered. Replacing this system, our software will handle digital entries at all the mess counters and will be stored in a database that can be viewed by the student. This provides transparency to the students and protects both the mess managers and students from potential frauds.
This Digitalization will make the whole process hassle-free.

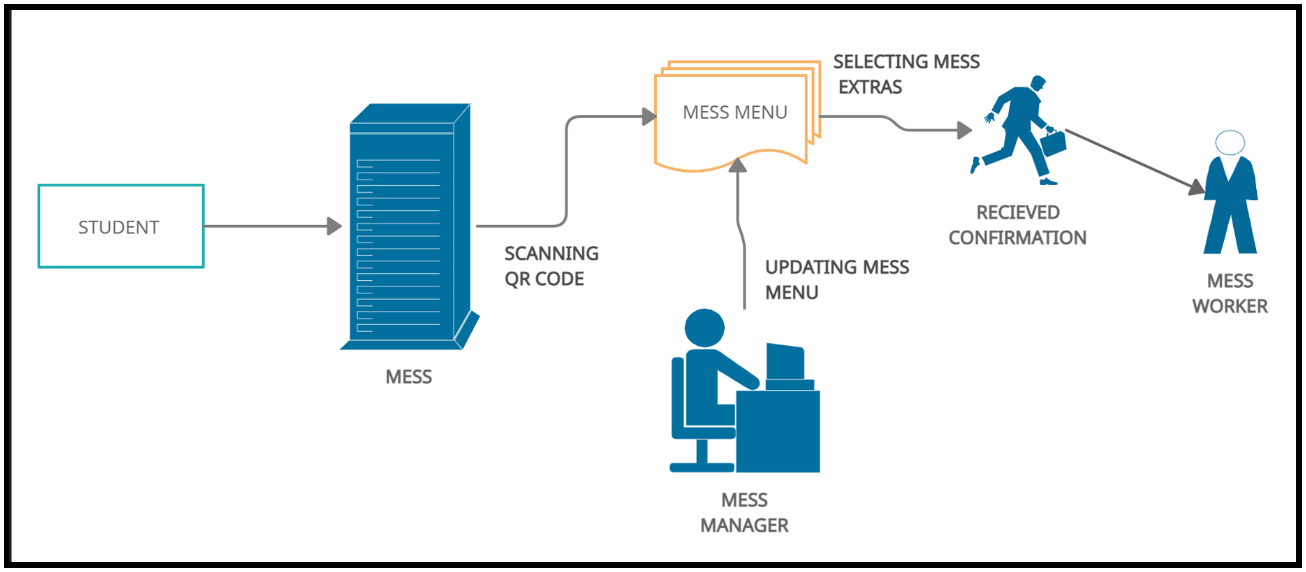
The system environment looks like this:


DIGI CAMPUS
QR CODE SCANNING FOR QUERY GENERATION
STUDENT
SELECTING MESS EXTRAS AND RECIEVING BILLS
HALL ENTRY -EXIT SYSTEM
RECIEVING QUERY AND GIVING SUITABLE OUTPUT
SIS GUARDS
GETS CONFIRMATION IF THE DATA MATCHES
MESS EXTRAS SYSTEM
PINGALA DATABASE
UPDATING MENU
MESS MANAGER

Overview Of Hall Entry/Exit System:


STUDENT
STUDENT SCANS QR CODE AT THE HALL GATE
HALL GATE
A QUERY IS SENT TO THE DATABASE
Database
CONFIRMATION IS SENT TO THE SIS GUARDS
SIS GUARDS
IF THE DATA MATCHES
ENTRY ALLOWED
IF THE DATA DOES NOT MATCH
ENTRY NOT ALLOWED

Overview Of Mess Extras System:



2.2 Product Functionality

- The system will allow the student to scan the hall’s QR code at the hall entry/exit which will update the real-time location of the student in the student database.
- The system will notify the students a few minutes before the stipulated time to leave the hall. It will also give the security the details of the students currently in the hall to directly call them.
- The system will allow the students to select/pre-order their Mess Extras and will be provided with a detailed mess bill.

2.3 Design and Implementation Constraints

- The Student Database will be given by Pingala Servers which requires the permission of authorities.
- The initial set-up will be done by our engineers and we will be maintaining the system for the first 3 months to cater to bugs if they arise. Further maintenance of the product is the customer's responsibility.
- Language requirements: The software will use only the English language.

2.4 Assumptions and Dependencies

- We assume that the authorities will provide us with the student database.
- We assume that all students are having a smartphone or a laptop with a working internet connection through which they can access our system.
- We assume that security guards will be able to use our product or the authorities will provide them assistance to make them comfortable with the User Interface.

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

The user interface for the software shall be compatible with any browser such as Internet Explorer, Mozilla, or Netscape Navigator by which the user can access the system. We hope that our software is compatible with all Operating systems: Android, Windows Linux, etc, as it is a web-based application, and therefore will not have many OS dependencies.

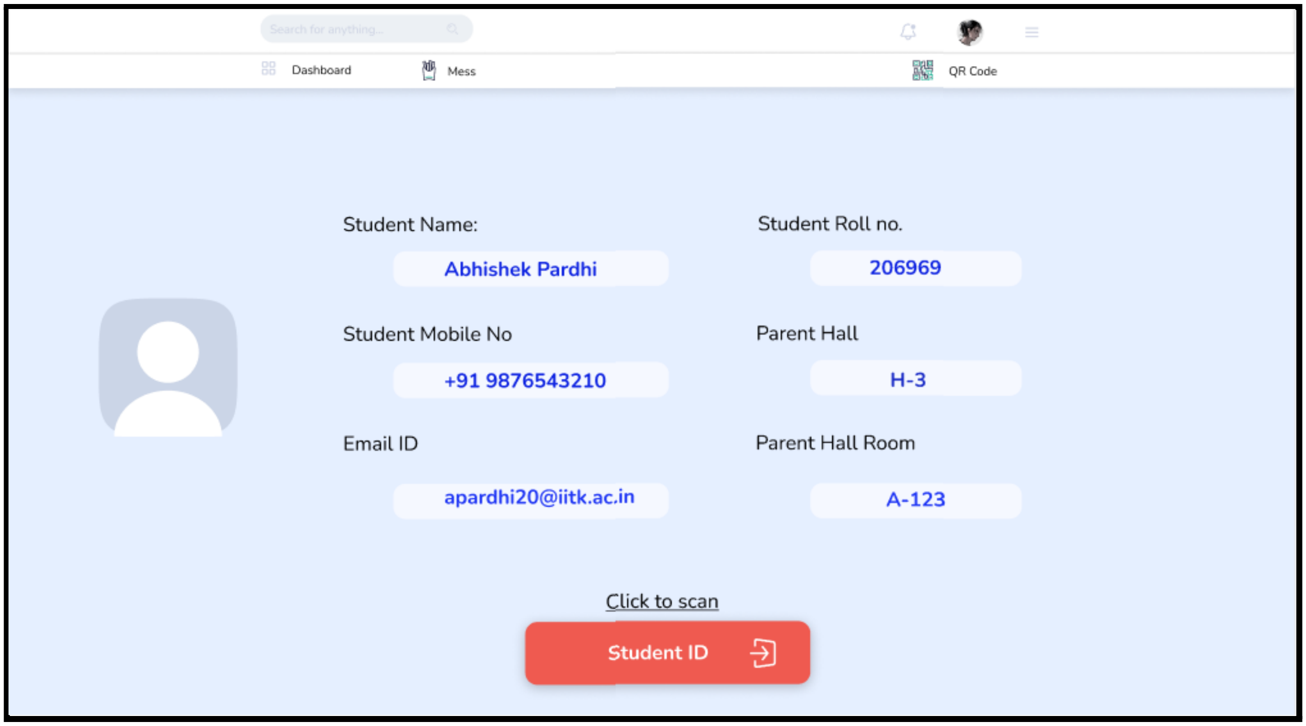
The user interface (Frontend) shall be implemented using HTML, CSS, and JavaScript.

Features:

1. The system shall provide a uniform look and feel between all the web pages.
2. The system shall provide a photo for the user for his profile, as well as other interface visual aids like the hall photos and mess photos.
3. The system shall provide the use of icons and toolbars.

The first version of UI looks like this:

- **Student Profile:**



Student Name: Abhishek Pardhi

Student Roll no. 206969

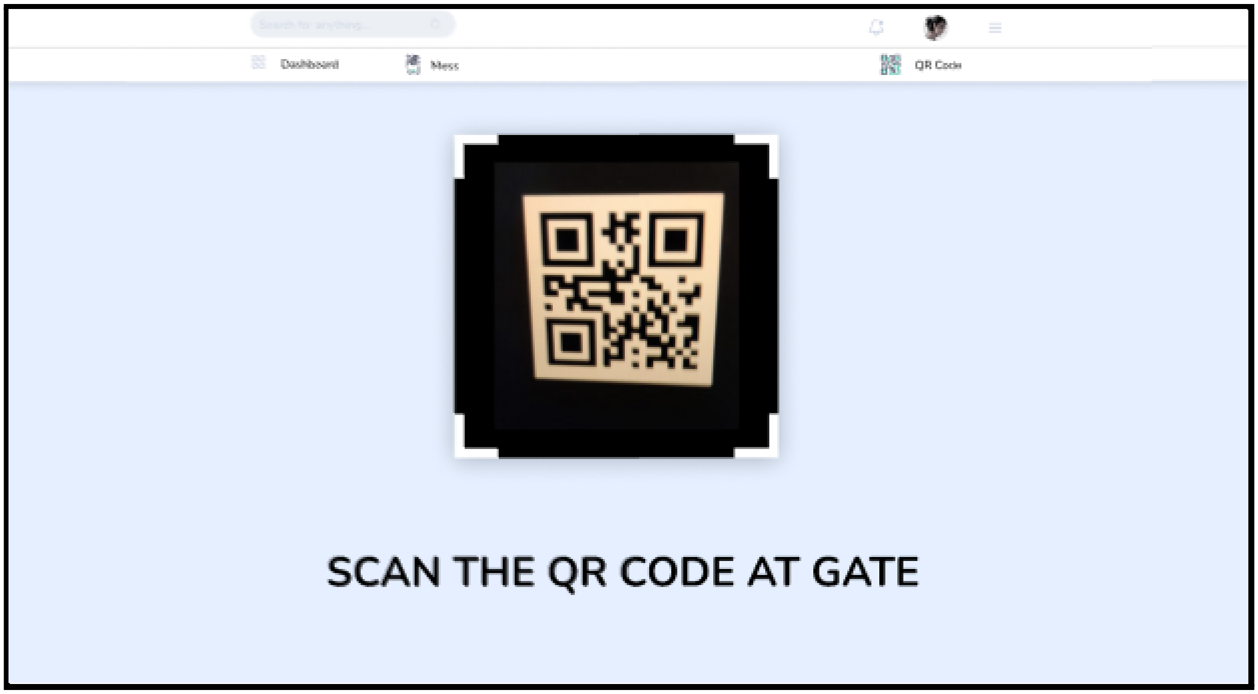
Student Mobile No +91 9876543210

Parent Hall H-3

Email ID apardhi20@iitk.ac.in

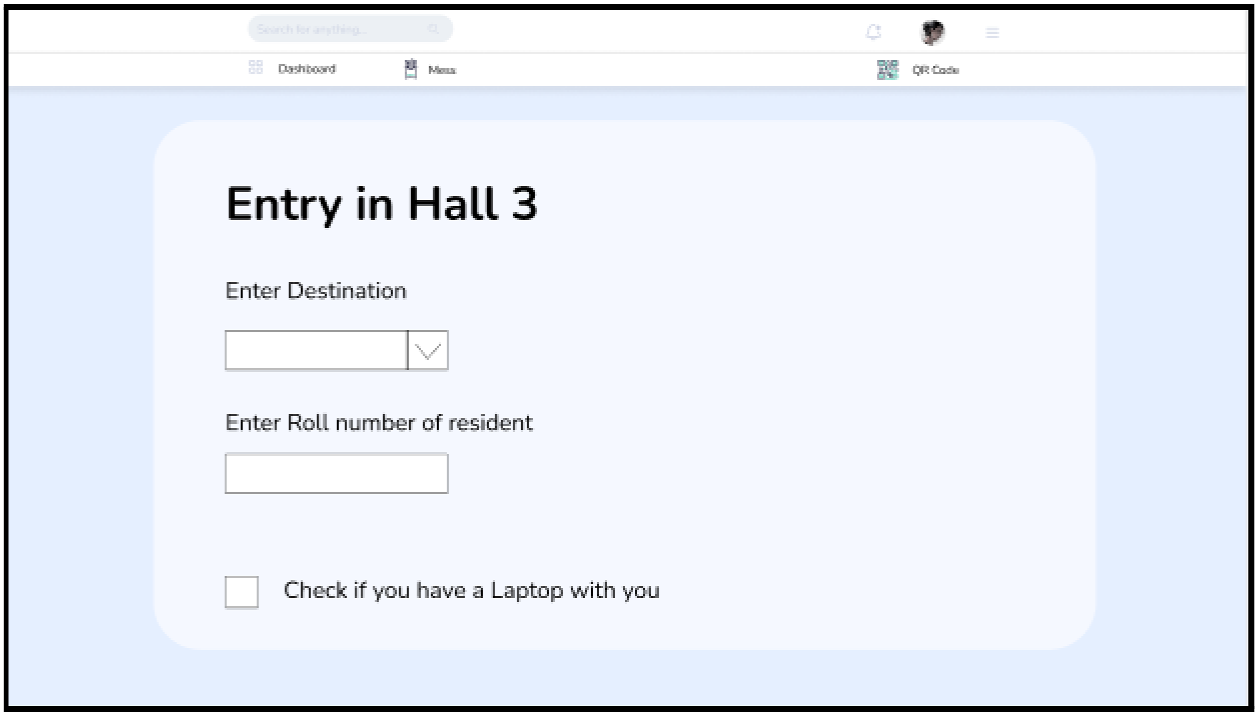
Parent Hall Room A-123

- **Scanning Code At The Gate**



SCAN THE QR CODE AT GATE

- **Entry/Exit Details**



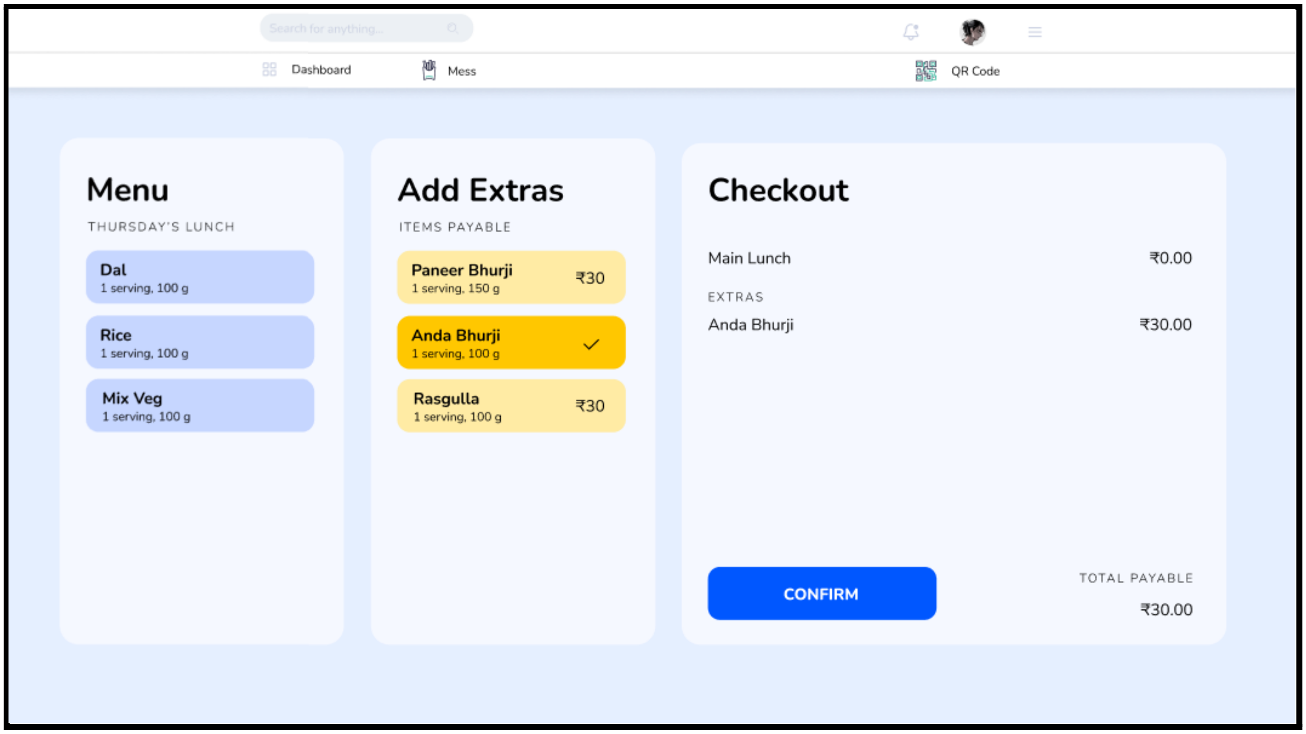
Entry in Hall 3

Enter Destination

Enter Roll number of resident

□ Check if you have a Laptop with you

- **Mess Menu and Extras**



Menu

THURSDAY'S LUNCH

Dal
1 serving, 100 g

Rice
1 serving, 100 g

Mix Veg
1 serving, 100 g

Add Extras

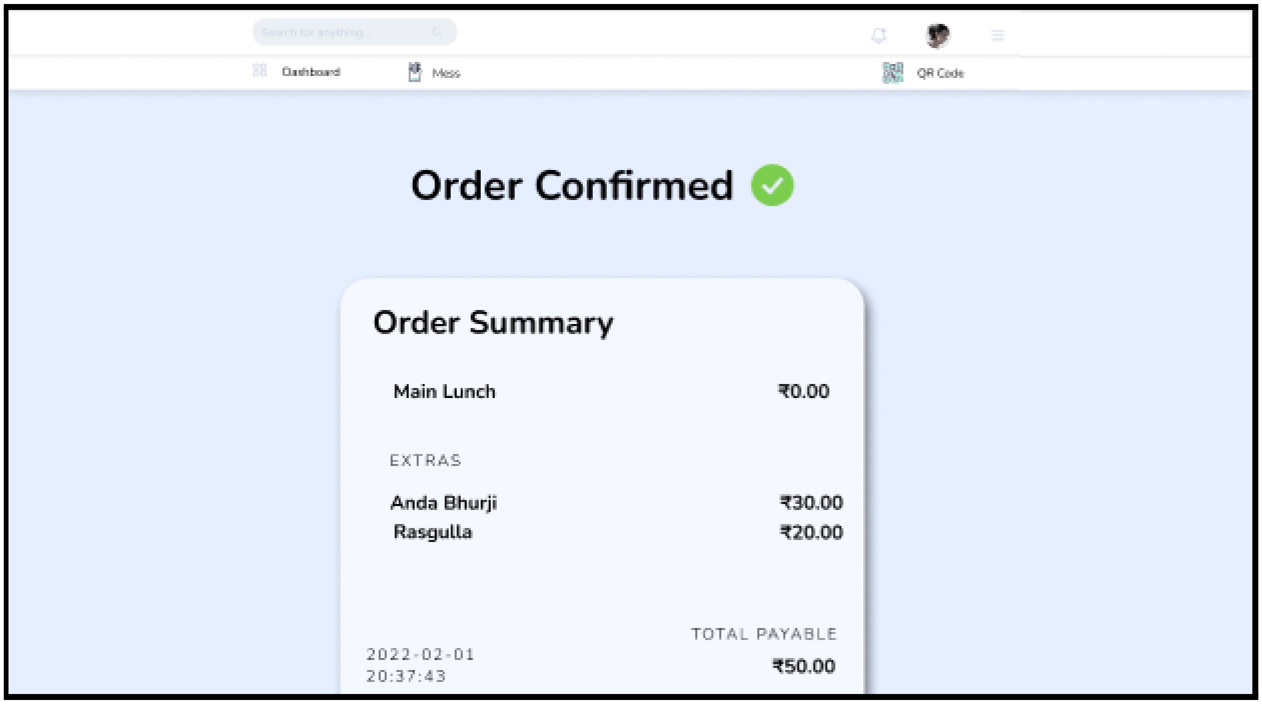
ITEMS PAYABLE

Paneer Bhurji 1 serving, 150 g	₹30
Anda Bhurji 1 serving, 100 g	✓
Rasgulla 1 serving, 100 g	₹30

Checkout

Main Lunch	₹0.00
EXTRAS	
Anda Bhurji	₹30.00
TOTAL PAYABLE	₹30.00

- **Confirmation Page**



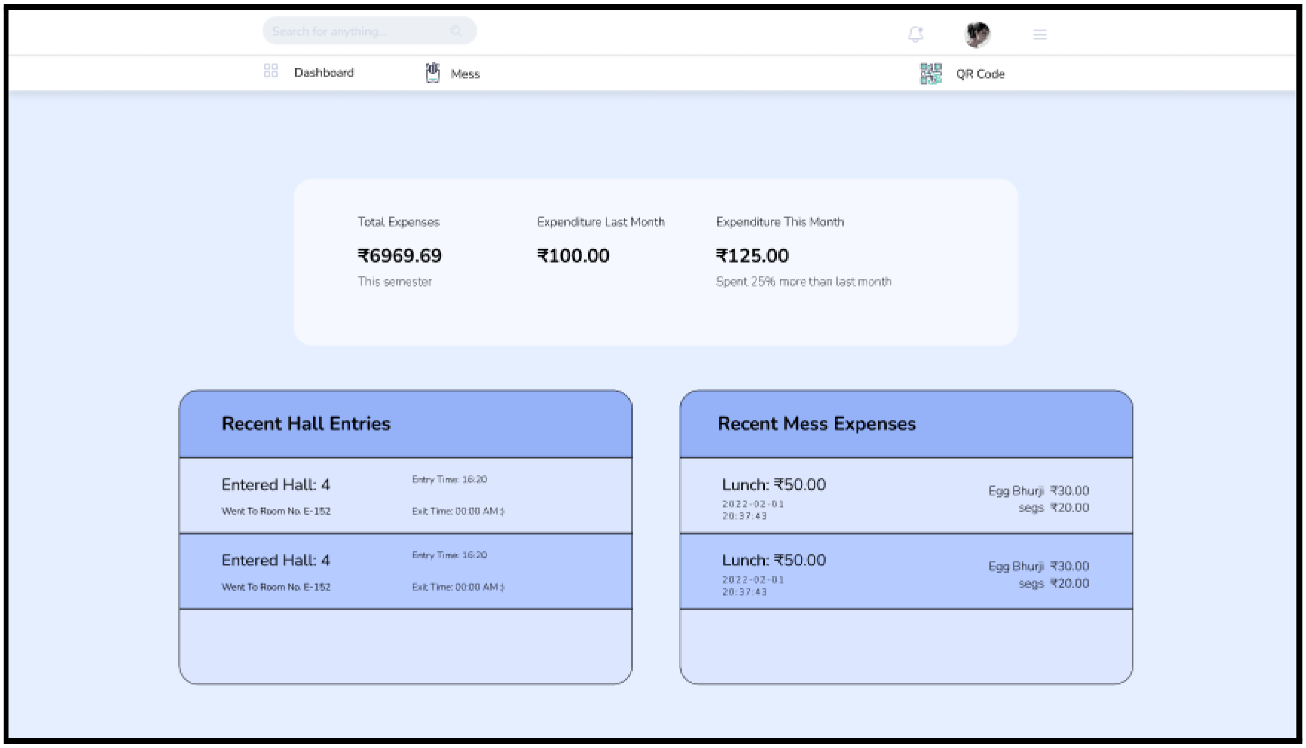
Order Confirmed ✓

Order Summary

Main Lunch	₹0.00
EXTRAS	
Anda Bhurji	₹30.00
Rasgulla	₹20.00
TOTAL PAYABLE	₹50.00

2022-02-01
20:37:43

- **Student Dashboard**



Total Expenses
₹6969.69
This semester

Expenditure Last Month
₹100.00

Expenditure This Month
₹125.00
Spent 25% more than last month

Recent Hall Entries

Entered Hall: 4
Went To Room No. E-152
Entry Time: 16:20
Exit Time: 00:00 AM :)

Entered Hall: 4
Went To Room No. E-152
Entry Time: 16:20
Exit Time: 00:00 AM :)

Recent Mess Expenses

Lunch: ₹50.00
2022-02-01
20:37:43
Egg Bhurji ₹30.00
segs ₹20.00

Lunch: ₹50.00
2022-02-01
20:37:43
Egg Bhurji ₹30.00
segs ₹20.00

3.1.2 Hardware Interfaces

Since the application must run over the internet, all the hardware required to connect to the internet will be the hardware interfaces for the system. As for e.g. Modem, WAN – LAN, Ethernet Cross-Cable.
We have chosen the IIT Kanpur servers to host our WebApp Service.

3.1.3 Software Interfaces

Operating System:
As it is a web-based service, the operating system should not affect the performance of the system. The operating system should have a working browser and internet connection.

Database Service:
To save the information of students, we have planned to use MySQL.

Framework:
We will be using the Django framework because it is easy to implement. We are using Javascript, HTML, and CSS for the front-end. For Backend, we are using MySQL and Django.

Browser:
A web browser that supports Django, HTML, and CGI is perfect for running this app.

3.2 Functional Requirements

3.2.1 F1: Configuring User

1. This allows the user to log in to his account on the device using his CC ID and password
2. If the user signs up for the first time, then other details like password generation and its confirmation, name, phone number, etc will be required.
3. Similarly, the user can sign out

This feature will allow for portability on any device

3.2.2 F2: QR Scanner.

1. The student scans a QR code.
2. (a) If the QR Code is for Hall Entry/Exit, it leads to F2/F3.
   (b) If the QR Code is for Mess Extras, it leads to F6.

3.2.3 F3: Hall Entry.

The student enters the roll number, room number, and name of the person in the hall who he/she is going to meet.
The student's data gets added to the database of outside-hall students currently in the hall.

3.2.4 F4: Hall Exit.

The student's data gets removed from the database of outside-hall students currently in the hall.

3.2.5 F5: Notification.

At 23:50 hrs, a notification is sent from email and SMS to all the outside-hall and guests students to vacate the hall.

3.2.6 F6: Query of Students inside the Hall.

1. The security guard asks for a query of the list of students inside the hall.
2. The database gets searched, returning the list of students.
3. The security guard can search for a particular name in the given list, and get his/her details.
4. Queries can also be run for editing the details and deleting in case of accidental wrong entry.

3.2.7 F7: Ordering Extras.

1. After scanning the QR code in the mess, the student will have an option of selecting the item(s) from the menu specified by the mess manager from F8.
2. The Student will be given a drop-down list where he selects his/her choice and is succeeded by a post-confirmation message.

3.2.8 F8: Order History.

1. The student can request their order history.
2. The system will return all the orders in their name in the past month.

3.2.9 F9: Menu Updation.

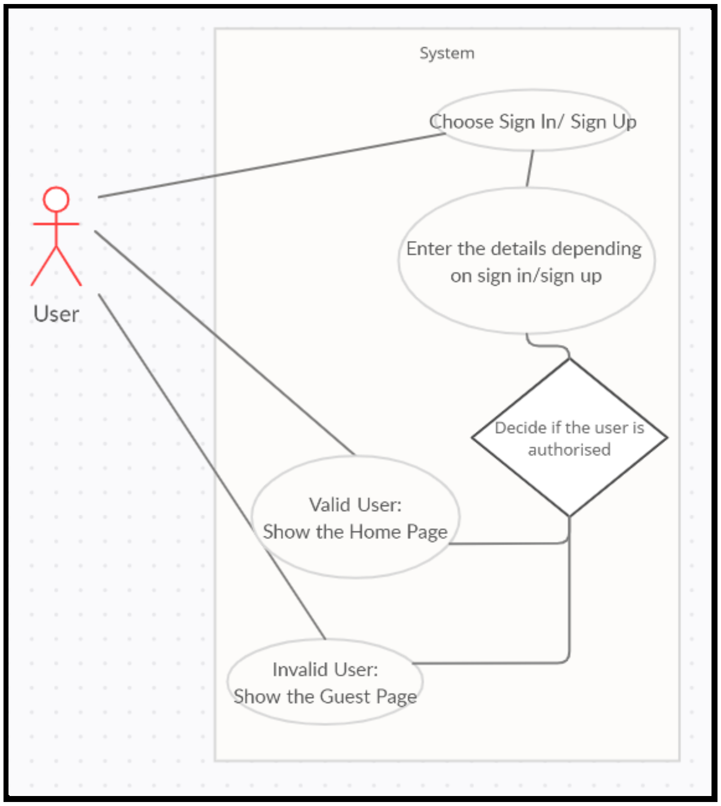
1. The mess manager will have access to edit the daily menu database.
2. They can remove and add new items along with their prices.

3.2.10 F10: Entries Updation.

1. As a safety feature, we are providing the facility of manually editing the database of entry and exit. However, the edits will be shown on the original database.
2. Only the authorized person (security guards) with edit access will be able to edit the entries.
3. Up to 2 edits are allowed and all the versions are stored in the database.

3.3 Use Case Model

3.3.1 U1: User Configuration


System
Choose Sign In/ Sign Up
User
Enter the details depending on sign in/sign up
Decide if the user is authorised
Valid User: Show the Home Page
Invalid User: Show the Guest Page

Author – Shashwat Gupta

Purpose - Demonstrate how the user will sign in/sign up

Requirements Traceability – F10

Priority - Medium

Preconditions - The user puts his ID and details to sign in/sign up

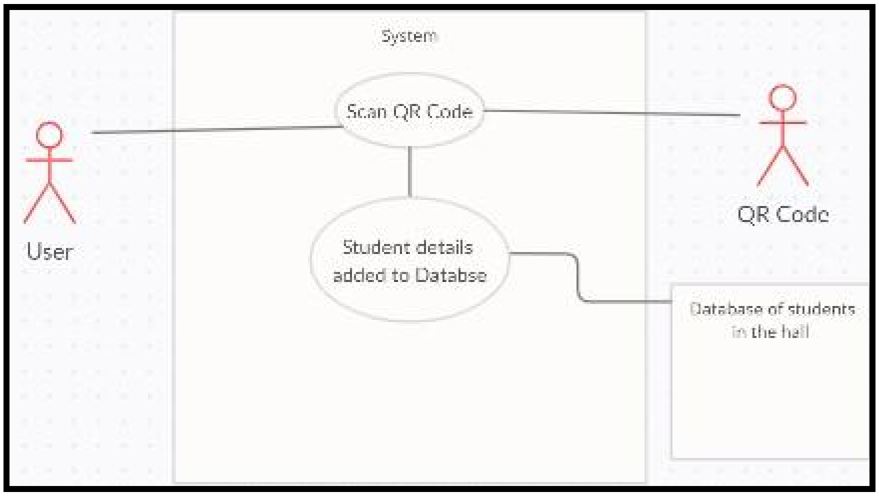
Postconditions - The main window of the WebApp appears.

Actors – Any user, database

Exceptions -

Notes/Issues -

3.3.2 U2: Entering a hall.


System
Scan QR Code
User
QR Code
Student details added to Databse
Database of students in the hall

Author – Aryan Vora

Purpose - Demonstrate how a student will gain entry to a hall.

Requirements Traceability – F2, F3

Priority - Medium

Preconditions - A student scans the QR code using the web-app.

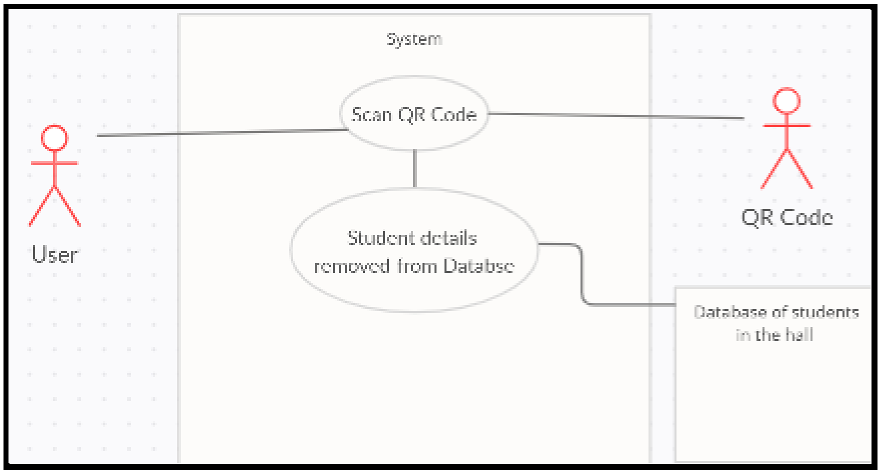
Postconditions - The database gets updated with details of the student who scanned the QR code.

Actors – Student, QR Code, Database

Exceptions -

Notes/Issues -

3.3.3 U3: Exiting a hall.


System
Scan QR Code
User
QR Code
Student details removed from Databse
Database of students in the hall

Author – Aryan Vora

Purpose - Demonstrate how a student will exit a hall.

Requirements Traceability – F2, F4

Priority - Medium

Preconditions - A student scans the QR code using the web-app.

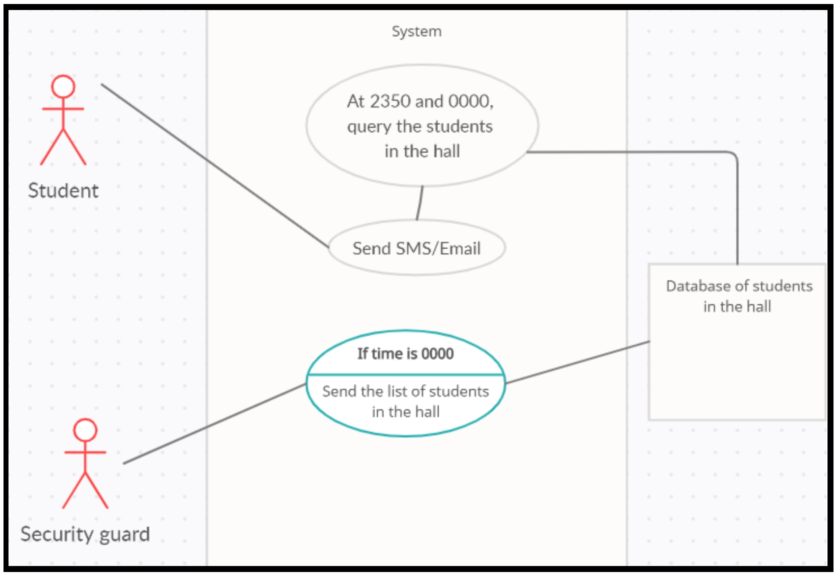
Postconditions - The database gets updated and removes the details of the student who scanned the QR code.

Actors – Student, QR Code, Database

Exceptions -

Notes/Issues -

3.3.4 U4: Notification.


System
Student
At 2350 and 0000, query the students in the hall
Send SMS/Email
Database of students in the hall
If time is 0000
Send the list of students in the hall
Security guard

Author – Aryan Vora

Purpose - Demonstrate how students get notified.

Requirements Traceability – F5, F6

Priority - High

Preconditions - The time is 2350hrs.

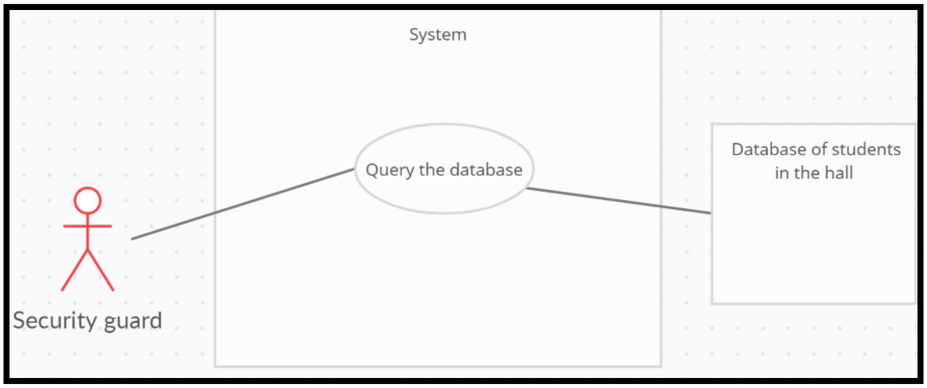
Postconditions - At 2350hrs, the system will generate a query to get the students outside the hall and send them an auto-generated email and text message that notifies them to leave the hall. At 0000hrs, the system again does the same. Also, at 0000hrs the system provides the details of students still inside the hall to the security for further action.

Actors – Database, Students, Guards

Exceptions -

Notes/Issues -

3.3.5 U5: Query of Students inside a hall.



Author – Ankur Kumar/Aryan Vora

Purpose - Provision of data of students inside the hall.

Requirements Traceability – F6

Priority -High

Preconditions -The user needs to be of the Guard profile

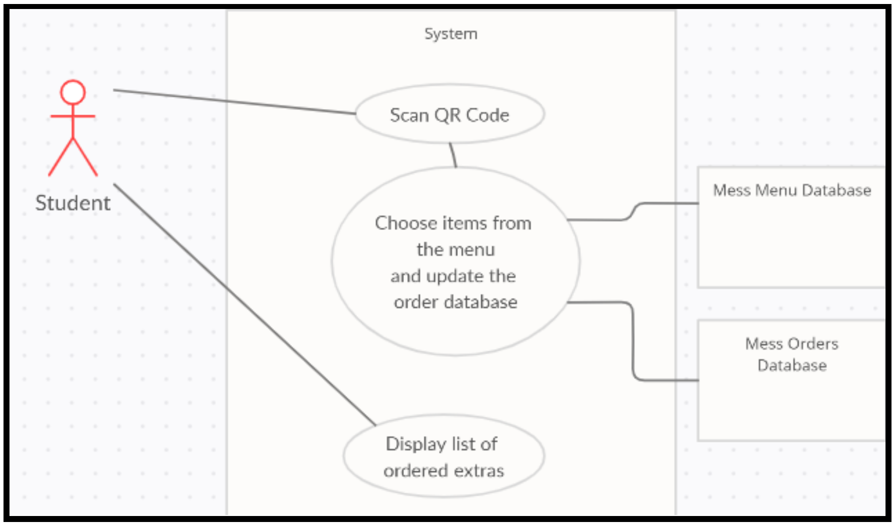
Postconditions - None

Actors – Security Guards.

Exceptions - Empty Record

Notes/Issues -

3.3.6 U6: Ordering Mess Extras


System
Student
Scan QR Code
Choose items from the menu and update the order database
Display list of ordered extras
Mess Menu Database
Mess Orders Database

Author – Ankur Kumar/Aryan Vora

Purpose - Register the extras in the database

Requirements Traceability – F2, F7

Priority - Low

Preconditions - QR code scanning

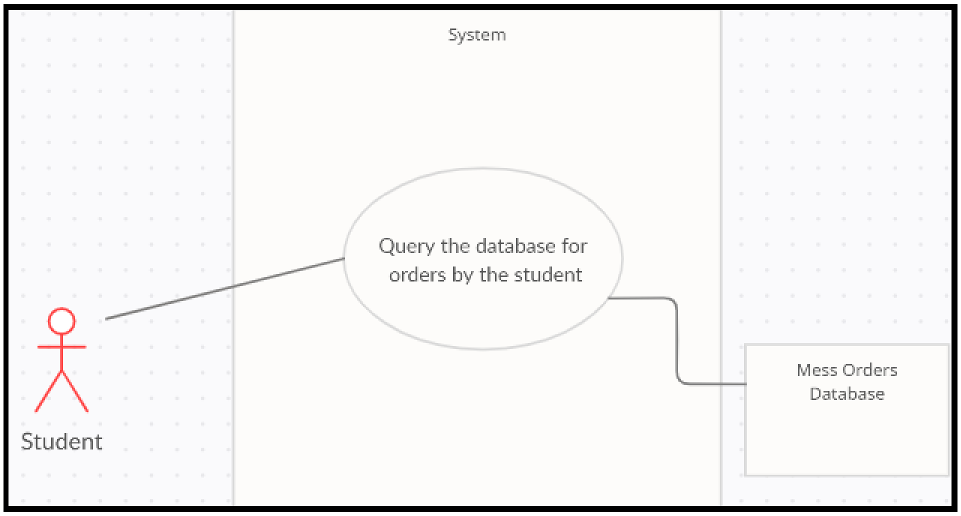
Post \conditions - The details of the transaction will be added to the database

Actors – Students

Exceptions -

Notes/Issues -

3.3.7 U7: Order History



Author – Ankur Kumar/Aryan Vora

Purpose - To enumerate all the extras bought by the particular student.

Requirements Traceability – F8

Priority - Low

Preconditions - None

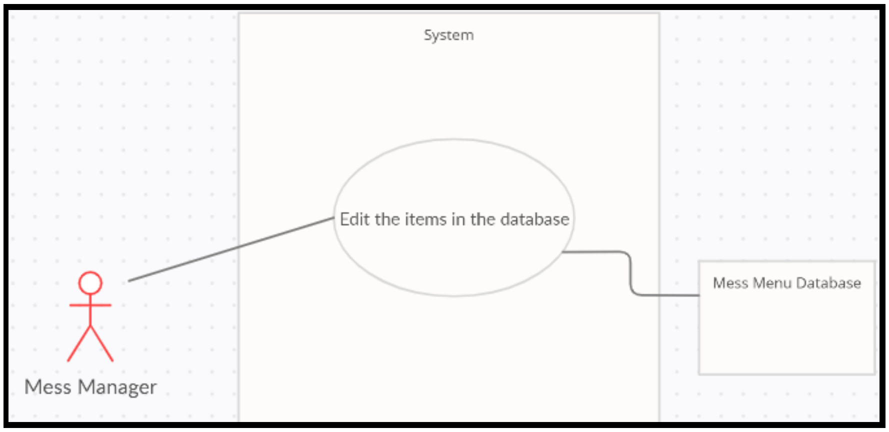
Postconditions - The user shall be provided with the required info

Actors – Student

Exceptions -

Notes/Issues -

3.3.8 U8: Menu Updation



Author – Ankur Kumar/Aryan Vora

Purpose - Enables the mess manager to update the daily mess menu database

Requirements Traceability – F9

Priority - Medium

Preconditions - The user must be a Mess Manager.

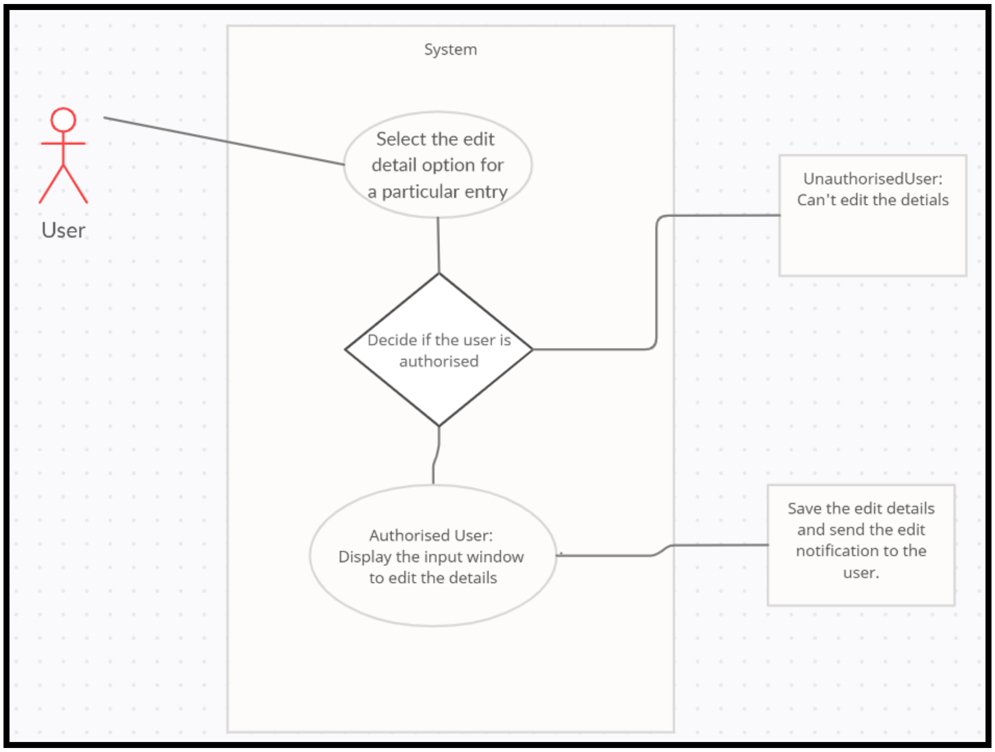
Postconditions - The mess menu database updated.

Actors – Mess Manager

Exceptions -

Notes/Issues -

3.3.10 U10: Editing Hall Entry/Exit Details


System
User
Select the edit detail option for a particular entry
Decide if the user is authorised
UnauthorisedUser: Can't edit the detials
Authorised User: Display the input window to edit the details
Save the edit details and send the edit notification to the user.

Author – Shashwat Gupta

Purpose - Demonstrate how the authorized person will be able to edit the details.

Requirements Traceability – F10

Priority - Medium

Preconditions - The authorized person scans the QR code using the web-app.

Postconditions - The window appears which enables the update of the entry-exit information.

Actors – Authorised Person, QR Code, Database

Exceptions - The Authorised person is not able to scan the code either due to an incorrect device or due to the error in QR generation.

Notes/Issues - How to deal with the exception mentioned above

4 Other Non-functional Requirements

4.1 Performance Requirements

- The DigiCampus application should load and be usable within 5 seconds to ensure no lag on the user side.
- The DigiCampus application should update the interface on interaction within 5 seconds to ensure no lag on the user side.
- The DigiCampus application should update the used databases within 5 seconds to ensure consistent operation.
- The database of the DigiCampus application should be normalized to prevent redundant data and improve performance.
- The database should be distributed to prevent outages.
- At any particular time, all IITK students should be able to use the application simultaneously without any overload to prevent crashing.
- A stable and functional application on both Android and iOS devices.
- The application is hosted on a web server that can be accessed concurrently
- The storage of the database should be such that it can handle the data of all students of IITK and be updated for more students if required.

4.2 Safety and Security Requirements

- Databases should use sharding to be redundant to prevent the loss of data.
- Backups of the database should be done hourly and be kept for a week.
- Authentication will be required by the user to access their personal data.
- Access to the master database will be restricted to the institute/hall administration.
- Provision of blocking access to any user’s data using their ID card if misplaced will be provided.
- Initial login will be authenticated using CC ID login credentials.
- Any keys used for the DigiCampus programming interface should be stored securely.
- Only the DigiCampus programming interface should be able to connect to the databases.
- Databases should be behind a firewall and be encrypted.

4.3 Software Quality Attributes

4.3.1 Availability:

This application will be made available to all IITK students owning an ID card and CC details.

4.3.2 Correctness:

This application will never allow anyone to view any person’s data except their own. The users will be able to log in to the DigiCampus application and view only their own data and records.

4.3.3 Maintainability:

The application should use continuous integration so that features and bug fixes can be deployed quickly without downtime.

4.3.4 Usability:

The interface will be kept simple and user-friendly and allow the user to view their records and use its features with ease.

4.3.5 Interoperability:

The systems will interact with a database that will in turn interact with other systems.

4.3.6 Reliability:

Based on the limited number of users as well as limited database size, we can ensure the reliability and stability of the application through sufficient failsafe implementations.

5 Other Requirements

- Database of Students.
- Authorized permission from IIT-Kanpur is required before accessing any kind of data of students.
- The security guards must be provided with either smartphones or Computers for this software as many of the security guards may not have a smartphone.
- Since the software will be used very frequently(on a daily basis) it is important that the client maintains it and fixes any bugs if they arise.
- Aimed to be integrated with other features to make a one-stop app for all campus needs.

Appendix A – Data Dictionary

Table	**Field**	**Datatype**	**Description**	**Operation**
HALL_DATA			Database corresponding to Hall Entry/Exit status.	
HALL_DATA	Hall Number	Text	Hall Number	F2,F3,F4,F5,F6, F10
HALL_DATA	Student Name	Text	The name of the student entering the hall.	F3,F4,F5,F6,F10
HALL_DATA	Student Roll Number	Integer	The roll number of the student entering the hall.	F3,F4,F5,F6,F10
HALL_DATA	Student Phone Number	Integer	The phone number of the student entering the hall.	F3,F4,F5,F6,F10
HALL_DATA	To Meet Name	Text	The name of the student whom the outside student is visiting.	F3,F4,F5,F6,F10
HALL_DATA	To Meet Roll Number	Integer	The roll number of the student whom the outside student is visiting.	F3,F4,F5,F6,F10
HALL_DATA	Room Number	Text	The room number of the student whom the outside student is visiting.	F3,F4,F5,F6,F10
HALL_DATA	In-Time	Time	The time the student enters the hall.	F3,F4,F5,F6,F10
HALL_DATA	Out-Time	Time	The time the student exits the hall.	F3,F4,F5,F6,F10

Table	Field	Datatype	Description	Operations
MESS_MENU			Database corresponding to the mess extras menu.	
MESS_MENU	Item Name	Text	The name of the extras that are available for the meal.	F7,F9
MESS_MENU	Item Price	Integer	The price of the extras that are available for the meal.	F7,F9

Table	Field	Datatype	Description	Operations
MESS_ORDERS			Database corresponding to the mess extras orders.	
MESS_ORDERS	Item Name	Text	The name of the extras that were ordered.	F7,F8,F9
MESS_ORDERS	Item Price	Integer	The price of the extras that were ordered.	F7,F8,F9
MESS_ORDERS	Item Quantity	Integer	The quantity of the extras that were ordered.	F7,F8,F9
MESS_ORDERS	Date	Date	The date on which the extra was ordered.	F7,F8,F9
MESS_ORDERS	Roll Number	Integer	The roll number of the student who ordered the extras.	F7,F8,F9
MESS_ORDERS	Room Number	Text	The room number of the student who ordered the extras.	F7,F8,F9

Table	**Field**	**Datatype**	**Description**	**Operation**
STUDENT_ DATA			Database corresponding to student data.	
STUDENT_ DATA	Student Name	Text	The name of the student.	F1,F3,F4,F5, F6,F7,F8,F9,F10
STUDENT_ DATA	Student Roll Number	Integer	The roll number of the student.	F1,F3,F4,F5, F6,F7,F8,F9,F10
STUDENT_ DATA	Student Phone Number	Integer	The phone number of the student.	F1,F3,F4,F5, F6,F7,F8,F9,F10
STUDENT_ DATA	CC ID	Text	The CC ID of the student.	F1,F3,F4,F5, F6,F7,F8,F9,F10

Appendix B - Group Log

<Please include here all the minutes from your group meetings, your group activities, and any other relevant information that will assist in determining the effort put forth to produce this document>

- 22nd January- Aryan completed 1.1 and 1.2.
- 24th January- Group meeting with TA in charge to address queries.
- 24th January- Group meeting to divide work and discuss the way forward.
  MoM (24th January):
  1. Section 1.3,1.4,1.5 - To be done once the SRS is over
  2. Section 2-> Samarth, Sarthak, Abhishek, Ananya
  3. Section 3->Ankur,Shashwat,Aryan
  4. Section 4->Dishay,Aayush,Girik
  5. A weekly meeting of the group will be held every Monday.
  6. Will complete first draft by 27th January
- 26th January- Ankur, Aryan, and Shashwat met to discuss developments in section 3.
- Samarth, Sarthak met to complete Section 2. Dishay, Girik, Aayush completed Section 4.
- 27th January- Use Case Models were completed by Aryan, Sarthak, and Shashwat which led to a better understanding of how the software will actually function and which helped to think about the minute details of what each step will look like.
- 29th January- Other requirements completed by Sarthak.
- 30th January- Sarthak, and Aryan worked on Data Dictionary.
- 30th January- Aryan finished 1.3, 1.4, and 1.5.
- 30th January- Proof Reading of version 1.0 by the entire team.
- 31st January-Ananya,Abhishek,Ankur made first version of UI on Figma
- 1st February- Completed Version 1.0 of SRS.