

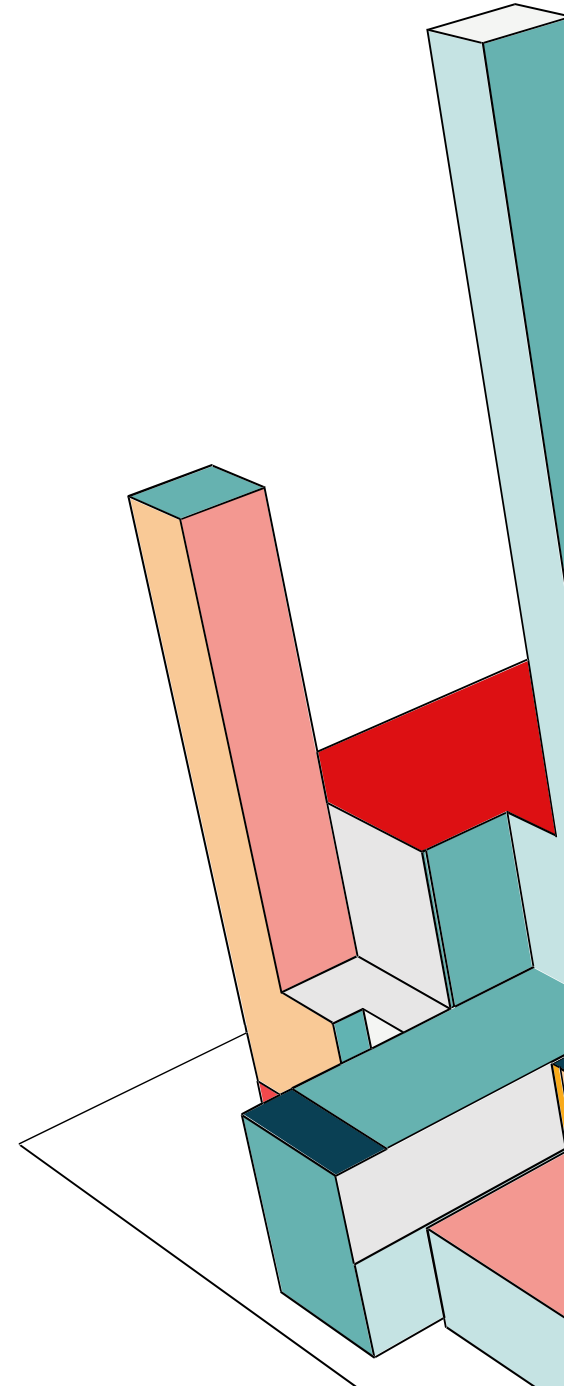
Title	Employee Management App
Course	Cross-Platform Application Development
Presented by	Vishal Sharma
Submitted to	Prof. Chandan R N
Date	27 Jan 2025

You are one of the best professors we have ever had. Your teaching style is so practical and engaging that there is no doubt any student who attends your class will acquire the skills provided by the course.

Note: I did take GPT's help for styling parts, as it has a somewhat steep learning curve for beginners for styling part (I felt). However, I troubleshooted and further improved the styling wherever issues arose.

PROJECT OVERVIEW

- **Objective:** Develop a cross-platform app demonstrating CRUD operations using Back4App as the backend.
- **Description:** A Flutter-based application managing employees with real-time notifications and robust authentication features.



FEATURES BY SCREENS



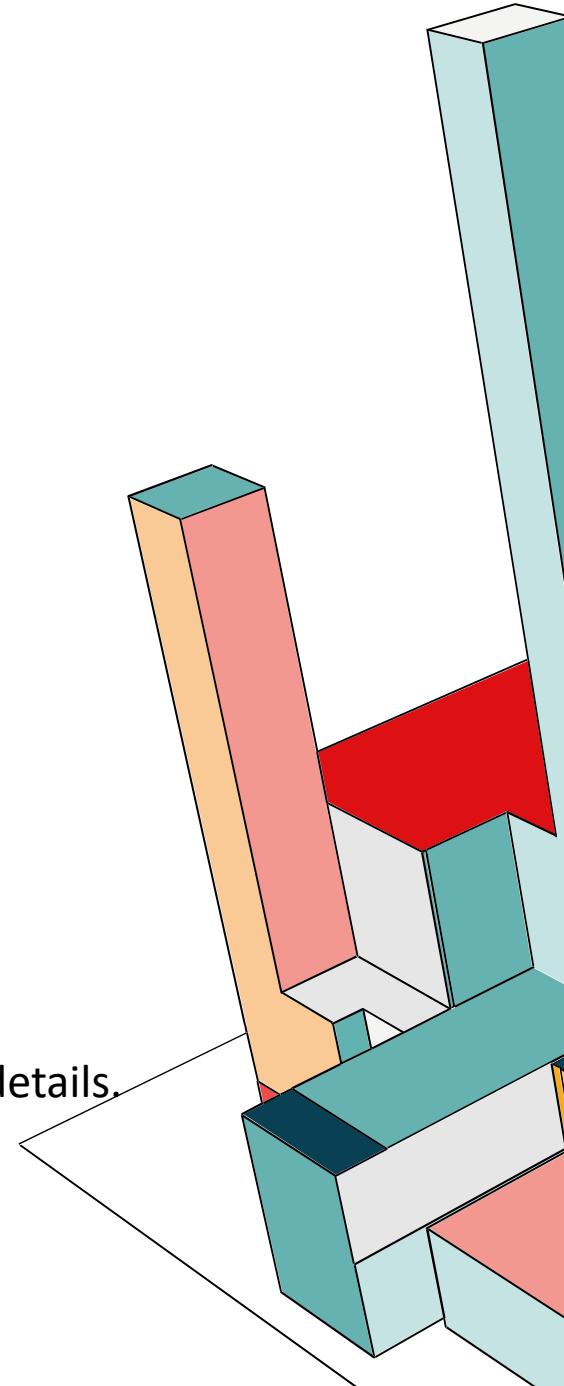
1. Authentication Screens

Login Screen (`lib/screens/auth/login_screen.dart`)

- **Features:**
 - Allows users to log in using their email and password.
 - Validates form inputs (e.g., email format and required fields).
 - Displays error messages for invalid credentials or network issues.
 - Shows a loading indicator during the login process.
 - Redirects to the Employee List Screen upon successful login.
 - Provides navigation to the Signup Screen for new users.

Signup Screen (`lib/screens/auth/signup_screen.dart`)

- **Features:**
 - Allows new users to register by providing email, password, and other required details.
 - Validates form inputs (e.g., email format, password strength).
 - Displays success or error notifications after registration.
 - Redirects users to the Login Screen upon successful signup.



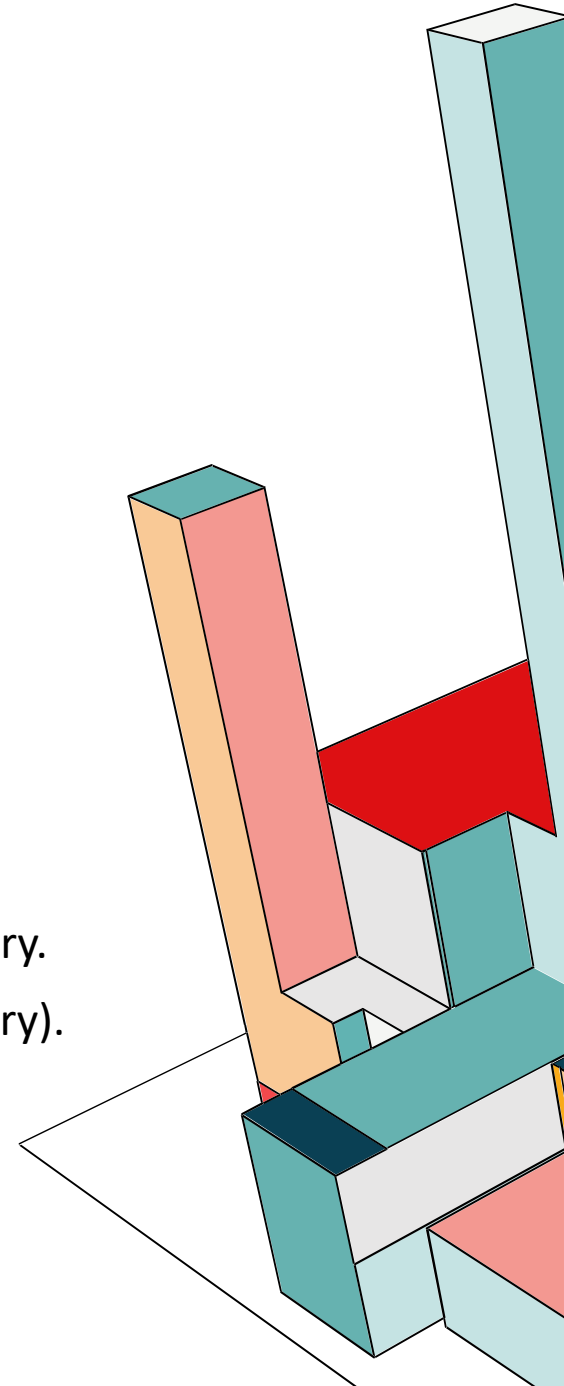
2. Employee Management Screens

Employee List Screen (`lib/screens/employee/employee_list_screen.dart`)

- **Features:**
 - Displays a list of employees fetched from the backend.
 - Provides options to add, edit, or delete employees.
 - Includes a notification badge to display the count of unread notifications.
 - Allows navigation to the Employee Form Screen for adding or editing employees.
 - Refreshes the employee list after CRUD operations.

Employee Form Screen (`lib/screens/employee/employee_form_screen.dart`)

- **Features:**
 - Allows users to add or edit employee details such as name, email, position, and salary.
 - Validates form inputs (e.g., required fields, email format, numeric validation for salary).
 - Displays success or error notifications after saving changes.
 - Redirects back to the Employee List Screen upon successful submission.



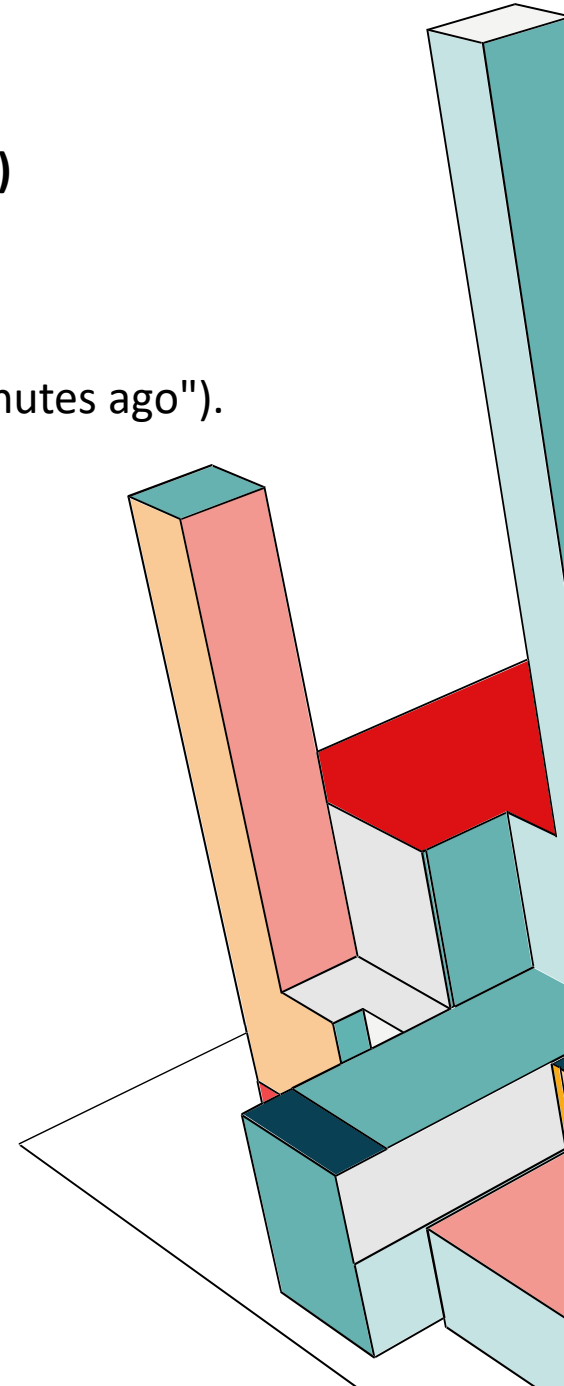
3. Notification System Screens

Notification History Screen (`lib/screens/notification/notification_history_screen.dart`)

- **Features:**
 - Displays a list of system notifications with timestamps.
 - Uses the `timeago` package to show human-readable timestamps (e.g., "5 minutes ago").
 - Filters notifications to show only those from the last 24 hours.
 - Allows users to mark notifications as read or clear old notifications.
 - Differentiates between read and unread notifications visually.

4. Common Features Across Screens

- **Error Handling:**
 - Displays error dialogs for network issues or invalid operations.
- **Loading Indicators:**
 - Shows loading spinners during API calls or data fetching.
- **Navigation:**
 - Seamless navigation between screens using Flutter's Navigator.



IMPLEMENTATION PERSPECTIVE & SECURITY CONSIDERATIONS

Key Features

- **Authentication:** Login, signup, and session management.
- **Employee Management:** Full CRUD functionality with validation.
- **Notifications:** Real-time updates with history and filtering.

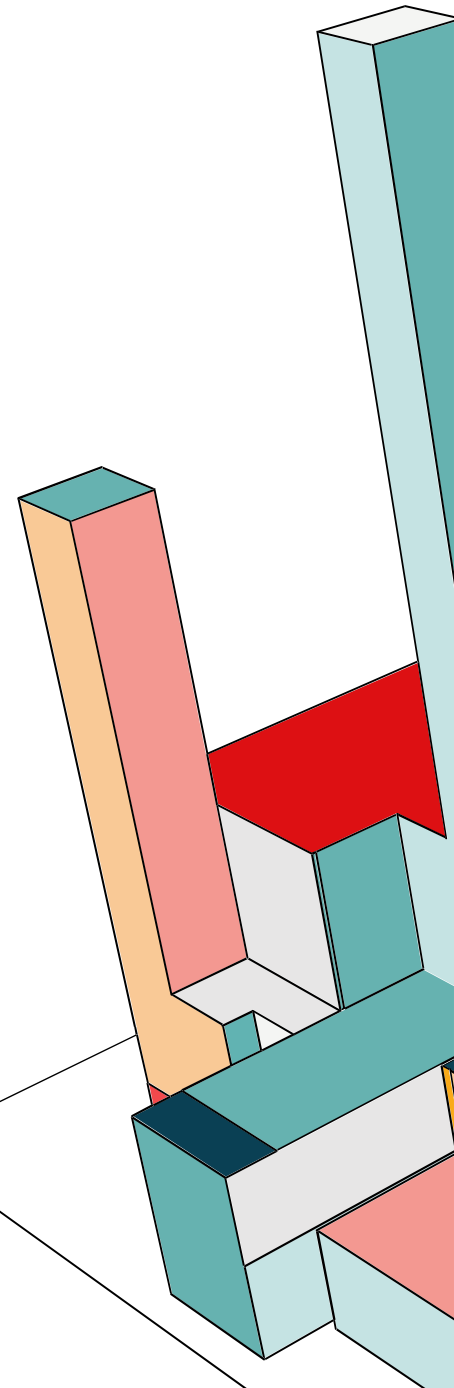


Authentication Implementation

- **User Authentication:** Handled via Back4App's Parse SDK using ParseUser for login, signup, and logout.
- **Session Management:** Validates session tokens and auto-logout on invalid sessions.
- **Security:** Passwords are securely managed by Parse SDK with HTTPS transmission.
- **ACL:** Setting ACL's to prevent security vulnerability by allowing right access to app user with invalid sessions by any mean.

Employee Management

- **CRUD Operations:** Employees can be added, edited, deleted, and listed using Back4App's Employee class.
- **Validation:** Form validation for required fields, email format, and numeric salary.
- **Features:** Employee list screen with navigation to add/edit forms. Notifications for CRUD actions.

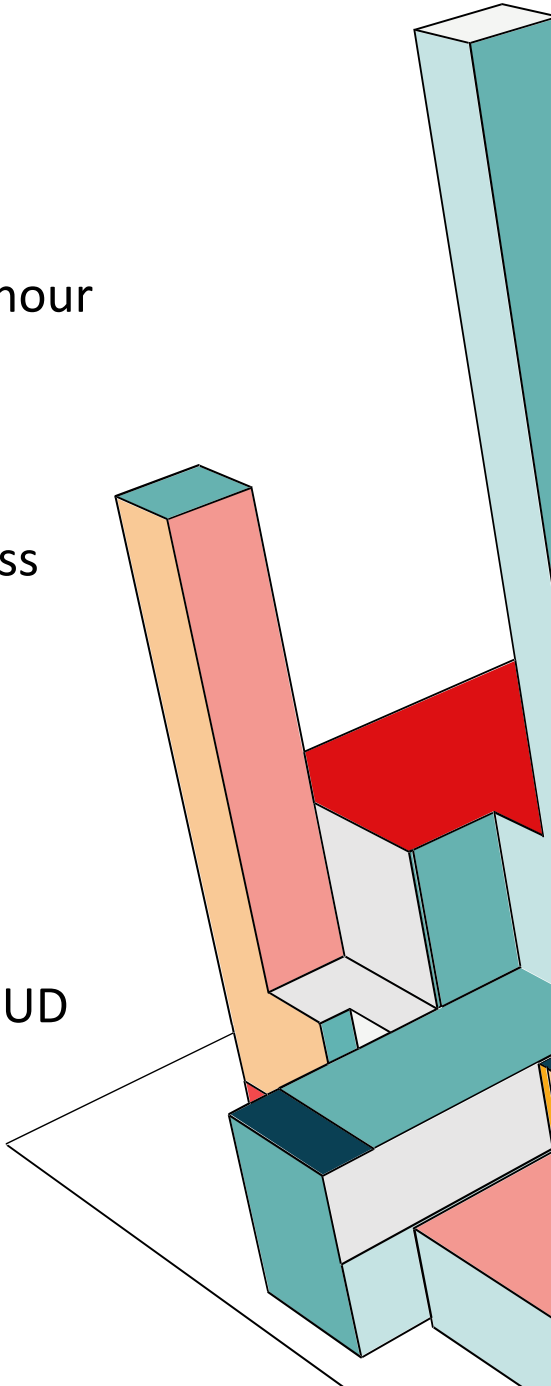


Notification System

- **Features:** Displays notifications with timestamps, unread/read status, and a 24-hour filter.
- **Storage:** Notifications are persisted using SharedPreferences.
- **Auto dismiss** notifications (in 2 seconds) or user could dismiss by clicking on cross button.

Back4App Models

1. **User Model:** Manages authentication with fields like username, password, and email.
2. **Employee Model:** Stores employee details (name, email, position, salary) for CRUD operations.





TECHNOLOGY STACK

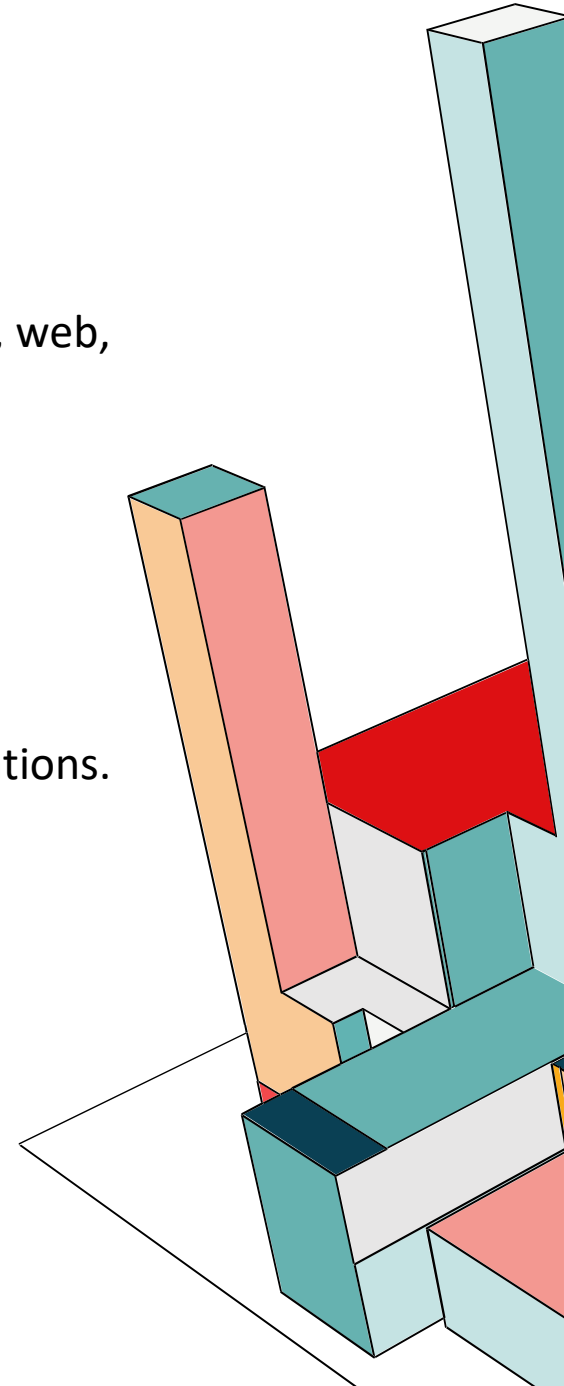
Technology Stack

Frontend

- **Flutter:** A cross-platform UI toolkit for building natively compiled applications for mobile, web, and desktop from a single codebase.
 - **Dart:** The programming language used for Flutter development.

Backend

- **Back4App:** A backend-as-a-service (BaaS) platform built on Parse Server.
 - **Parse SDK:** Used for handling authentication, session management, and CRUD operations.
 - **Parse Server Features:**
 - User authentication and session management.
 - Data storage for employee and notification models.
 - Built-in security features like HTTPS and session token validation.



State Management

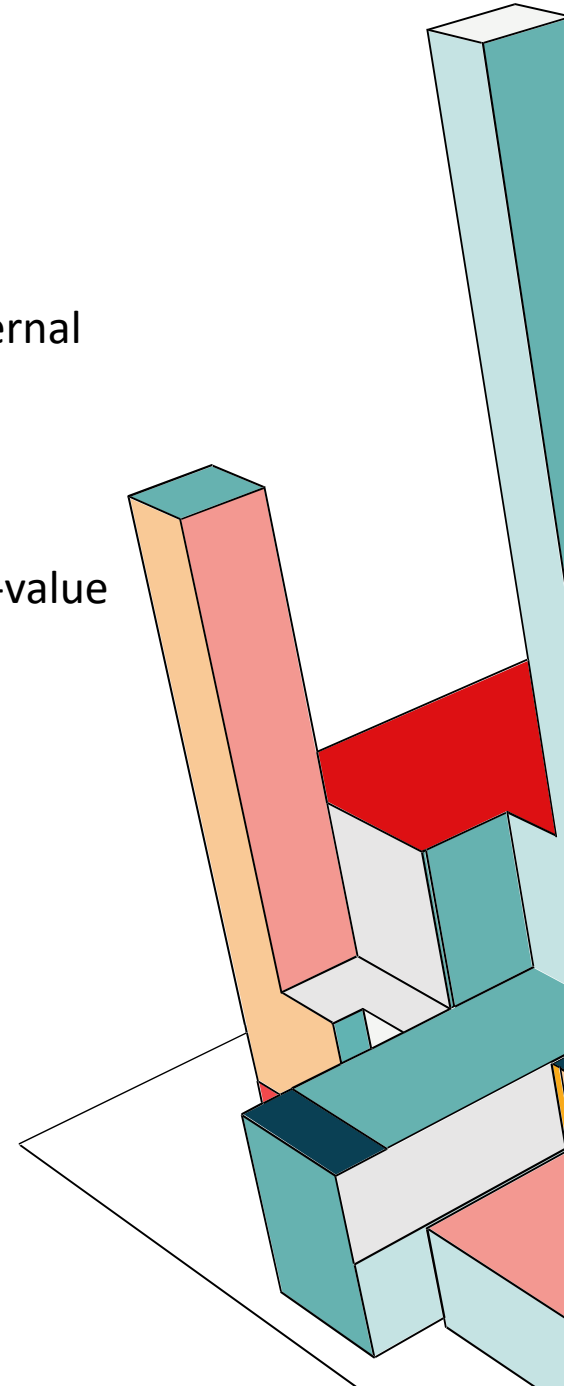
- **Local State Management:** Managed directly within widgets using `setState`. No external state management libraries like `Provider` are used.

Storage

- **SharedPreferences:** Used for local storage of notification data and other small key-value pairs.

Packages and Libraries

1. **parse_server_sdk_flutter:** For interacting with Back4App's Parse Server.
2. **shared_preferences:** For local data persistence.
3. **timeago:** For displaying human-readable timestamps (e.g., "5 minutes ago").
4. **crypto:** For cryptographic operations (if required).



Development Tools

- **Visual Studio Code:** Recommended IDE for Flutter development.
- **Flutter CLI:** For building, running, and managing the Flutter project.

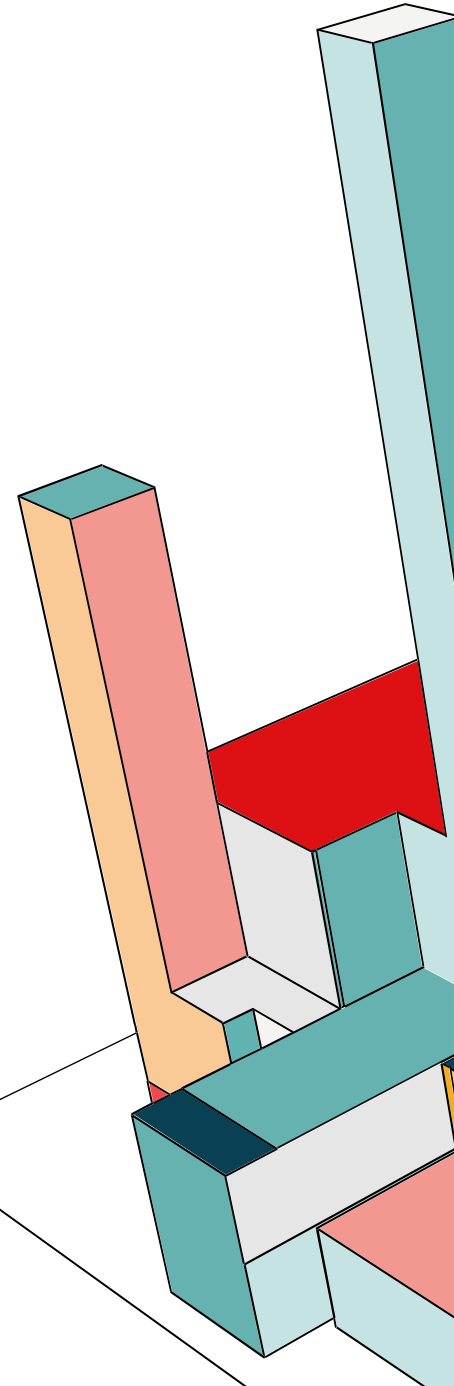
APIs

- **Parse API:** Used for backend communication, including user authentication, employee data management, and notifications.

Security

- **HTTPS:** Ensures secure communication between the app and Back4App.
- **Parse SDK Security:** Handles password hashing, session token management, and secure data transmission.

This stack ensures a robust, scalable, and secure application with minimal backend management, leveraging Back4App's BaaS capabilities.

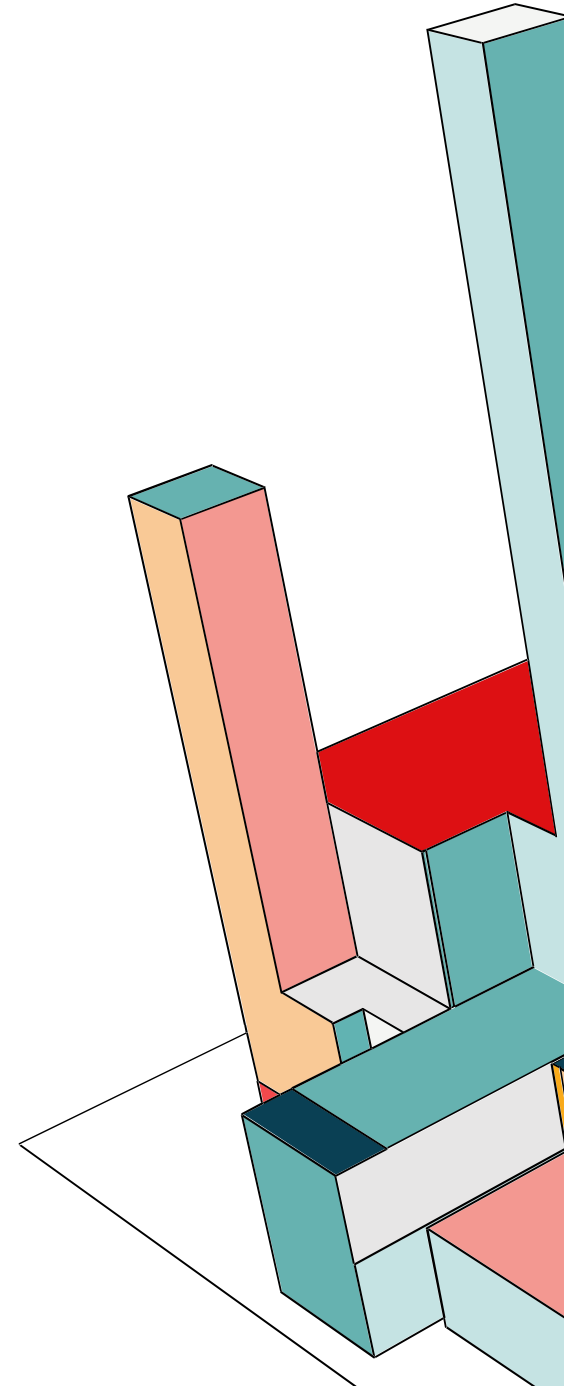




CHALLENGES ENCOUNTERED

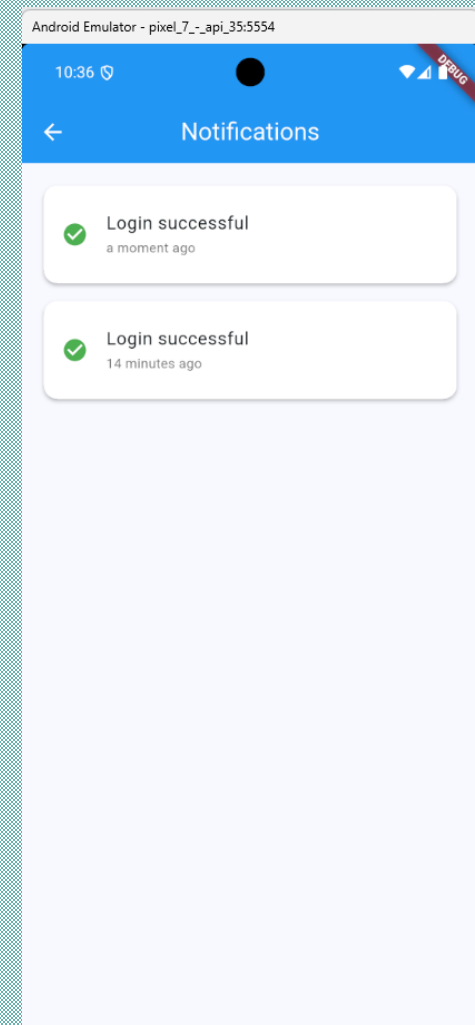
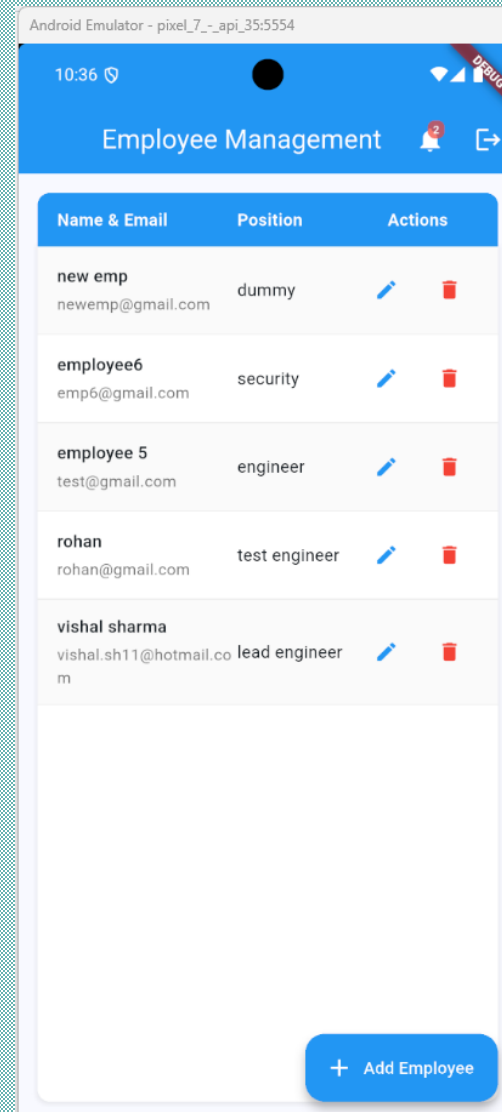
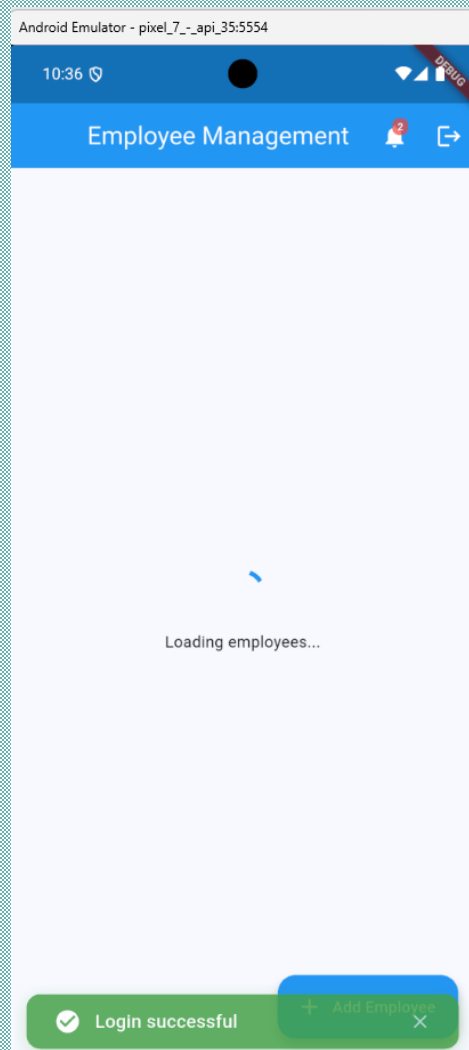
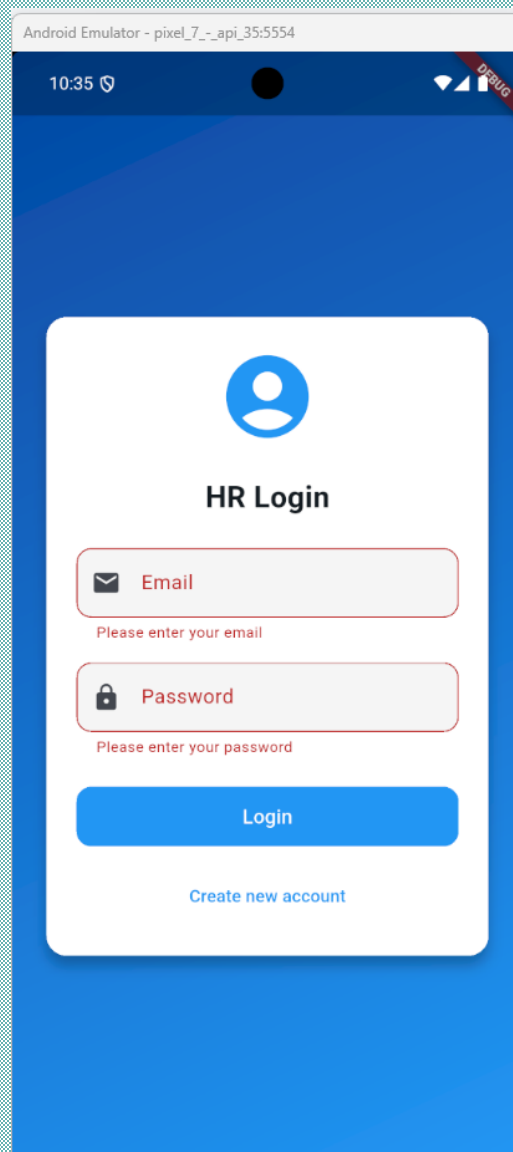
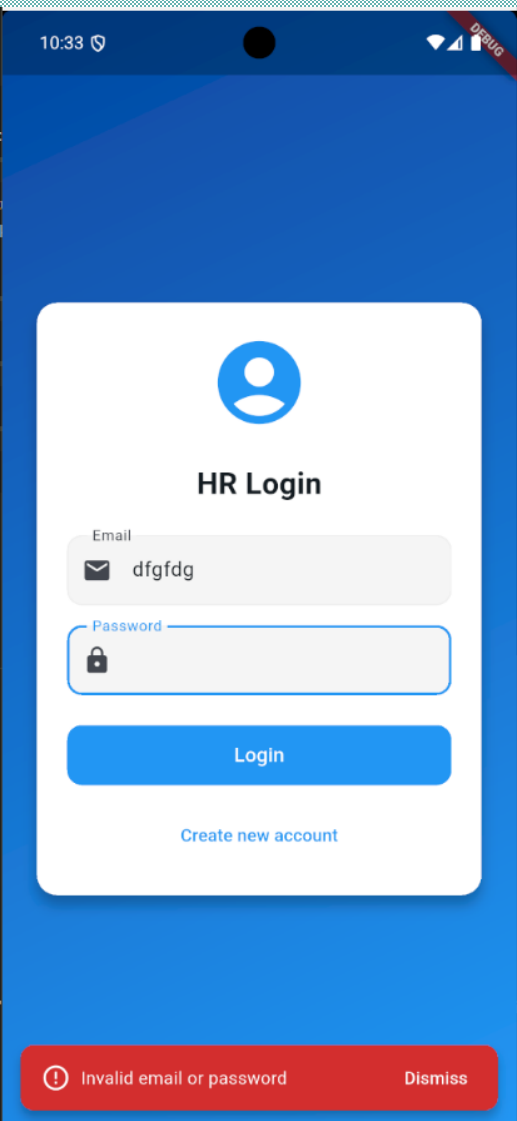
Challenges Encountered

- Ensuring cross-platform UI consistency.
- Styling has a steep learning curve, would be nice if they have followed similar HTML styling standard.



SCREENSHOTS / DEMO





Android Emulator - pixel_7_-_api_35:5554

10:37

Edit Employee

Name
employee5

Email
test@gmail.com

Position
engineer











Salary
\$ 2501230.0

Update Employee

Android Emulator - pixel_7_-_api_35:5554

10:38

Employee Management









Name & Email	Position	Actions
new emp newemp@gmail.com	dummy	 
employee6 emp6@gmail.com	security	 
employee5 test@gmail.com	engineer	 
rohan rohan@gmail.com	staff engineer	 
vishal sharma vishal.sh11@hotmail.co m	lead engineer	 

Employee updated successfully

Android Emulator - pixel_7_-_api_35:5554

10:38

Employee Management

Name & Email	Position	Actions
new emp newemp@gmail.com	dummy	 
employee6 emp6@gmail.com	security	 
employee5 test@gmail.com	engineer	 
rohan rohan@gmail.com	staff engineer	 

Employee deleted successfully

Android Emulator - pixel_7_-_api_35:5554

10:39

Add Employee

Name
new_employee

Email
newemp@gmail.com

Position
Please enter a position











Salary
Please enter a salary

Add Employee

Android Emulator - pixel_7_-_api_35:5554

10:40

Employee Management

Name & Email	Position	Actions
new_employee newemp@gmail.com	lead	 
new emp newemp@gmail.com	dummy	 
employee6 emp6@gmail.com	security	 
employee5 test@gmail.com	engineer	 
rohan rohan@gmail.com	staff engineer	 

Employee added successfully

back4app

What do you want to build today?

My

CPAD_Assignment

Database

Employee

5 objects

Overview

Database

Browser

Add Class

_Role

_Session

_User

Employee

class_1

objectId String

createdAt Date

updatedAt Date

ACL ACL

position String

salary Number

name String

email String

SpTRWh54s0

20 Apr 2025 at 17:1...

20 Apr 2025 at 17:1...

Public Read, Caza08JxDv

lead

4586525

new_employee

newemp@gmail.com

OJFYMZ0jq4

20 Apr 2025 at 16:2...

20 Apr 2025 at 16:2...

Public Read, Caza08JxDv

dummy

5865652

new emp

newemp@gmail.com

1S05i7pNLA

20 Apr 2025 at 15:4...

20 Apr 2025 at 15:4...

Public Read, Caza08JxDv

security

520125

employee6

emp6@gmail.com

C8Hu65Z9Rc

20 Apr 2025 at 15:2...

20 Apr 2025 at 17:0...

Public Read, Caza08JxDv

engineer

2501230

employee5

test@gmail.com

Wr4F1BSrd8

20 Apr 2025 at 14:3...

20 Apr 2025 at 17:0...

Public Read + Write

staff engineer

500011

rohan

rohan@gmail.com

back4app

What do you want to build today?

My Apps Docs

CPAD_Assignment

Database

_User

3 objects

Row

Overview

Database

Browser

Add Class

_Role

_Session

_User

Employee

class_1

objectId String

emailVerifi_ Boolean

ACL ACL

updatedAt Date

authData Object*

username String*

createdAt Date

password String*

email String

uPiECgwGP5

(undefined)

uPiECgwGP5

27 Apr 2025 at 12:1...

(undefined)

testg@gmail.com

27 Apr 2025 at 12:1...

(hidden)

testg@gmail.com

9awb6NpybP

(undefined)

9awb6NpybP

27 Apr 2025 at 12:1...

(undefined)

testuser@gmail.com

27 Apr 2025 at 12:1...

(hidden)

testuser@gmail.com

Caza08JxDv

(undefined)

Caza08JxDv

20 Apr 2025 at 14:5...

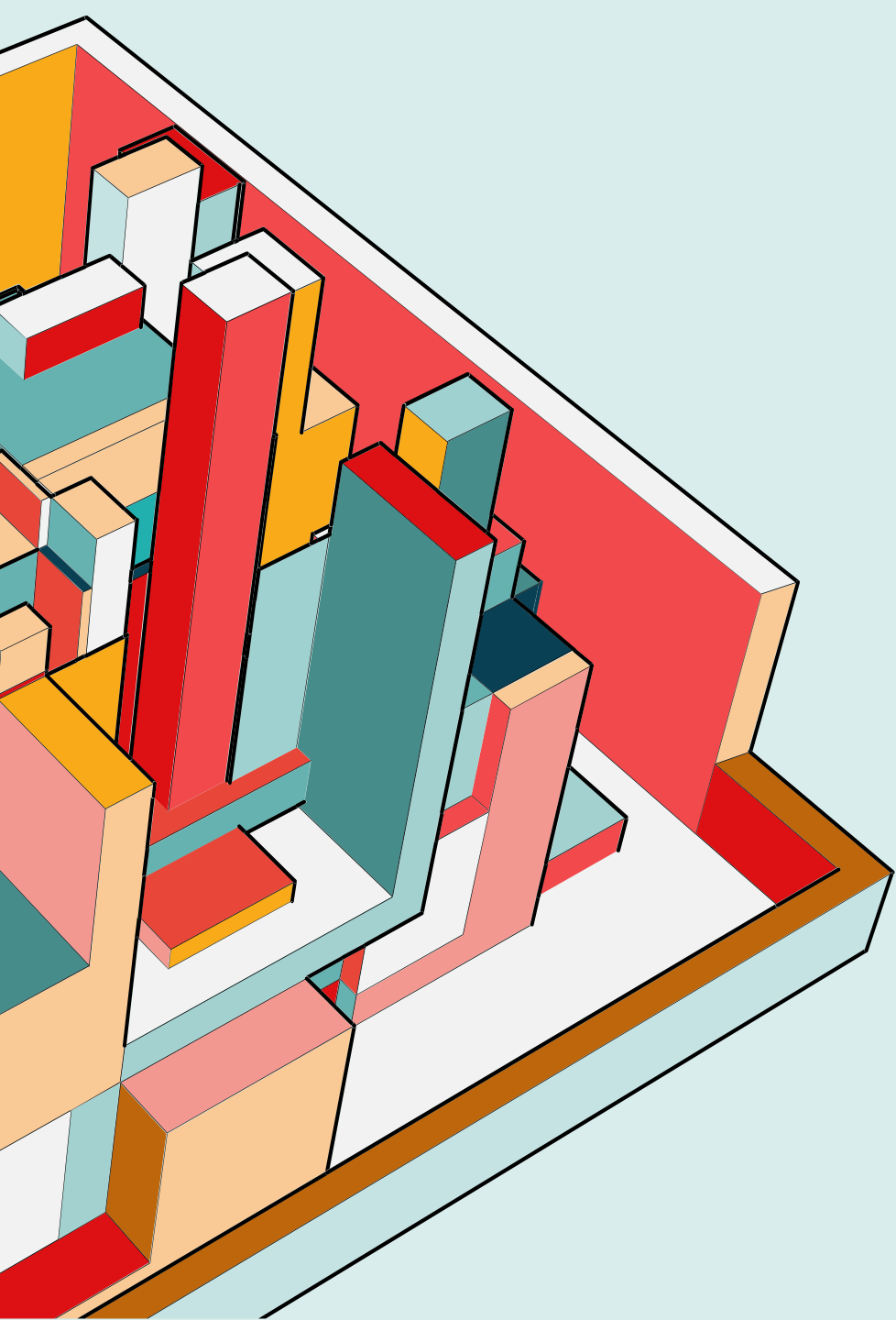
(undefined)

vishal.sh11@hotmail...

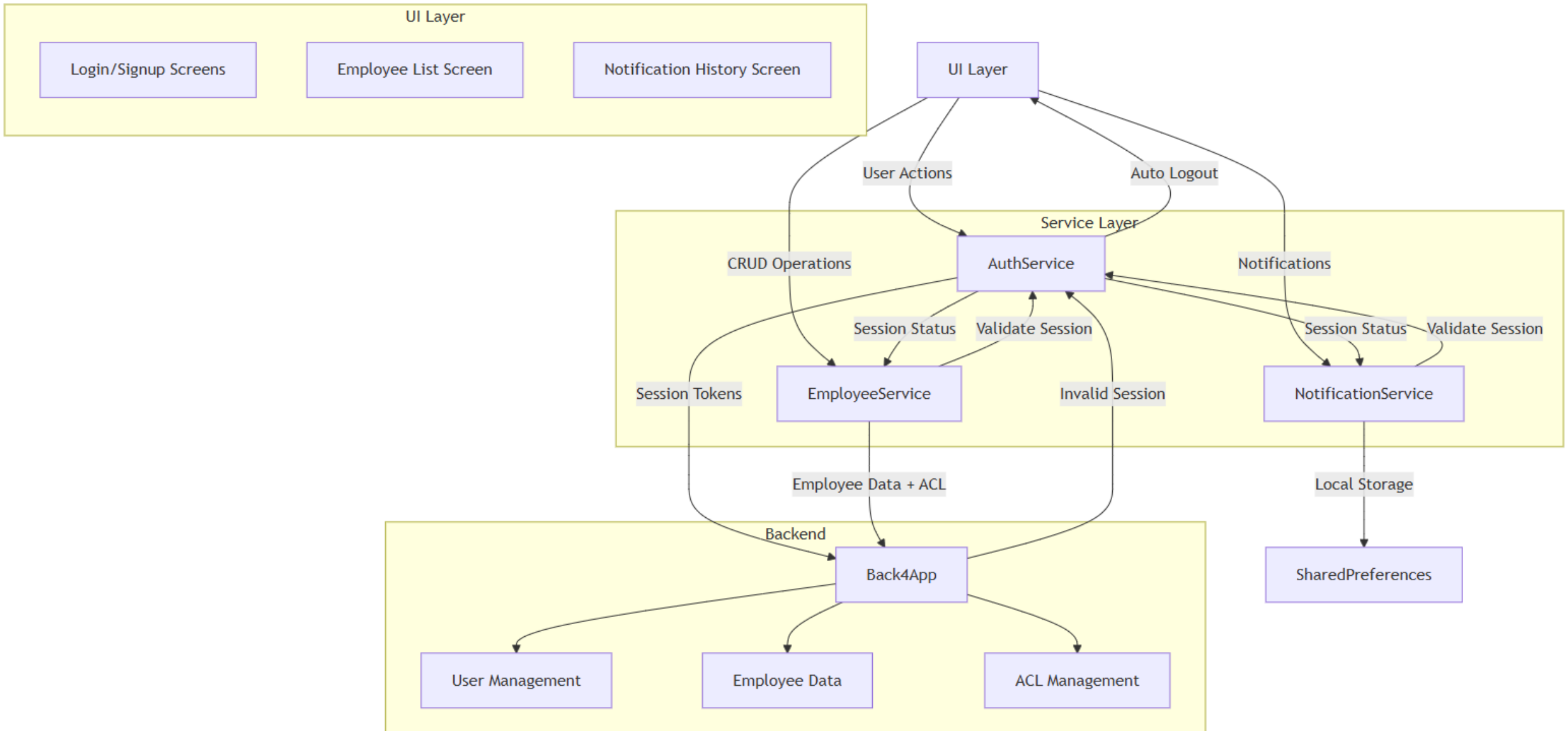
20 Apr 2025 at 14:5...

(hidden)

vishal.sh11@hotmail...



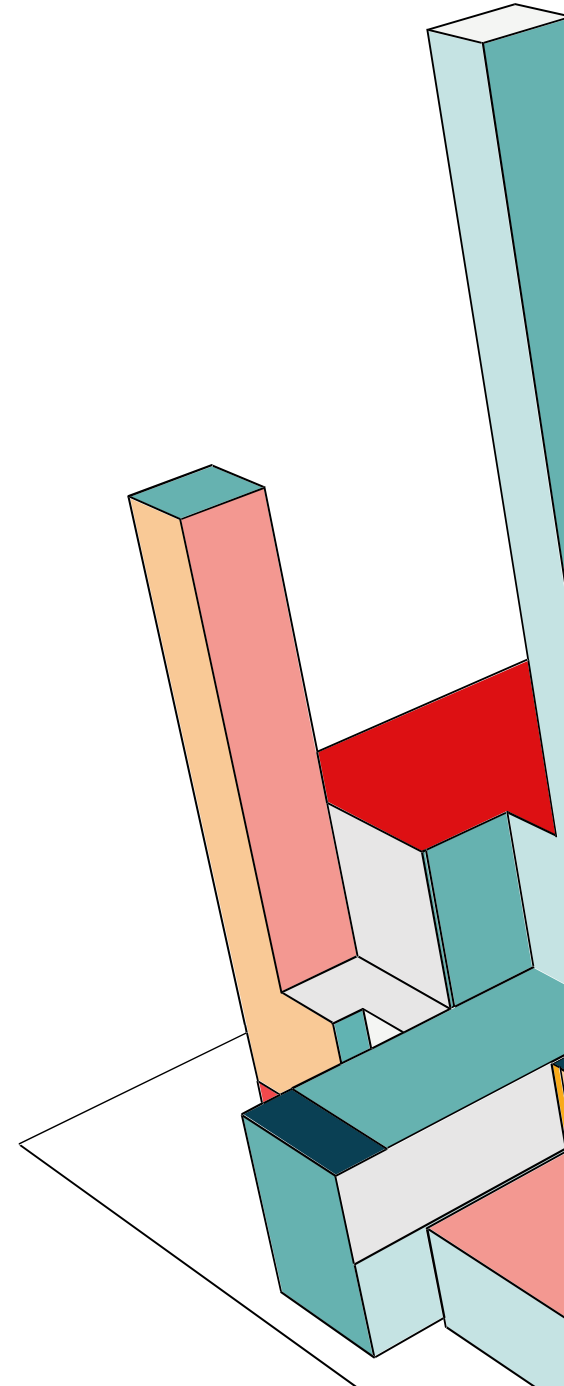
ARCHITECTURE



LEARNING OUTCOMES



- Gained experience with Flutter's widget tree and state management.
- Learned to integrate backend services with Parse Server.
- Improved skills in designing responsive and adaptive UI.
- Leant low-code development with back4app framework



THANK YOU

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