DESIS ASCEND EDUCARE PROGRAM
2023-24

SPILTSMARTY

A bill-splitting website

PROJECT REPORT

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

SplitSmarty is an innovative online platform designed for bill-splitting and expense management.

The website features **a user-friendly interface,** starting with a login/signup page, followed by a **personalized user dashboard** where users can edit their profile details.

Users can create groups to share expenses among members, either uniformly or non-uniformly providing flexibility and convenience in managing shared expenses..

The website incorporates a **minimising transactions graph algorithm** to optimize the number of transactions within a group.

Users can **add their own expenses**, categorizing them by type (e.g., food, travel, shopping) to track and manage their spending habits effectively.

The groups page allows users to view all groups they are a part of and create new groups with multiple participants. Users also have the option to leave a group or delete it(if they are the Admin).

The tech stack used for this website is Express.js and NodeJs (Backend); ReactJs, CSS (Frontend), and MySQL, Sequelize (Database Management). The concepts of OOPs, DBMS, design and architecture were extensively used, along with the use of optimization algorithms.

REQUIREMENTS

SplitSmarty is built using the following technology stack:

- **Frontend**
  - JavaScript (React.js)

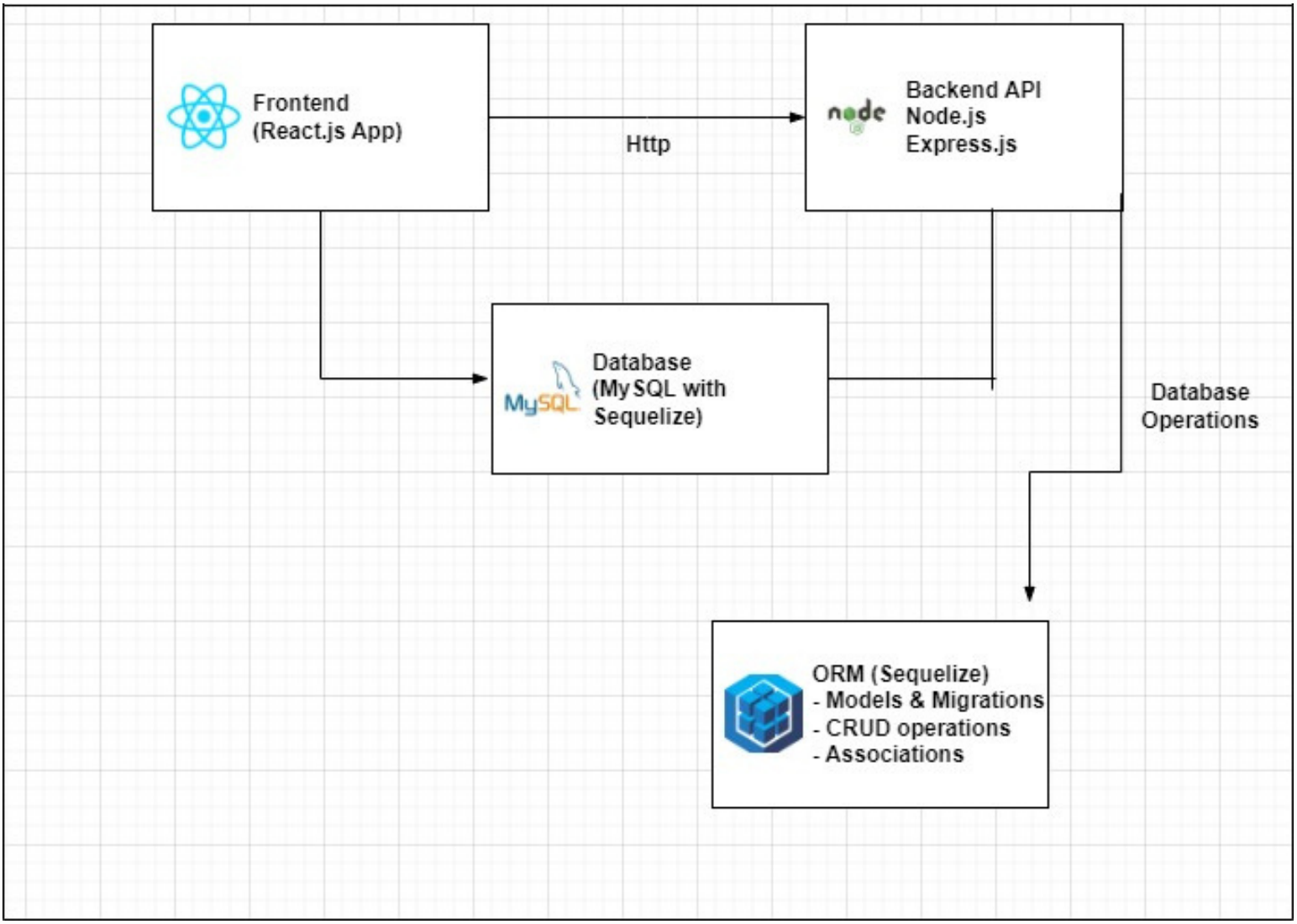
- **Backend**
  - Node.js
  - Express.js

- **Database**
  - Sequelize and MySQL (Relational Database Management System)

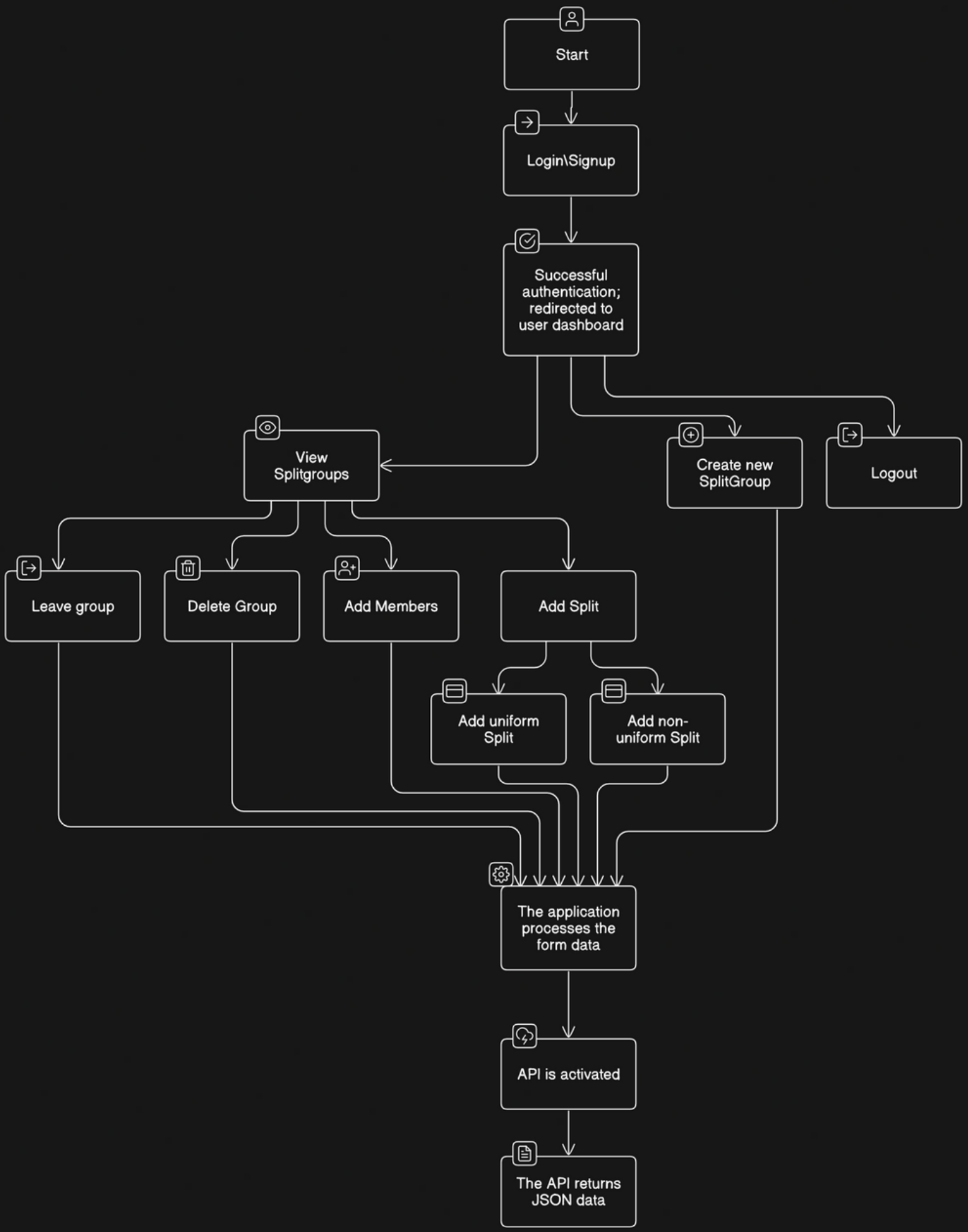
- **Authentication**
  - JSON Web Tokens (JWT)

- **Development Tools**
  - Git
  - npm (Node Package Manager)

APPLICATION ARCHITECTURE OVERVIEW

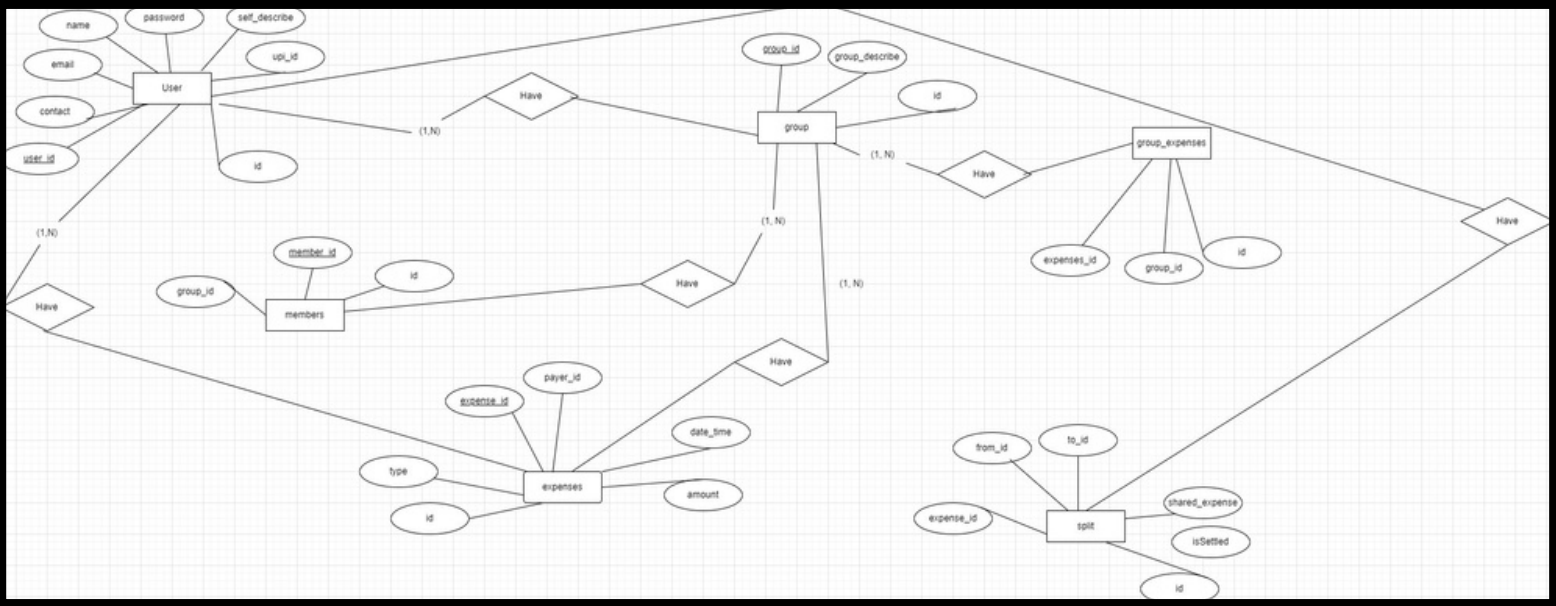


Activity flow diagram for SplitSmarty



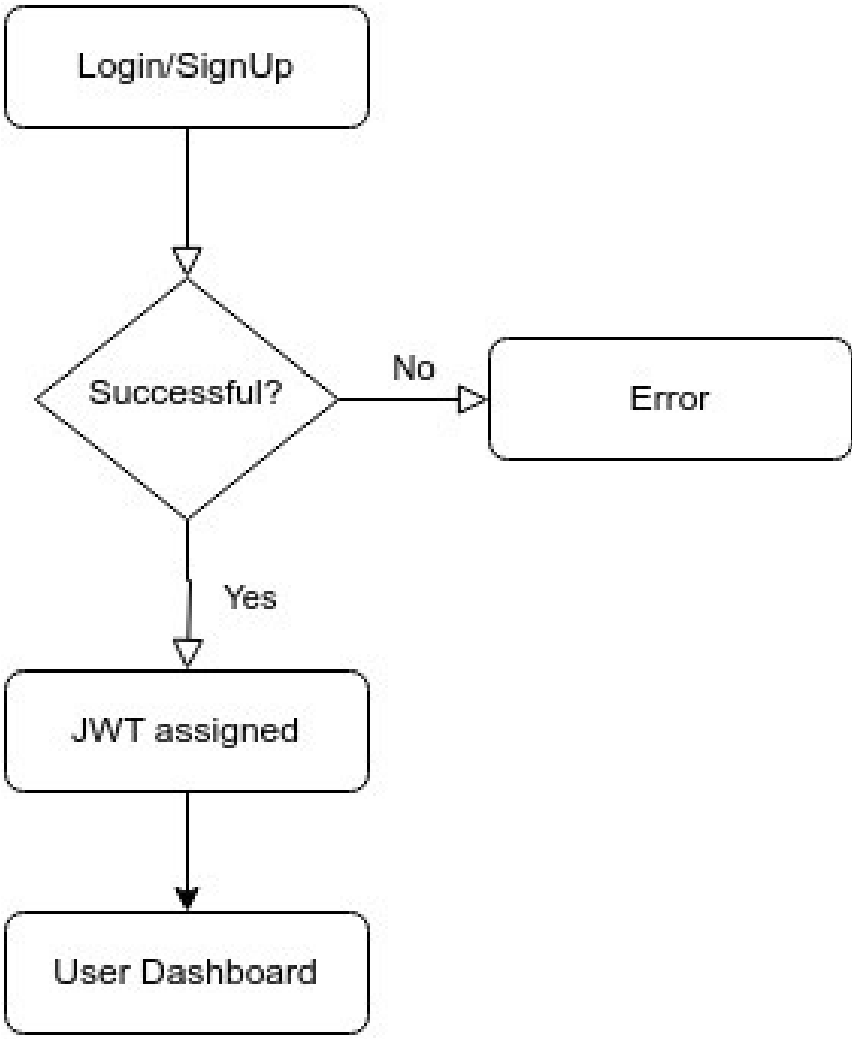
ER DIAGRAM

console.log(-”SPLITSMARTY”-);

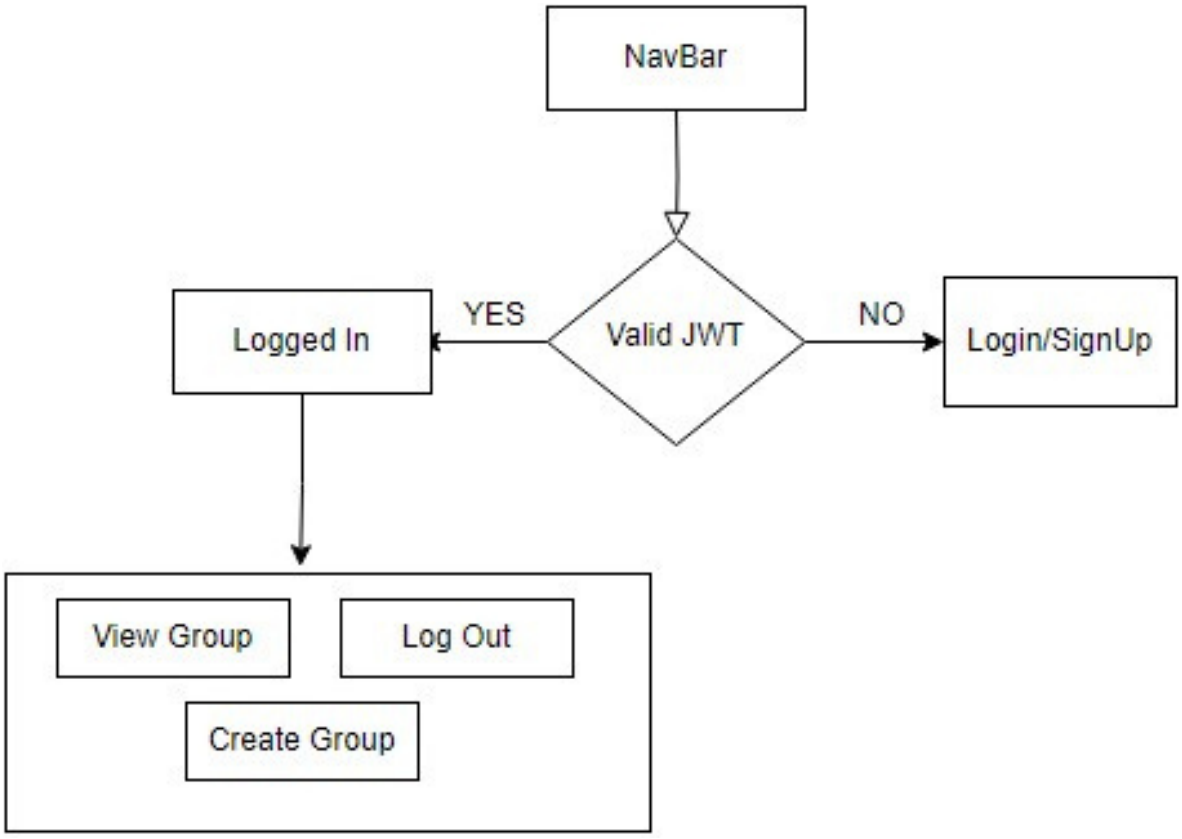


COMPONENT DETAILS

For all protected routes, a middleware checks whether the JWT sent in the header of the API is valid or not. If it's invalid (altered/ null/ expired) the user is redirected to the login/signup page.

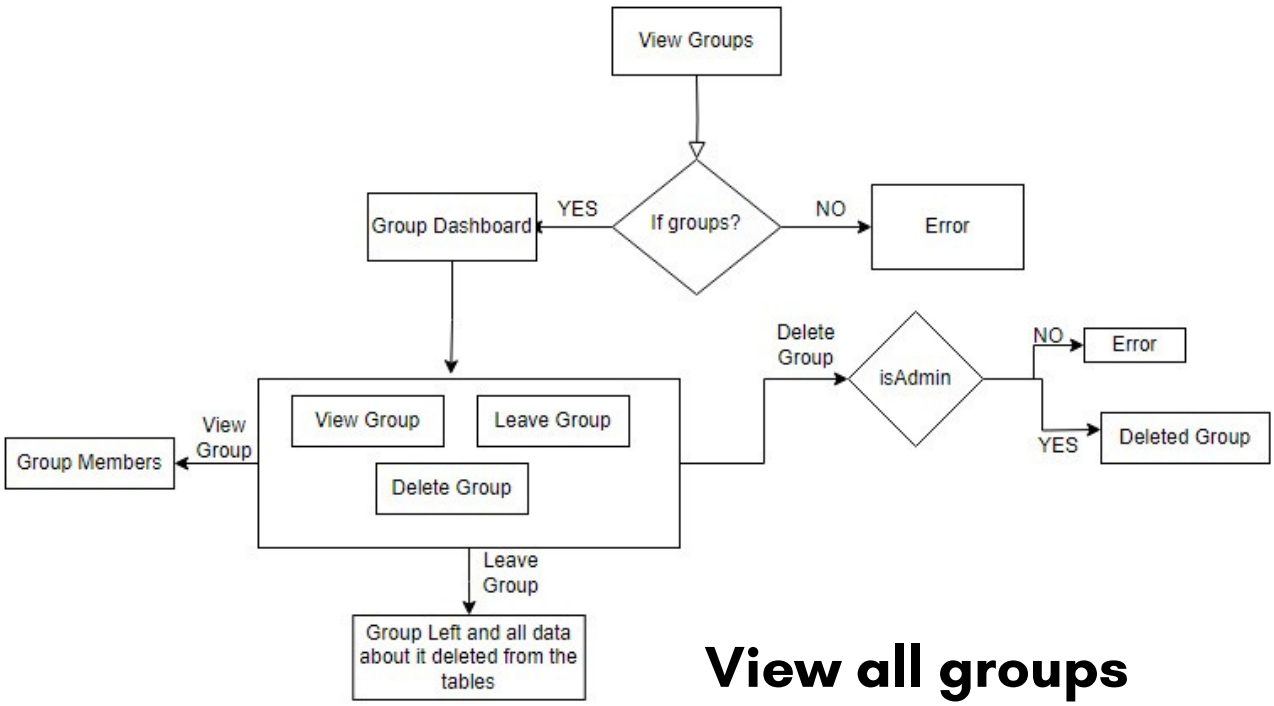


LOGIN/SIGNUP



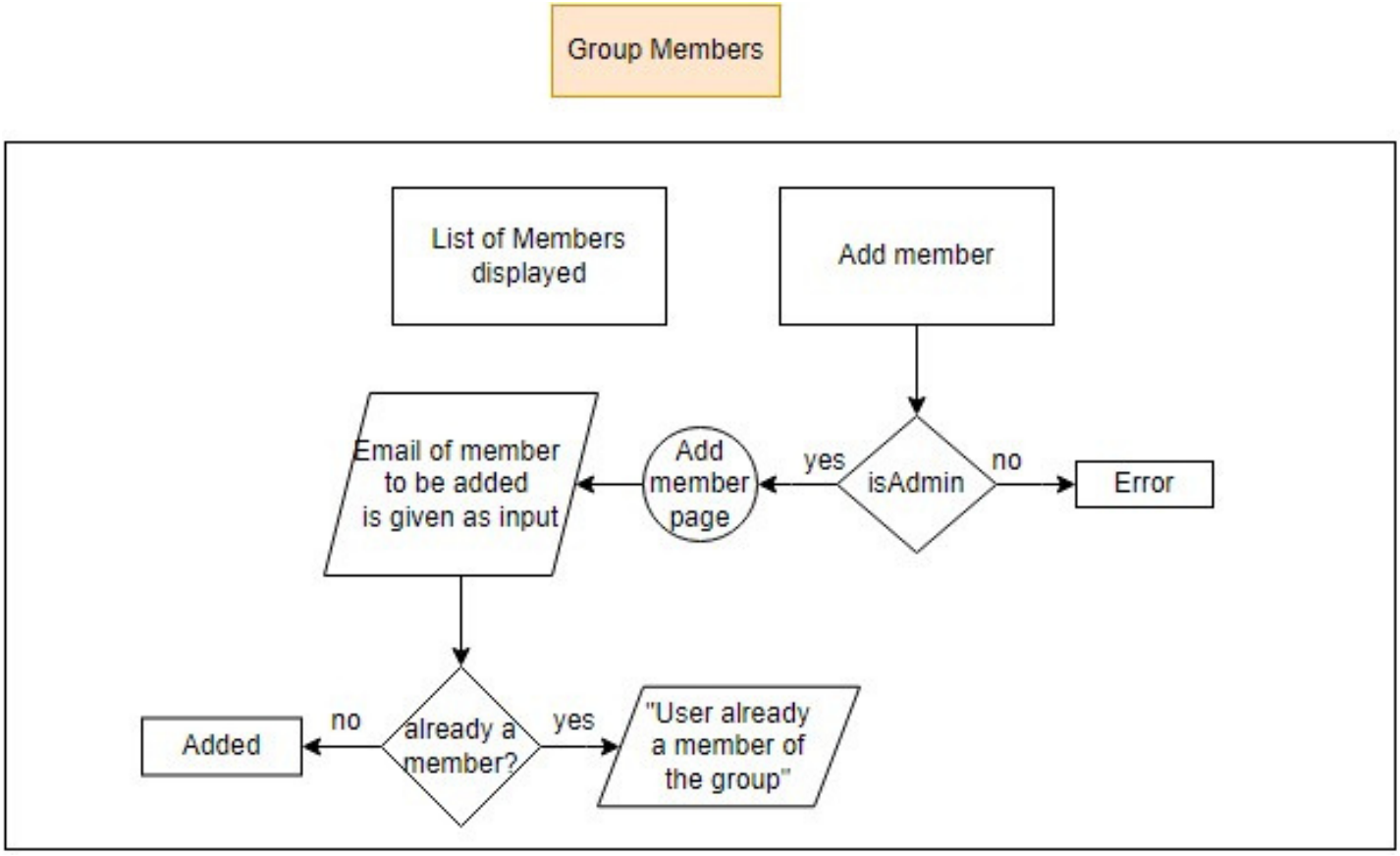
Navigation Bar

- A person can choose to view group or create a new one in which he will automatically become the admin



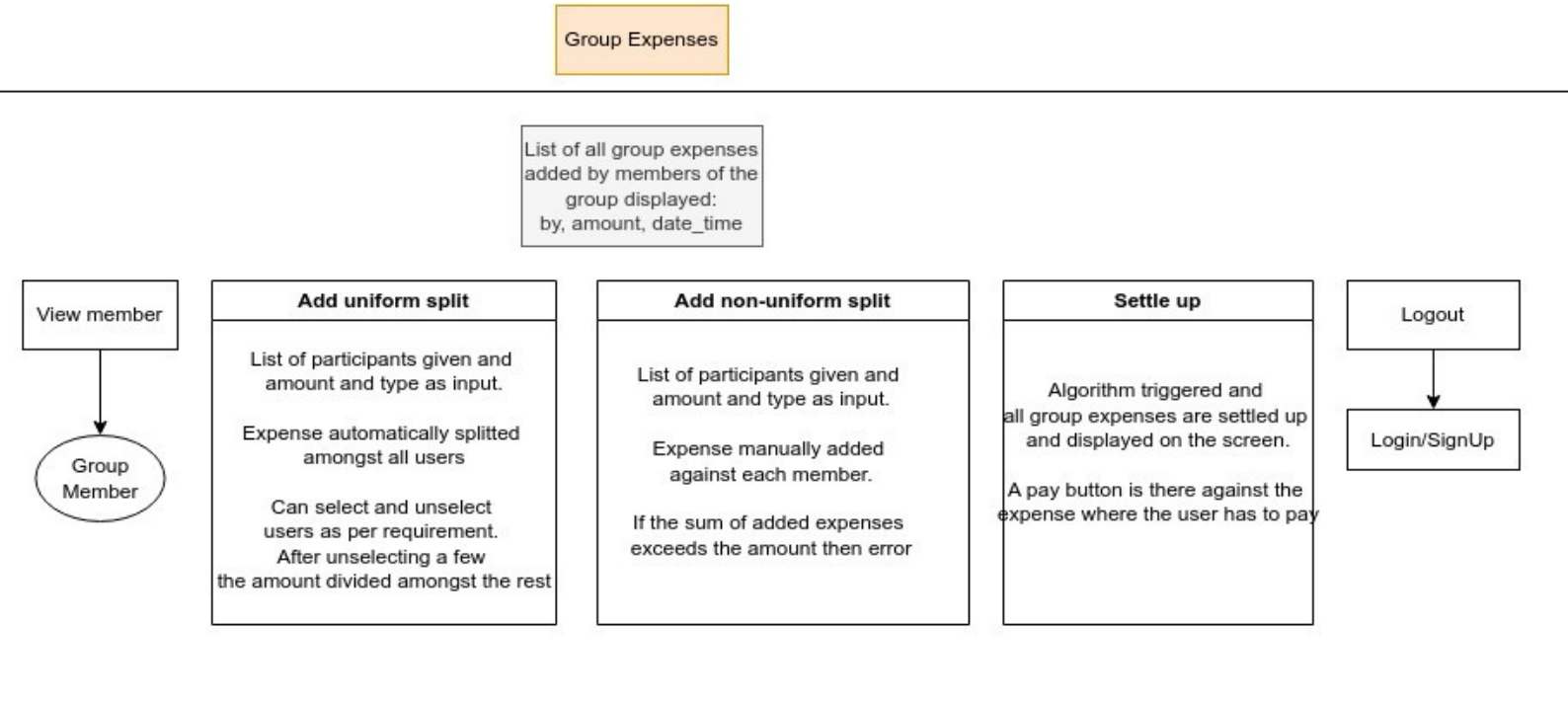
View all groups

- A person is Admin can DELETE a group, may leave it or view it to use other functions



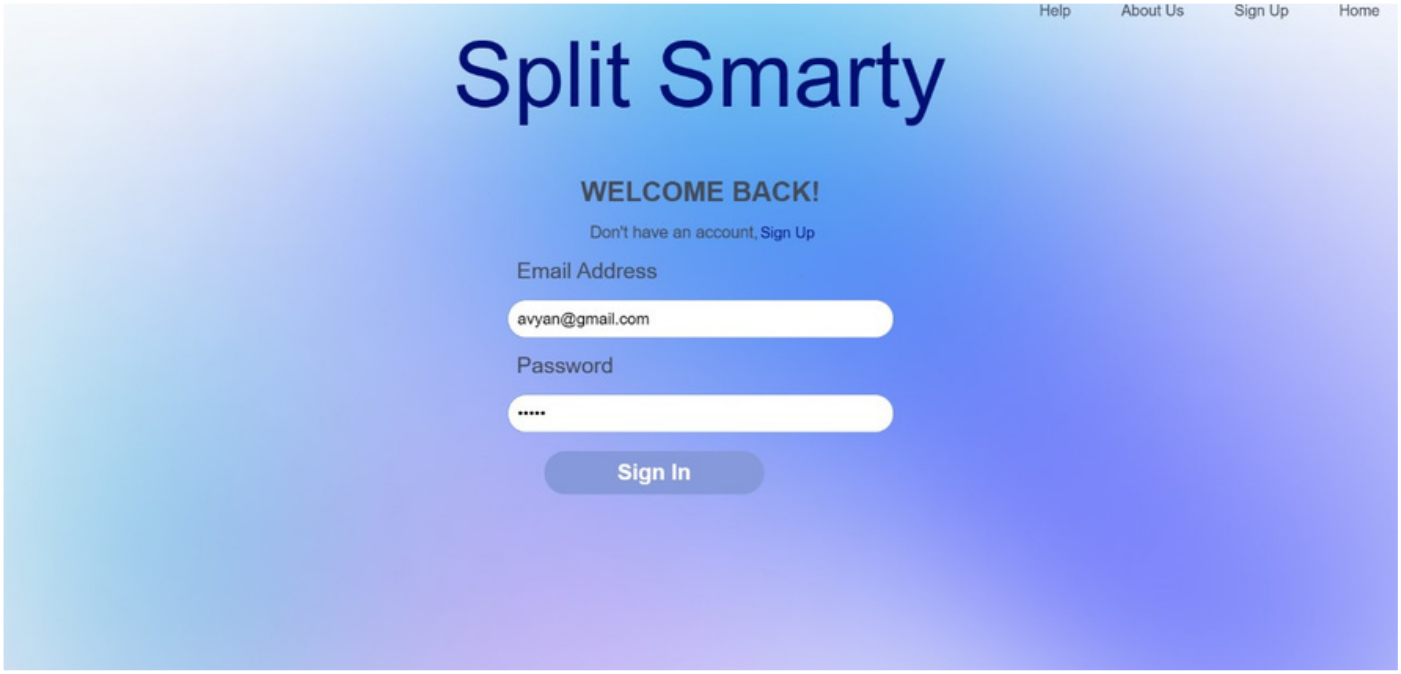
Group Dashboard

- A user if admin can add others by their email into the group
- all members are displayed

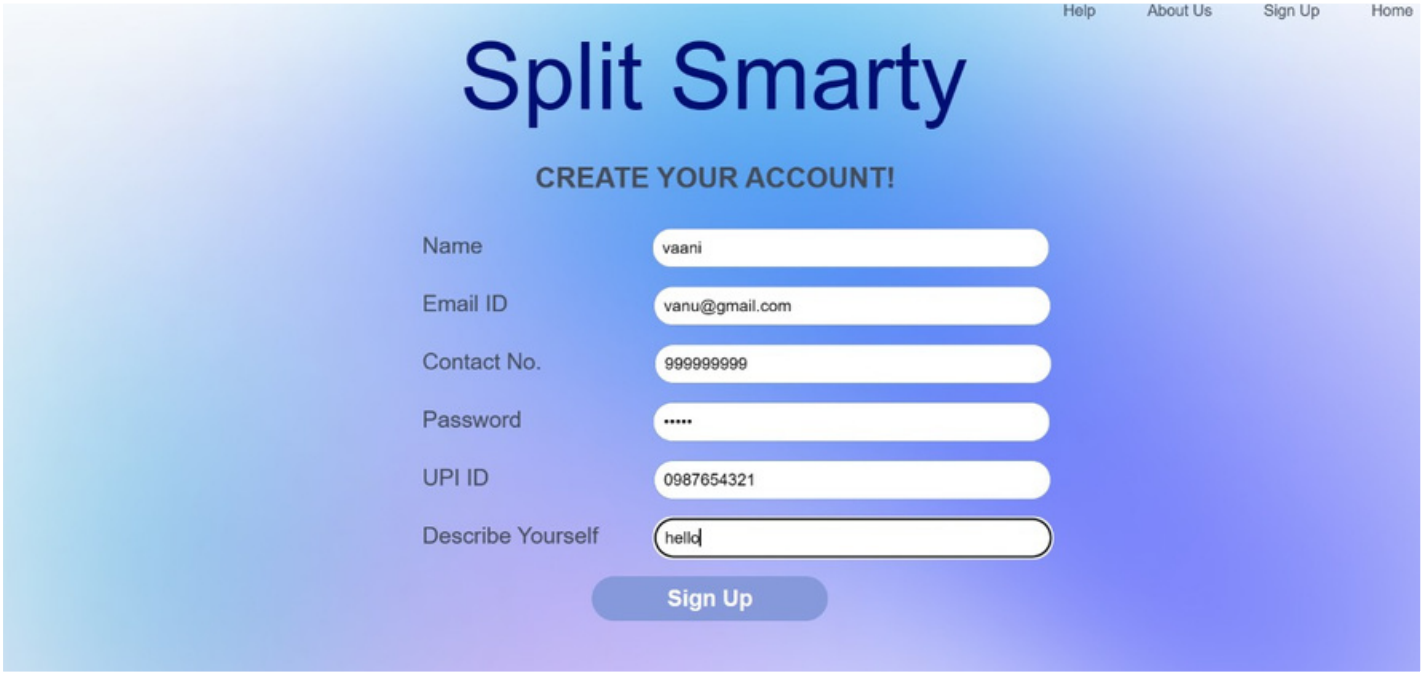


Expense and Settle Up

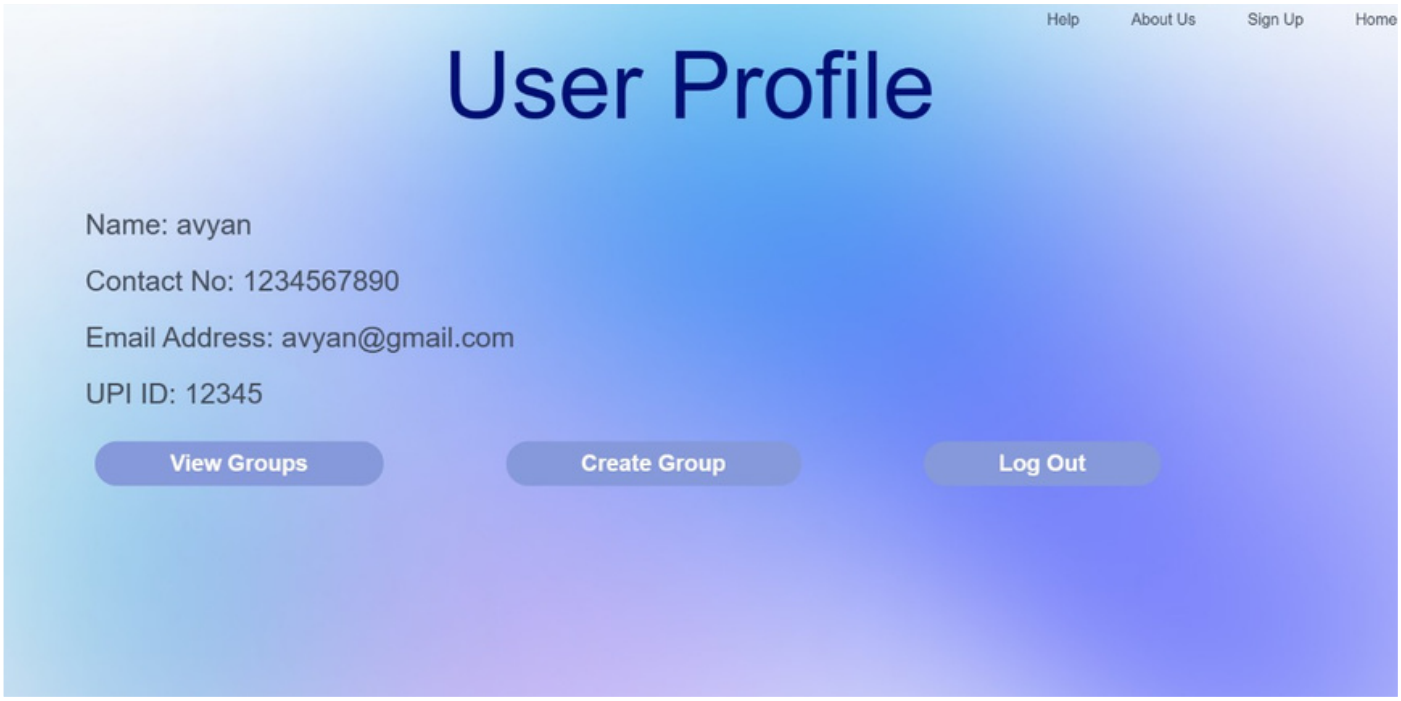
SNIPPETS



Login

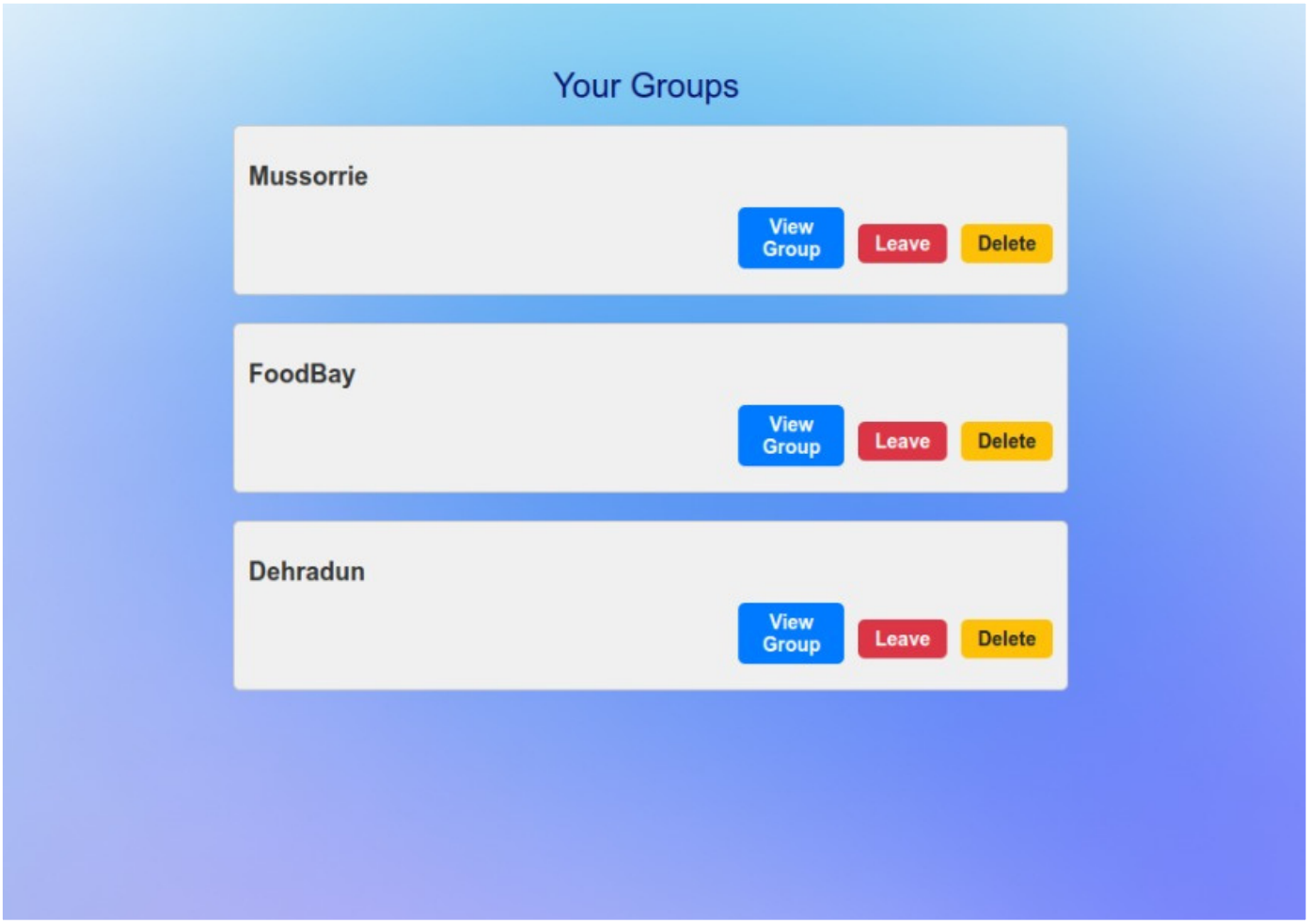


Sign Up

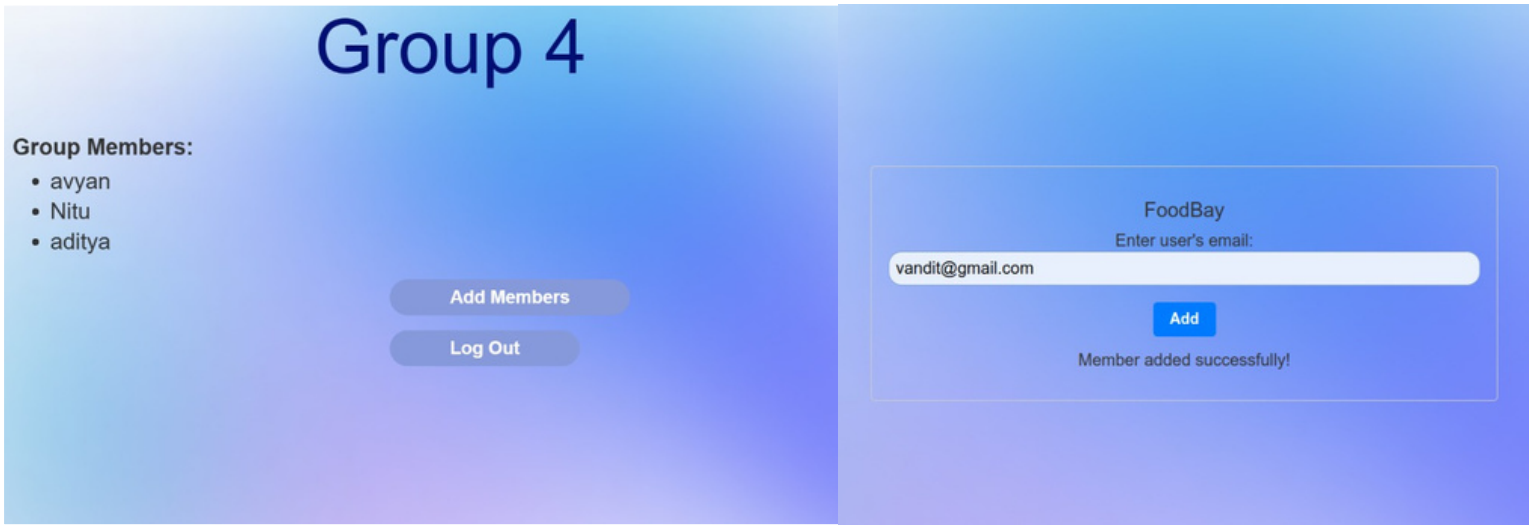


User Profile

Create Groups



View Groups + Leave + Delete Groups



Group Dashboard with List of Members

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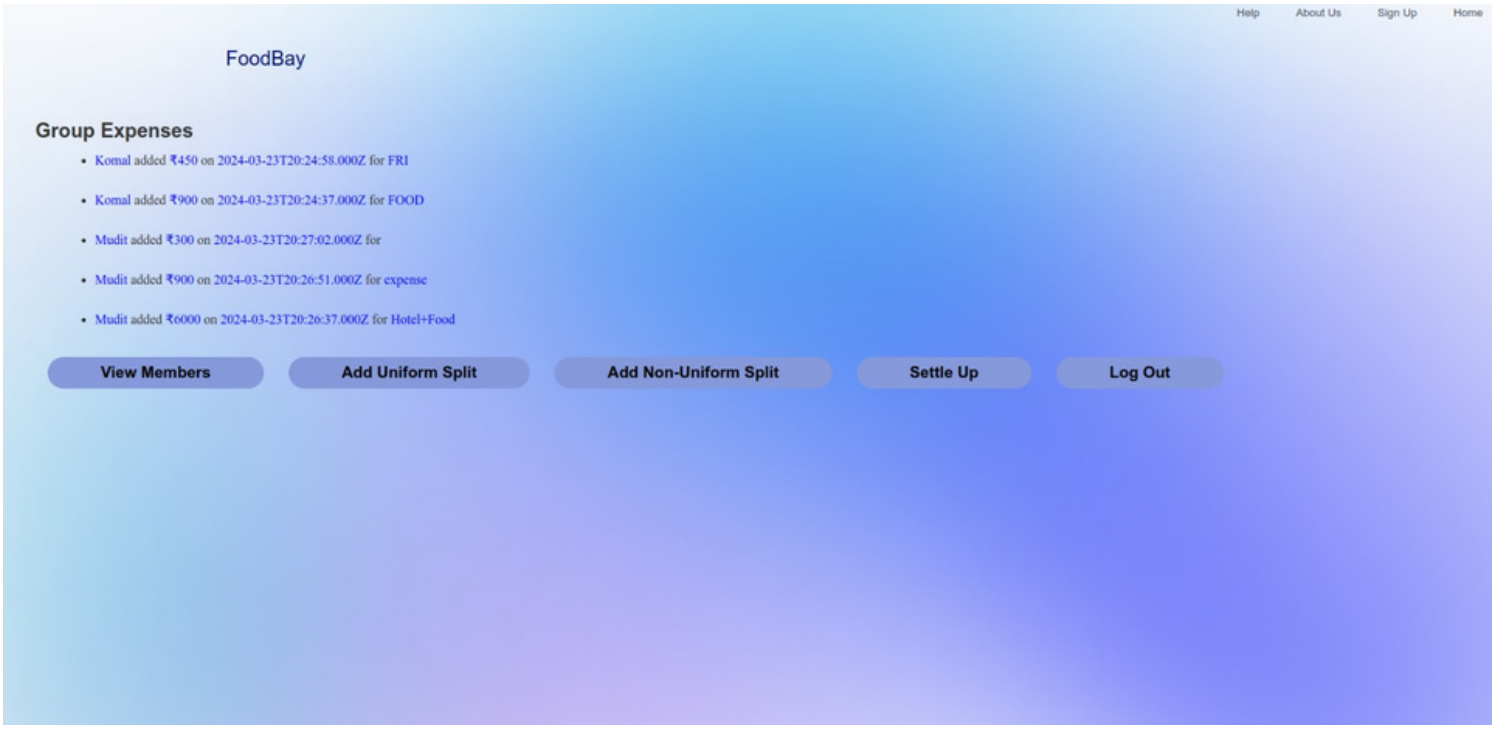
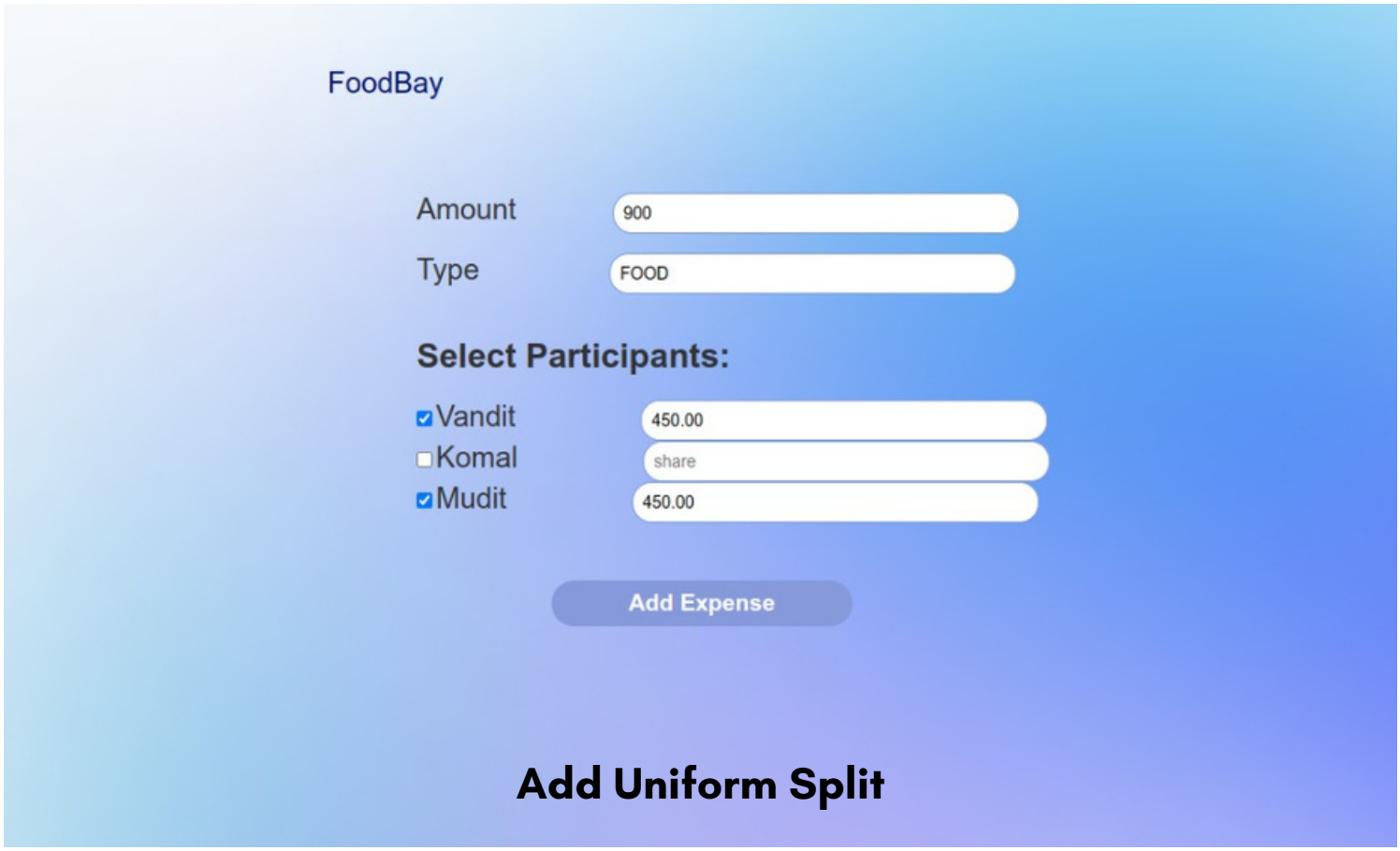
Add Members

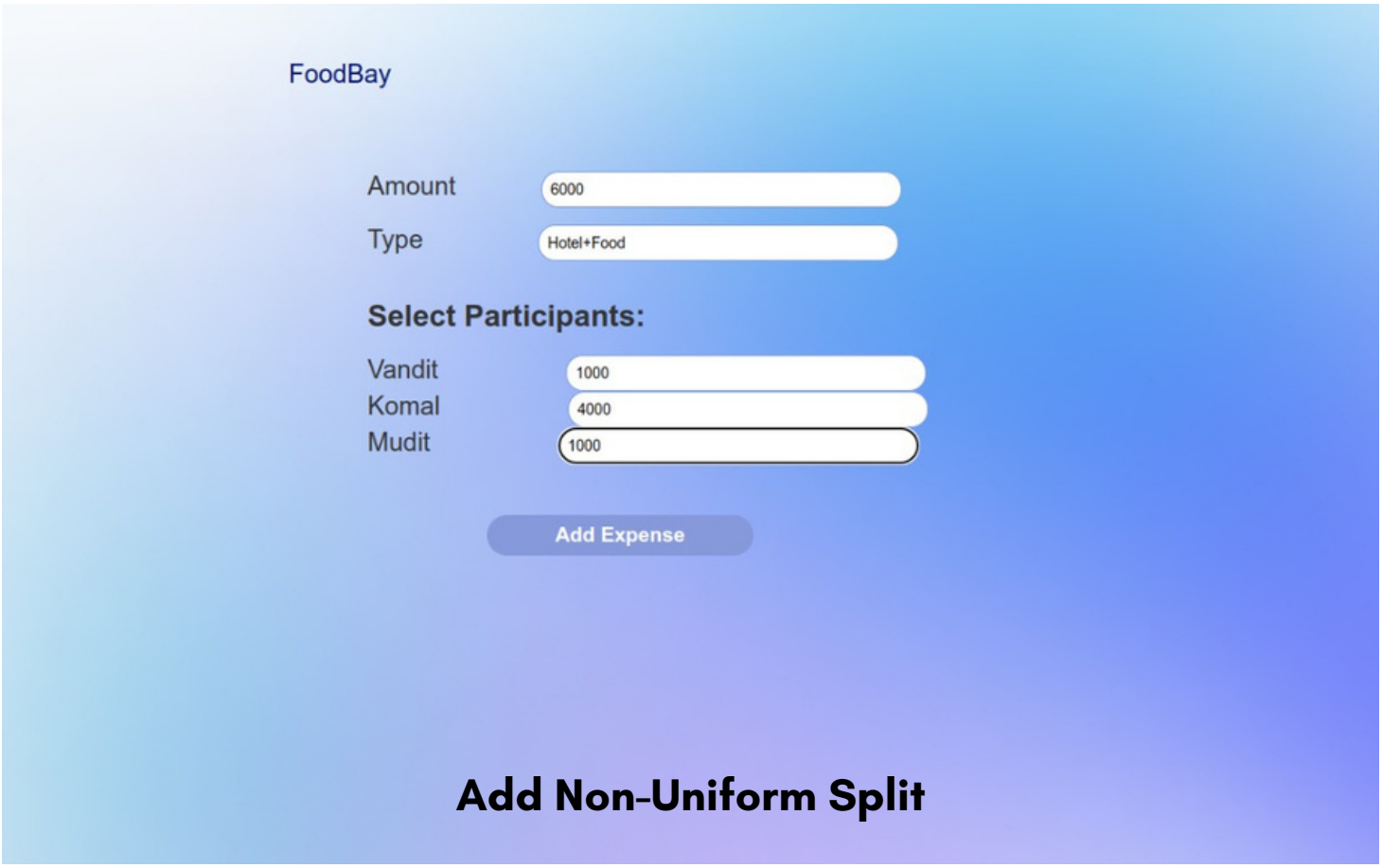


Group Expenses Listed



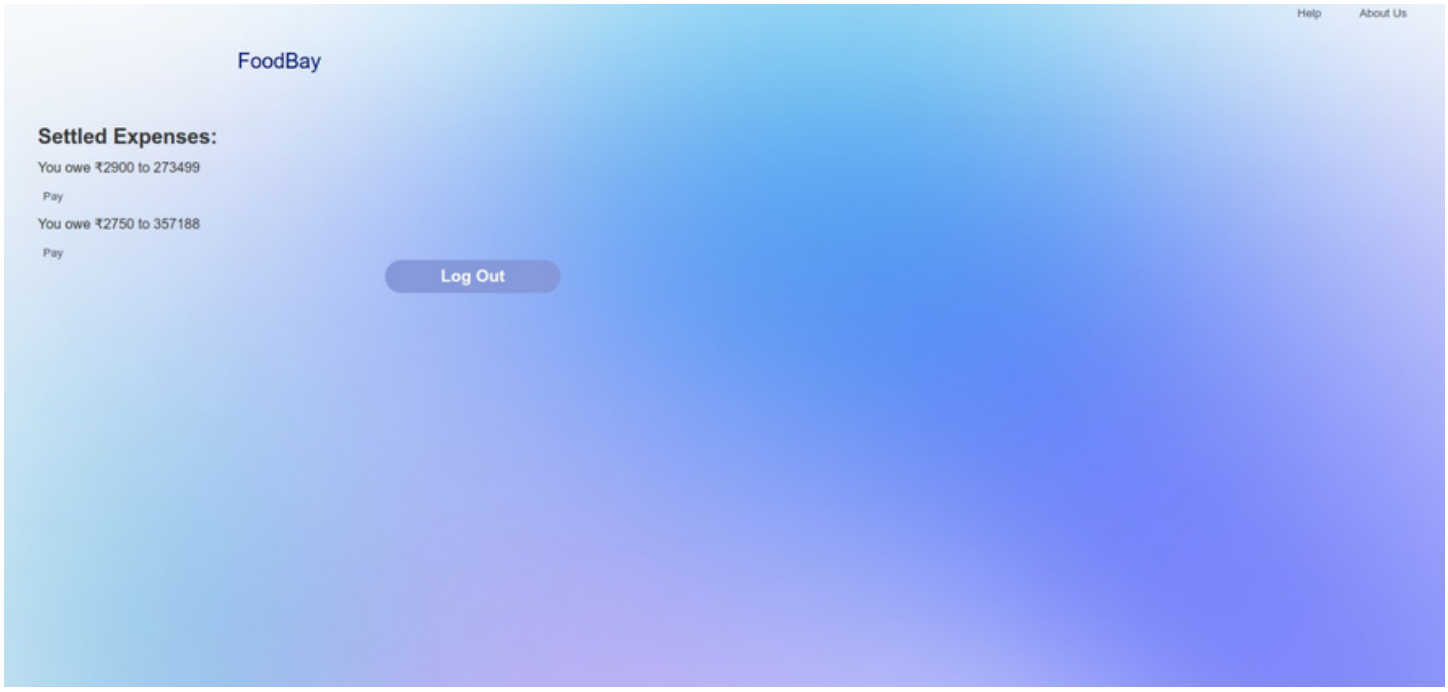
Add Uniform Split

- The amount when added is automatically divided amongst the participants chosen



Add Non-Uniform Split

- The amount can be manually entered against the chosen participants.



Settle Up expenses

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Record Payment

LEARNINGS IMPLEMENTED FROM DESIS ASCEND EDUCARE

We have developed an optimised **Bill-splitting and Minimum Transaction algorithm** using the of DSA and Graph optimisation techniques.

We applied OOPs principles in our design. The evaluation of expense is abstracted from the User.

We have maintained separate servers for the frontend and backend of the application to facilitate easy debugging.

Keeping the Design and Architecture in mind we have tried to hit the database as less as possible and hence we have just one function each for adding Expense (both uniform and non-uniform) and for settling expenses.

We used JSON which is eventually a hash-map.

We have used the concepts learnt in the DBMS course to normalise the tables, add triggers and maintain proper associations between tables and their attributes.

The knowledge we gained about Git and GitHub in our Understanding Systems course came in very handy while collaborating with the group to build this project.

FUTURE SCOPE

In the future, we plan to enhance the user interface so that it can be more visually appealing.

We also plan to integrate a “Payment Gateway” for secure payments through the application.

Currently our website has the bill splitting feature, but we would like to extend that to expense categorization for expense tracking and finding out where the most amount of money of the user is spent.

Currently, our website supports only signup and authentication through email and password. However, we intend to integrate Google authentication and implement a "Forgot Password" feature to enhance user experience and security.

CONTRIBUTION

Frontend: Vaani Goyal, Praneetha Kancharla, Tanishka Misra

Backend: Komal, Sanjana Vajrapu

Database Model: Komal, Sanjana Vajrapu

Connection of the database: Komal

Minimum Transaction Algorithm: Tanishka Misra, Sanjana Vajrapu, Komal

Integration of frontend and backend: Komal, Vaani Goyal

Testing: Komal

Report: Praneetha Kancharla, Sanjana Vajrapu, Komal, Tanishka Misra, Vaani Goyal

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Sequelize: *https://sequelize.org/*

Bill splitting Optimisation:
https://leetcode.com/discuss/study-guide/2154270/low-level-design-of-splitwise

ReactJs & NodeJs: *https://www.w3schools.com*