



# **Project Report**

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**Section:** 01

**Project Title:** Mess Management App

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# **1. Introduction:**

The Mess Management App allows a vast variety of features related to planning meals per day, joint costs, and monthly payments in one Android-based app. The application has been created with help of Android Studio and it is based on Activities, Intents, Layouts, and local databases that help to provide a user with an interactive and smooth user experience. The various screens are easily navigated through to allow users to record meals, manage the expenses, view balances, and monthly check-ups.

The application has a role-based access control system so that the Admin users can manage the members, determine the price of their meals and control their expenses, whereas the Member ones can add the meals, check the status of their balance and pay. SQLite and firebase hybrid data storage are used to provide offline and cloud-synchronization. Background tasks like data synchronization and computations are managed effectively to ensure that user experience is not compromised. The system enhances transparency, minimizes manual errors, and prevents conflict among members of the mess as the financial data is presented in a clear and accurate manner.

## **1.1 Background:**

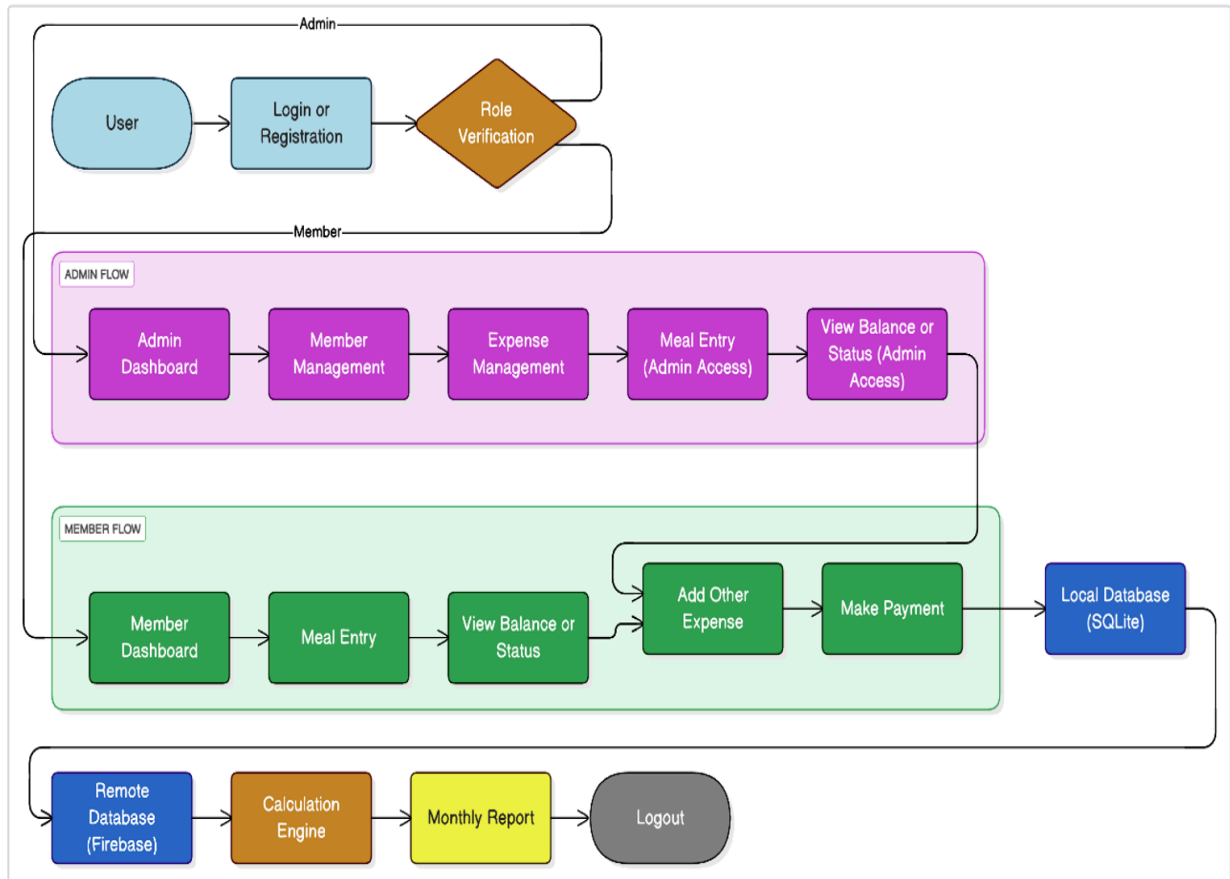
In common living situations like bachelor messes or hostels, common budgeting like day to day meals is usually done manually. The error in calculations, absence of records and lack of understanding among the members are caused by this traditional approach. Since the use of a smartphone has become the regular case, it is necessary to have a digital solution that will be able to automate the process of tracking meals and expenses, as well as monthly settlement.

The Mess Management App would be able to solve these problems and provide a centralized Android-based application in which every member would be able to engage in an open way. SQLite allows operating it offline to perform daily business, whereas Firebase provides cloud storage and device synchronization. The application will make mess management easier and bring fairness and responsibility among its users through the combination of user-friendly interface, data storage organization, and automatic calculations.

## 1.2 Challenges faced in development:

1. **Layout Design:** The design of a clean and easy to use interface was not easy as several features needed to be shown to the user without overwhelming them. To ensure consistency of all the screens and still make them usable demanded proper planning.
2. **Role-Based Access Control:** Admin and Member functionalities had to be implemented distinctly, and a robust permission handling was needed to ensure that only the authorized access control and prevent unauthorized information access to retain the integrity of the data.
3. **Database Synchronization:** It was complicated to maintain the data flow between SQLite (local) and Firebase (remote). It was necessary to make sure that offline information could be later synchronized and did not have to be duplicated or lost.
4. **Accuracy in the calculation:** Calculation of meal rate and due was necessary keeping in mind the various types of meals, costs, payment details on each member.
5. **Data Validation & Error Handling:** Data validation, bad entries and error recovery in unusual cases like data missing or network problems were the key problems in the development.
6. **UI Consistency:** It was a challenging process to ensure consistency in colors, button styles, and typography throughout the application and have several features in it.

## 2. Methodology :



**Figure 1: Data Flow Diagram**

The system follows a structured workflow starting from user authentication to final report generation. After login or registration, the system verifies the user role (Admin or Member) and directs the user to the appropriate dashboard. Both roles can perform allowed actions such as meal entry, expense entry, and payment recording. All data is first stored in SQLite for offline access and then synchronized to Firebase. The calculation engine processes meal rates and dues, which are later used to generate monthly summaries and settlement reports.

### 3. Benefits / Usability:

The Mess Management App provides a number of advantages to mess members and administrators, which allows them to handle their daily management more effectively:

1. **Automated Meal Tracking:** The users will be able to log meals on a daily basis and less reliance on manual logging.
2. **Clear Cost Control:** The cost of all shared expenses is transparent, and this promotes justice amongst the members.
3. **Status of Real Time Balance:** Members are able to see paid and due at any point in time.
4. **Offline Access:** SQLite enables the user to retrieve and store data in absence of the internet.
5. **Cloud Synchronization:** Firebase provides secure backups of data and is multi-device compatible.
6. **Easy to Use Interface:** The app is easy to navigate as it has simple layouts and is user friendly to all users.

### 4. Implementation Details :

Mess Management App is designed using the latest methods of development on Android in order to be reliable and performance-oriented:

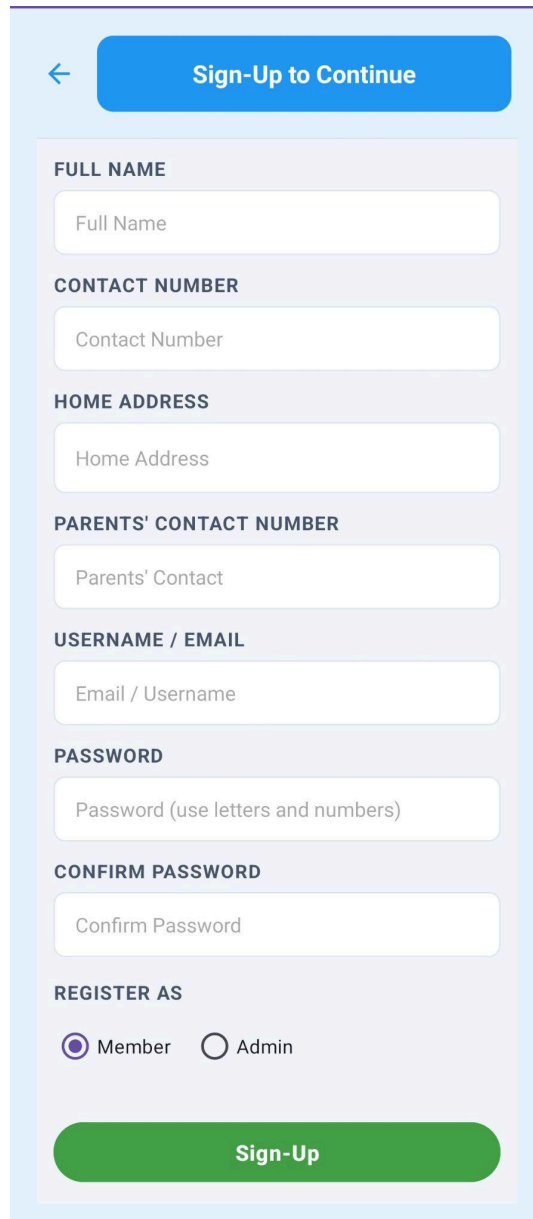
1. **Activities, Intents & Layouts:** Will be utilized in order to move around between login, dashboard, expense, and report screens.
2. **Local/Remote Databases:** SQLite is more stable with offline data, and Firebase is more stable with online data, which is synchronized and saved in a safe place.
3. **Calculation Engine:** It automatically computes a meal cost, total expense and dues per person.
4. **Secure Authentication:** The user credentials and role data are stored in a secure manner to avoid unauthorized access.
5. **UI Consistency:** The theme of consistency is applied to the entire application because it makes it easier to use.

The combination of these elements will result in a powerful and scalable system that can serve the purpose of real-life mess management.

## 4.1 Key Features:

### ➤ Sign Up and Login Pages

**Sign Up Page:** New users can register by entering personal information and selecting their role.



The image shows a mobile app sign-up page. At the top, there is a blue header bar with a back arrow on the left and a blue button labeled "Sign-Up to Continue" on the right. Below the header, the form is organized into several sections, each with a title in bold uppercase letters: "FULL NAME", "CONTACT NUMBER", "HOME ADDRESS", "PARENTS' CONTACT NUMBER", "USERNAME / EMAIL", "PASSWORD", "CONFIRM PASSWORD", and "REGISTER AS". Each section contains a white input field with a light gray border and a placeholder text. The "REGISTER AS" section has two radio buttons: "Member" (which is selected) and "Admin". At the bottom of the form, there is a large green button labeled "Sign-Up".

← Sign-Up to Continue

**FULL NAME**  
Full Name

**CONTACT NUMBER**  
Contact Number

**HOME ADDRESS**  
Home Address

**PARENTS' CONTACT NUMBER**  
Parents' Contact

**USERNAME / EMAIL**  
Email / Username

**PASSWORD**  
Password (use letters and numbers)

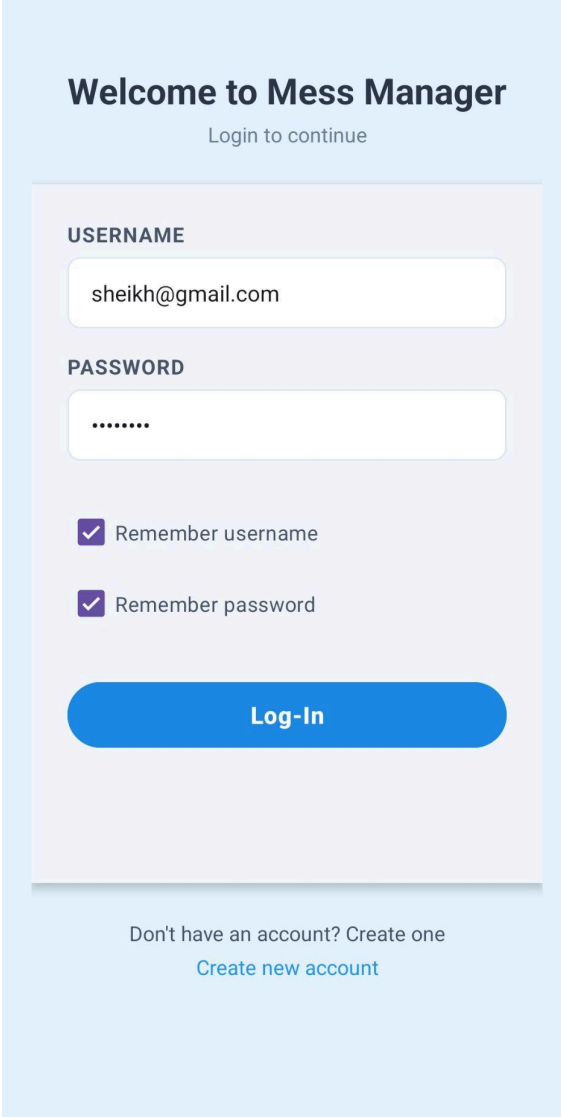
**CONFIRM PASSWORD**  
Confirm Password

**REGISTER AS**  
☒ Member ☐ Admin

Sign-Up

**Figure 2: Sign-Up Page**

**Login Page:** Registered users authenticate securely to access their dashboard.

The image shows a login page for 'Mess Manager'. It has a light blue background. At the top, it says 'Welcome to Mess Manager' in bold, followed by 'Login to continue' in a smaller font. Below this is a light purple box containing the login form. The form has two input fields: 'USERNAME' with the value 'sheikh@gmail.com' and 'PASSWORD' with masked characters '.....'. There are two checkboxes: 'Remember username' and 'Remember password', both of which are checked. A blue 'Log-In' button is at the bottom of the form. Below the purple box, it says 'Don't have an account? Create one' followed by a blue link 'Create new account'.

**Figure 3: Login Page**



## ➤ Admin Dashboard

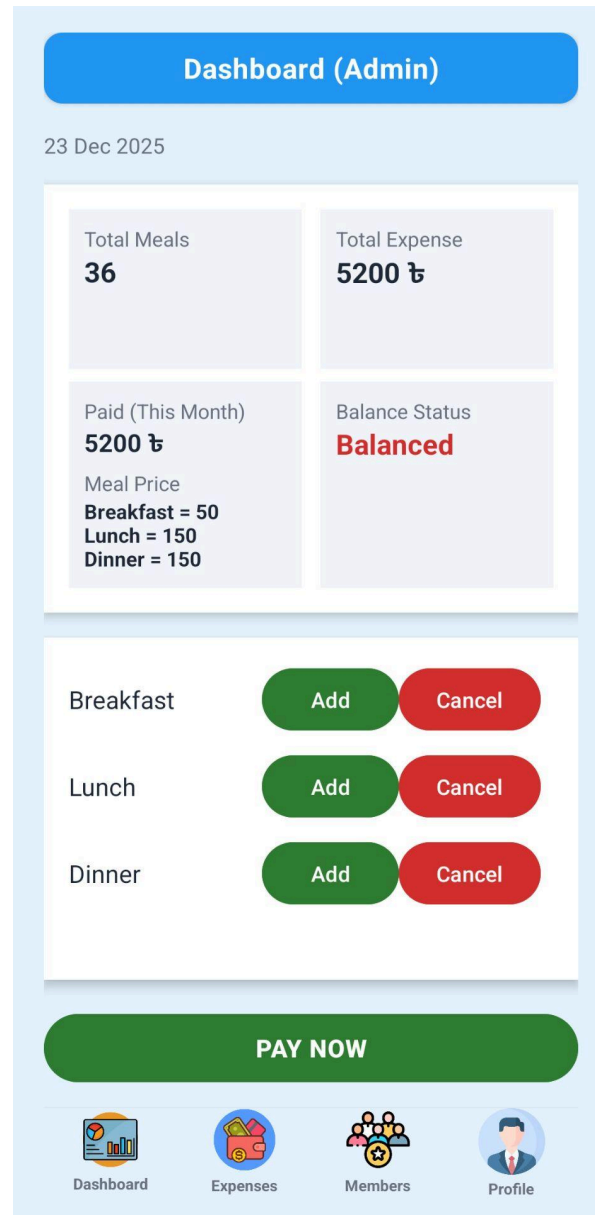


Figure 4: Admin Dashboard

## ➤ Meal Entry System

- Record breakfast, lunch, and dinner.
- Meal price is controlled by Admin.
- Prevents duplicate or invalid entries.

← Set Meal Prices

BREAKFAST PRICE (₹)

50

LUNCH PRICE (₹)

150

DINNER PRICE (₹)

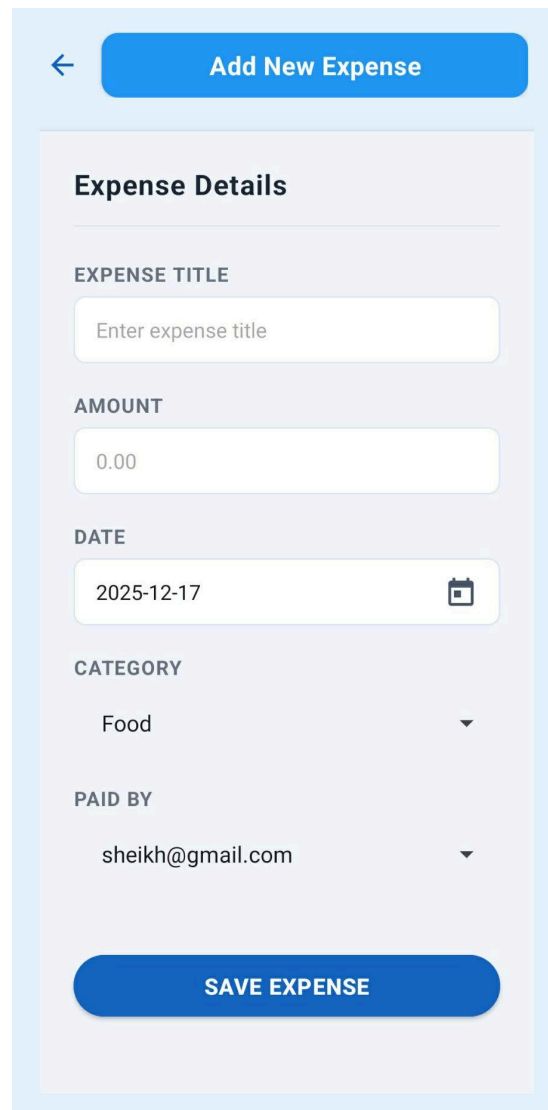
150

Set Price

**Figure 5: Set Meal Price Page**

## ➤ Expense Management

- Add and manage shared expenses.
- Categorize expenses for better tracking.



The image shows a mobile application interface for adding a new expense. At the top, there is a blue header bar with a back arrow on the left and a blue button labeled "Add New Expense" on the right. Below the header, the main content area has a light purple background. It starts with the title "Expense Details" in bold. Underneath, there are five form fields: "EXPENSE TITLE" with a placeholder "Enter expense title", "AMOUNT" with a value of "0.00", "DATE" with a value of "2025-12-17" and a calendar icon, "CATEGORY" with a dropdown menu showing "Food", and "PAID BY" with a dropdown menu showing "sheikh@gmail.com". At the bottom of the form is a large blue button labeled "SAVE EXPENSE".

Expense Management

- Add and manage shared expenses.
- Categorize expenses for better tracking.

Expense Details

EXPENSE TITLE

Enter expense title

AMOUNT

0.00

DATE

2025-12-17

CATEGORY

Food

PAID BY

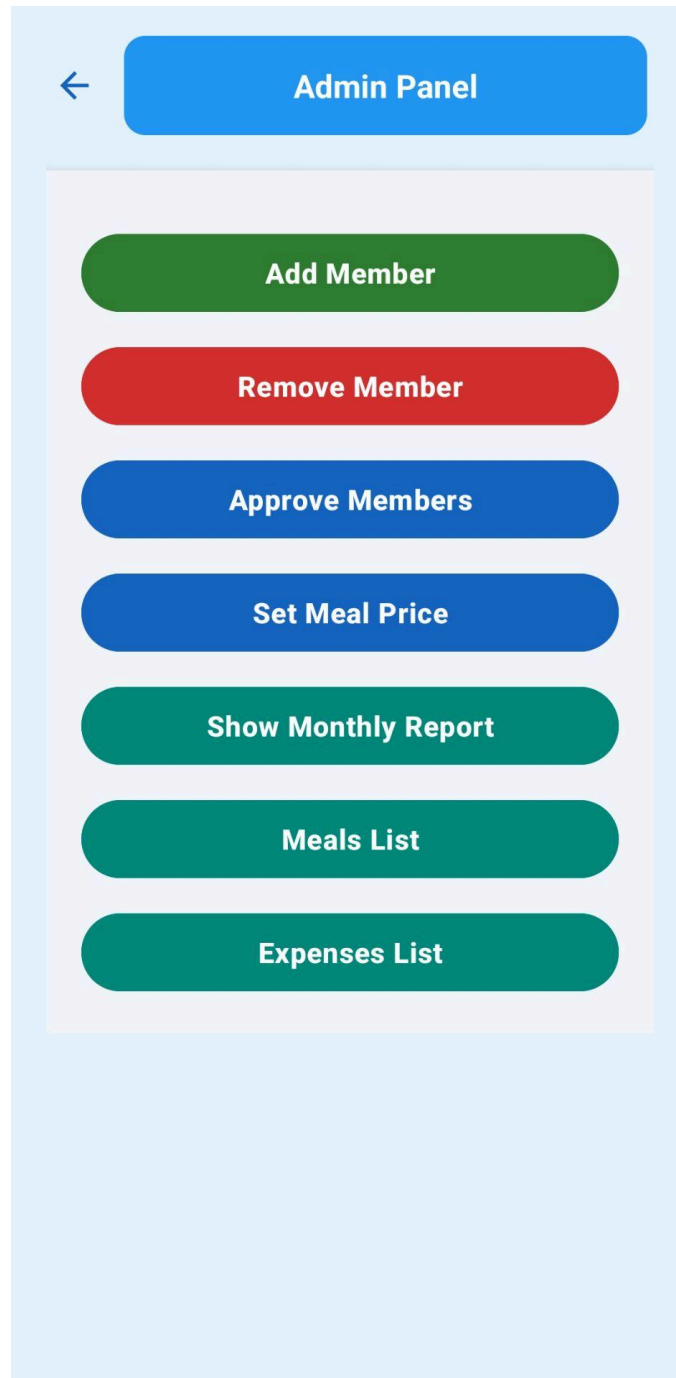
sheikh@gmail.com

SAVE EXPENSE

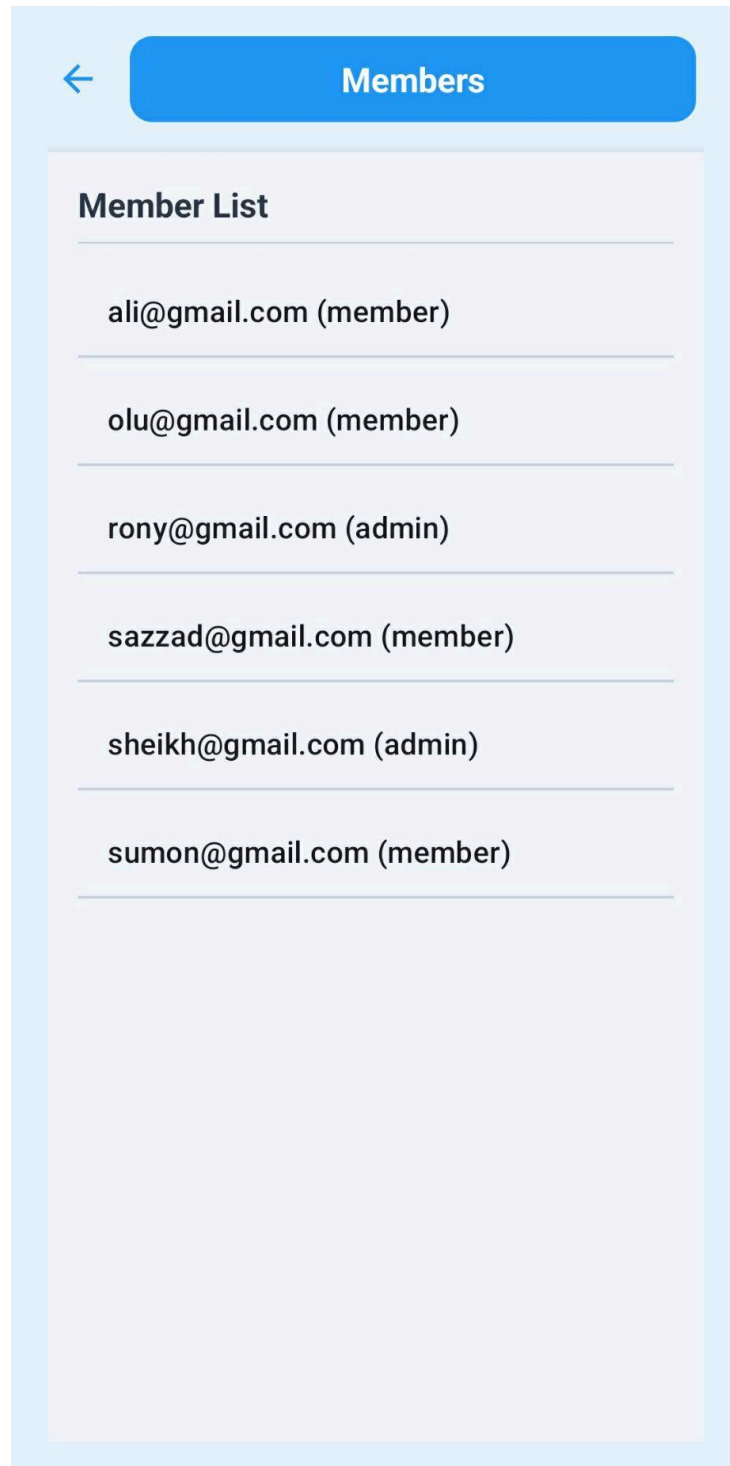
**Figure 6: Add Expense Page**

### ➤ Member Management (Admin)

- Approve members and add or remove members.
- Monitor individual meal and expense data.



**Figure 7: Admin Panel**



**Figure 8: Member List**

←

Member Details

Full Name: Sheikh

Email: sheikh@gmail.com

Role: admin

Phone: +8801794516646

Parent Phone: +8801645764334

Address: Dhaka

Total Meals: 3

Total Paid: 550 ₳

Balanced

Meals Details

Breakfast: 1 × 50 = 50 ₳

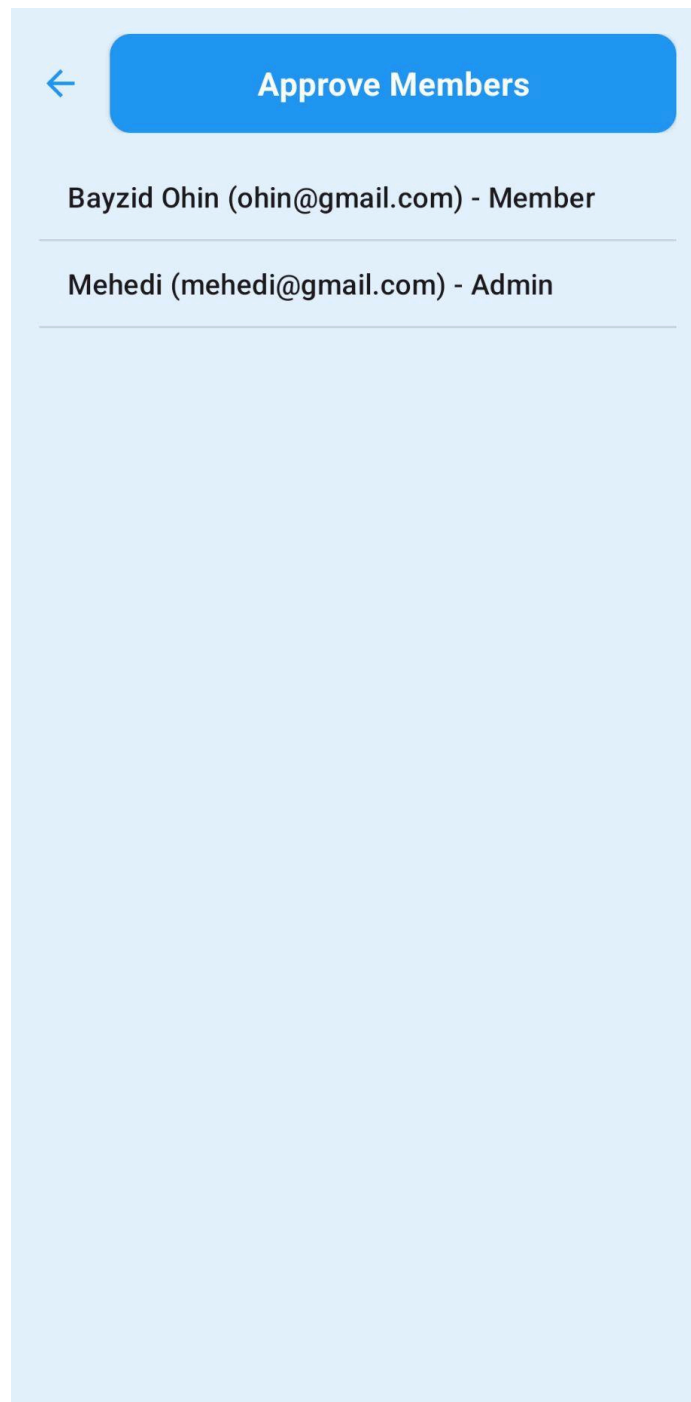
Lunch: 1 × 150 = 150 ₳

Dinner: 1 × 150 = 150 ₳

Meal Cost Total: 350 ₳

Other Expenses: 200 ₳

**Figure 9: Member Details**



**Figure 10: Approve Members**

## ➤ Monthly Summary

- Displays total meals, expenses, paid amount, and dues.
- Clearly shows settlement status.

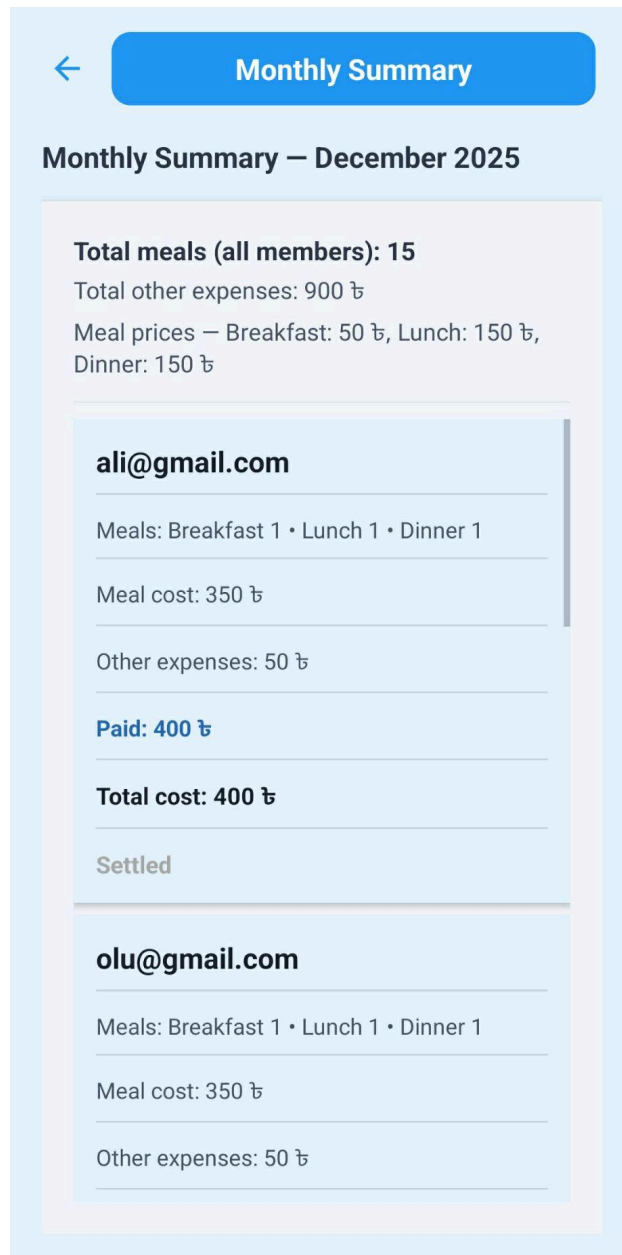


Figure 11: Monthly Summary



## 4.2 Profile Management & Cloud Synchronization

The application also has a profile management screen where the user may view profile details, add profile pictures and also administration functions where authorized users may access the administration controls. Cloud synchronization is also available in the profile section and gives the user an option to do a manual sync between the local data in the SQLite and the Firebase remote database. This will guarantee the backup of data, inter-device consistency, and safe storage. There is also a logout mechanism that is used to end user sessions safely.

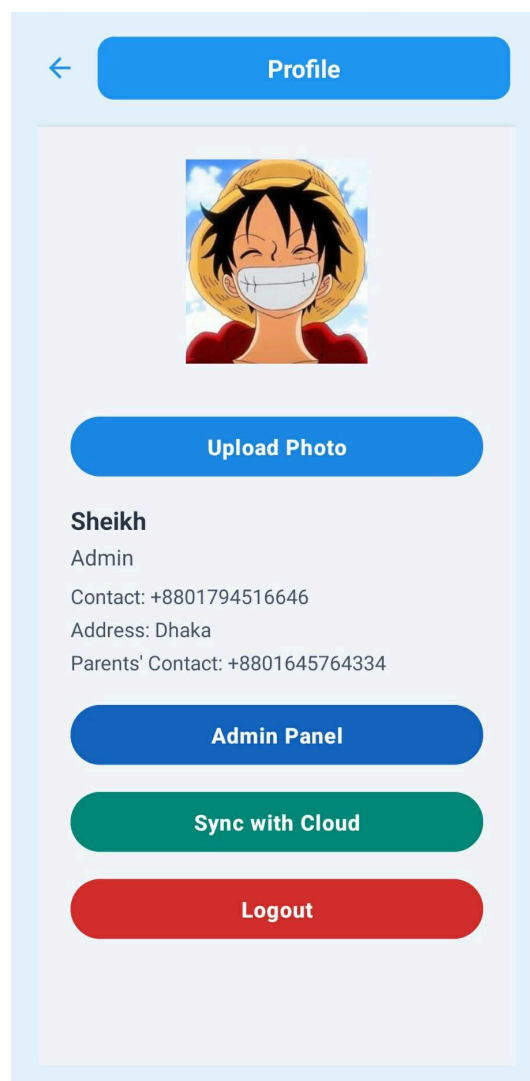
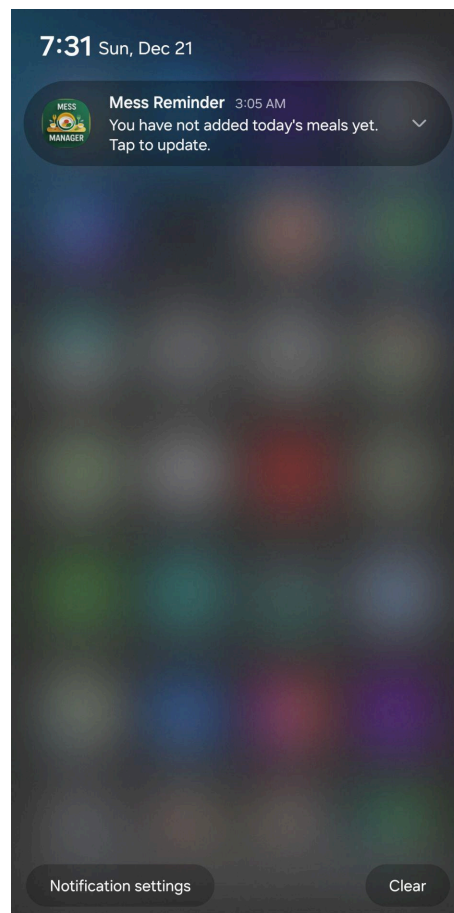


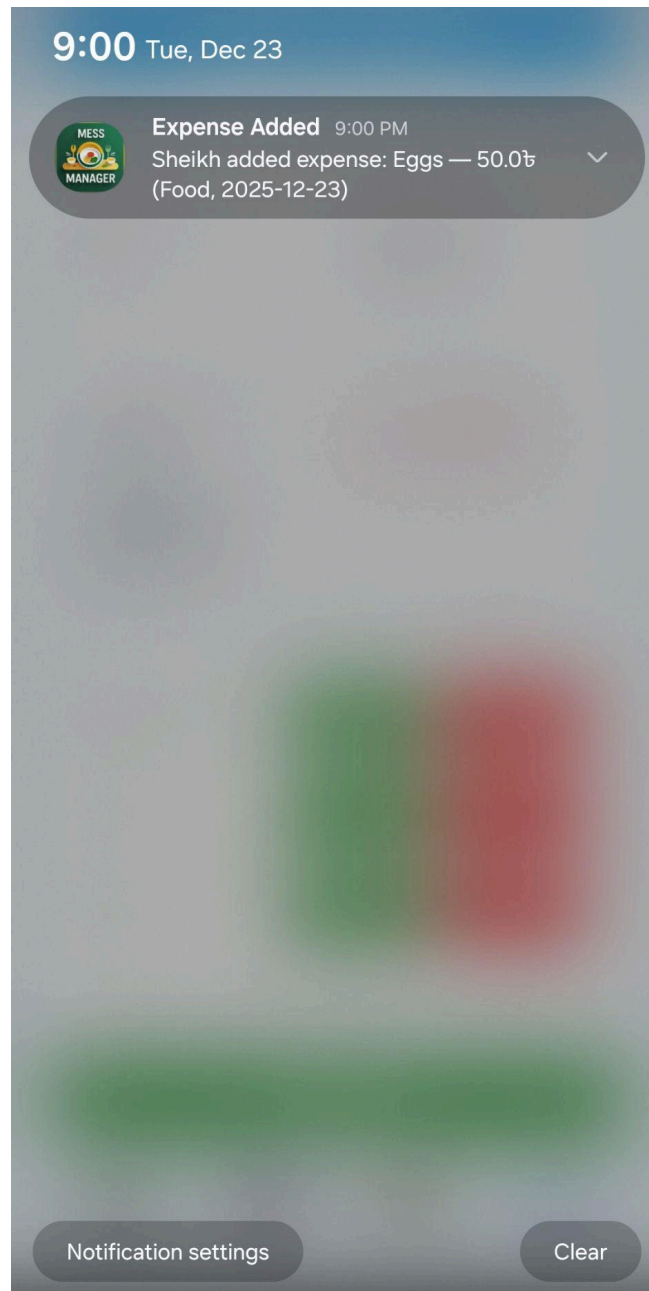
Figure 12: Profile & Cloud Sync

### 4.3 Notification System

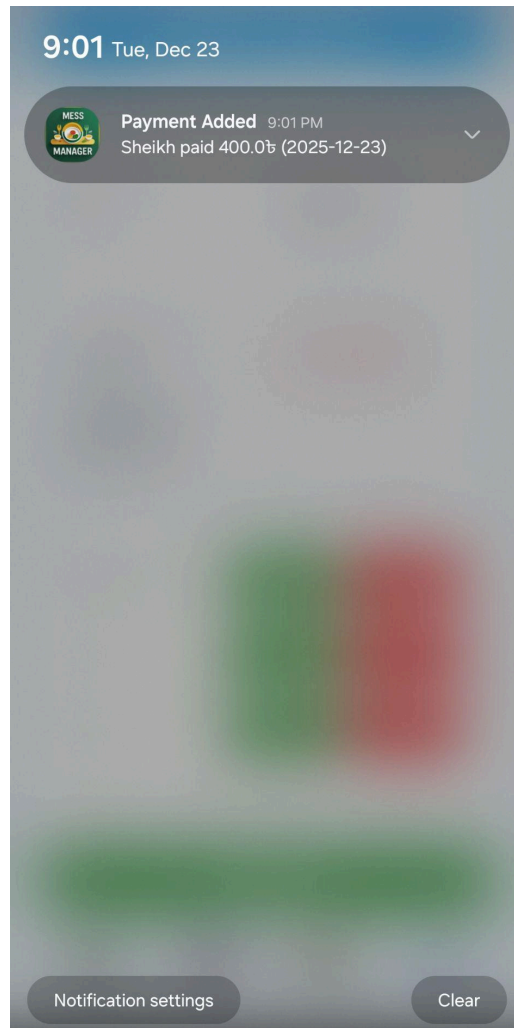
The Mess Management App includes a notification system to keep users informed about important daily activities. Notifications are automatically triggered for events such as missing meal entries, newly added expenses, and payment confirmations. This feature helps users stay updated without opening the application frequently and improves overall usability. By providing timely reminders and alerts, the notification system ensures better participation and reduces the chances of missing critical updates.



**Figure 13:** Meal Reminder Notification



**Figure 14:** Expense Added Notification



**Figure 15:** Payment Confirmation Notification

## 5. Business Model:

The Mess Management App follows a **Freemium business model**:

- **Free Version:** Meal tracking, expense entry, and monthly summary.
- **Premium Version:** Cloud sync, advanced reports, and analytics features.

This model allows basic usage at no cost while offering advanced features for long-term mess management needs.

## **6. Future Enhancements**

1. Online Payment Gateway Integration
2. Advanced Analytics and Graphical Reports
3. PDF/Excel Report Export
4. Multi-language Support
5. iOS Platform Support

### **6.1 Vision for the Future:**

It is the vision of the Mess Management App to be a digital solution to shared living environments fully and intelligently in the long-run. The coming versions will see the introduction of secure online payment gateways and elaborate analytics to lower the costs. The system will also be designed to serve various platforms, such as Internet-based and iOS access, so that more people can use them. The application aims to reduce conflicts, increase transparency, and ease the daily management of messes by ensuring it is always more automated, scaled, and easy to use.