Cross Platform Application Development

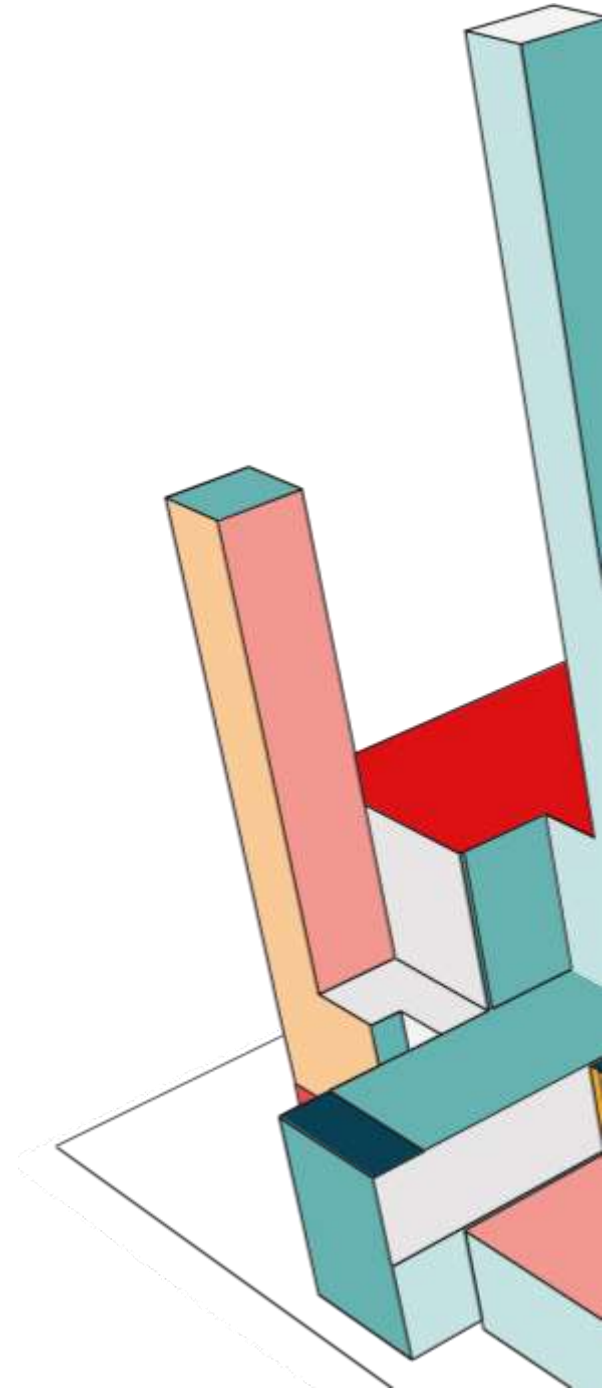E-mail : 2023tm93756@wilp.bits-Pilani.ac.in
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PROJECT OVERVIEW

- **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/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/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.
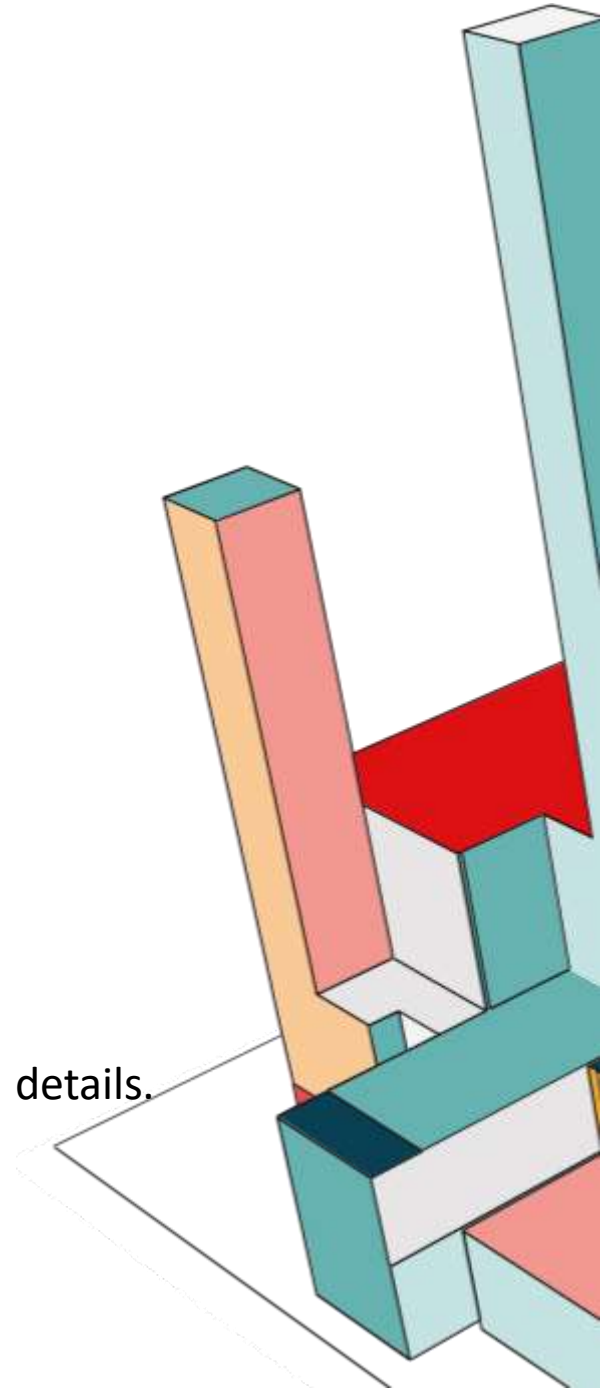
IMPLEMENTATION PERSPECTIVE & SECURITY CONSIDERATIONS

Key Features

- **Authentication**: Login, signup, and session management.

- **Task Management**: Full CRUD functionality with validation.

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.

Task and Notes Management

- **CRUD Operations**: Task and notes can be added, edited, deleted, and listed using Back4App's Employee class.

- **Validation**: Form validation for required fields.
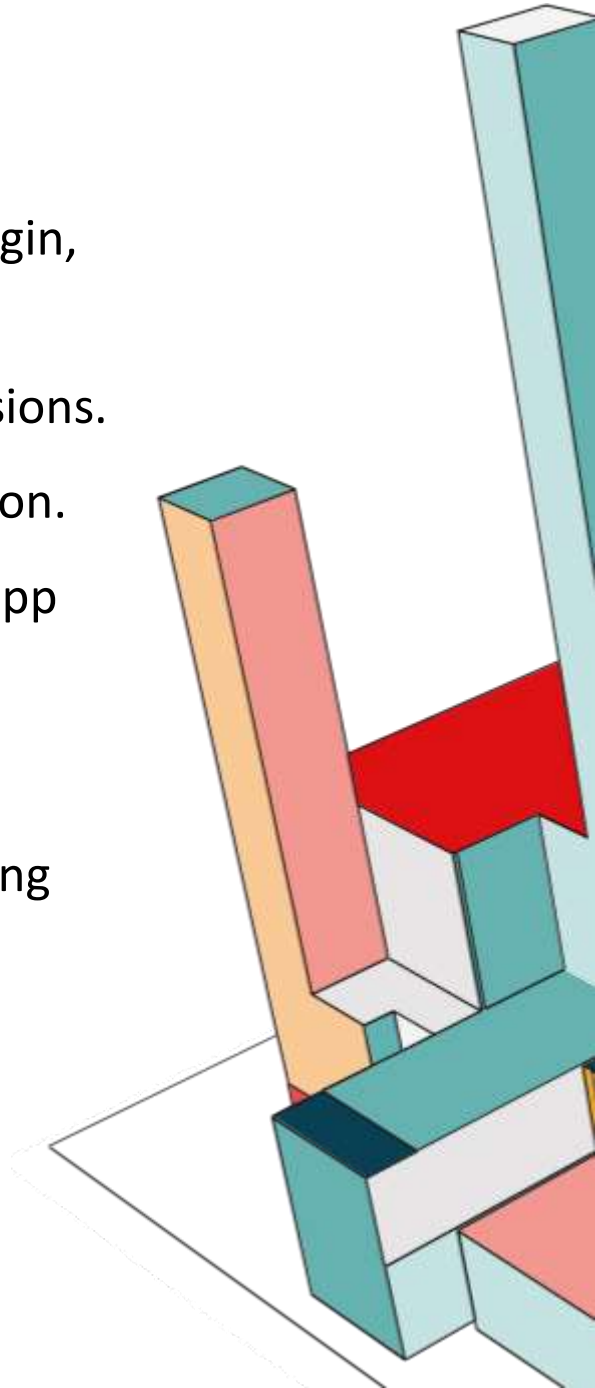
Back4App Models

1. **User Model**: Manages authentication with fields like username, password, and email.

2. **Task Model**: Stores employee details (title, description, isdone) for CRUD operations.

3. **Note Model**: Stores Notes details(title, content, category) for CRUD operations.
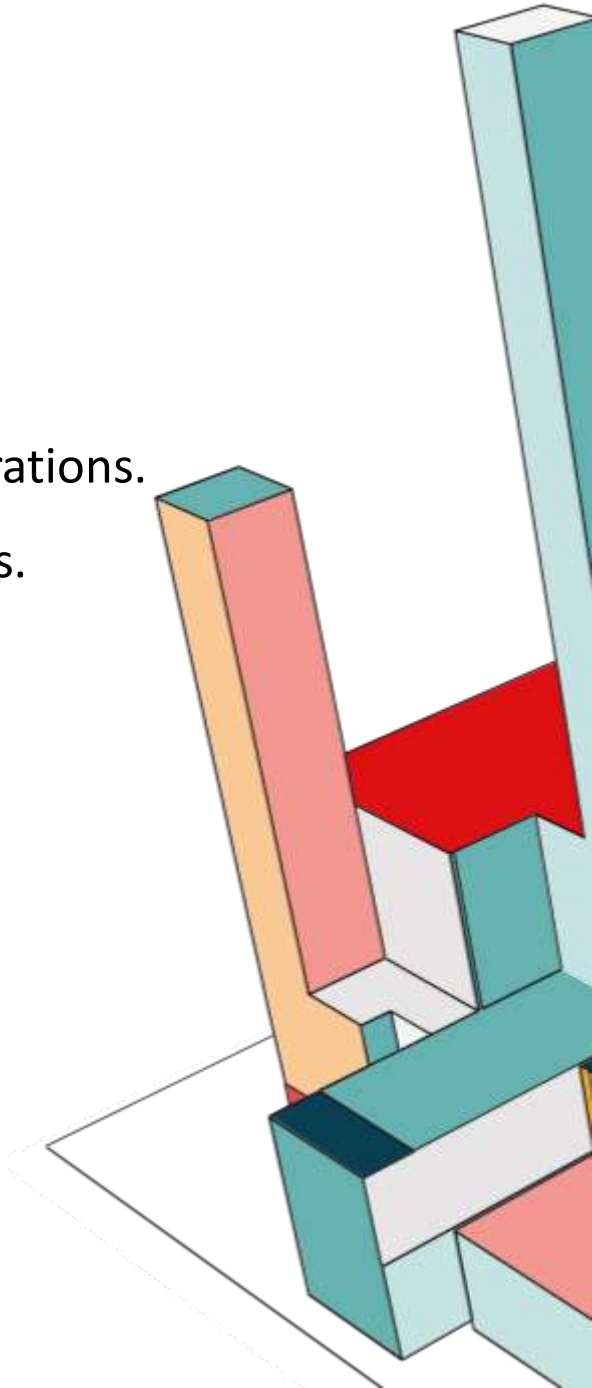
TECHNOLOGY STACK

Technology Stack

Frontend

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

  o **Dart**: The programming language used for Flutter development.

Backend

- **Back4App**: A backend-as-a-service (BaaS) platform built on Parse Server.

  o **Parse SDK**: Used for handling authentication, session management, and CRUD operations.

  o **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.
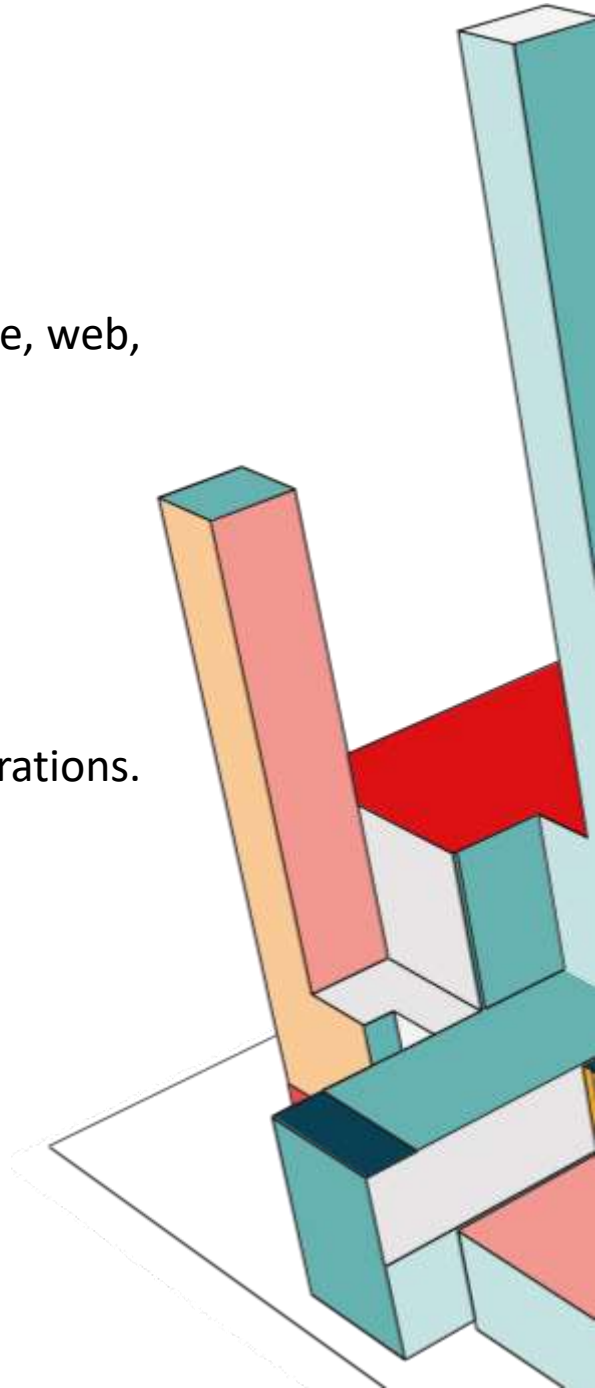
State Management

> **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.
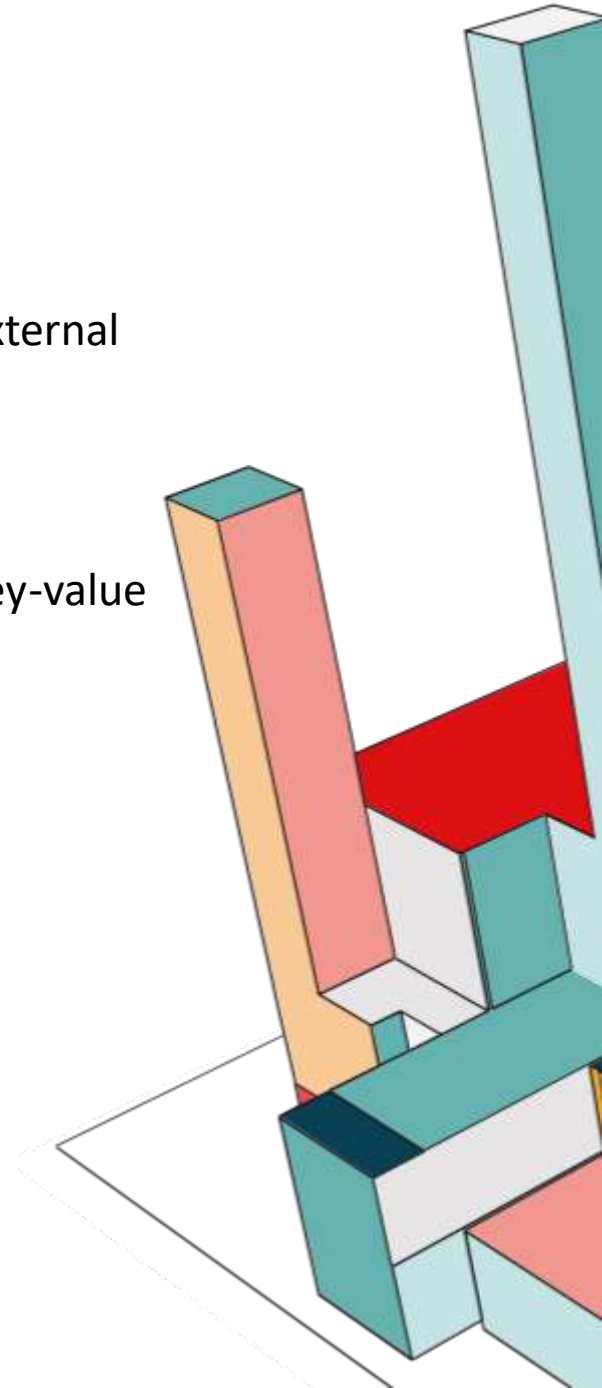
Development Tools

- **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.
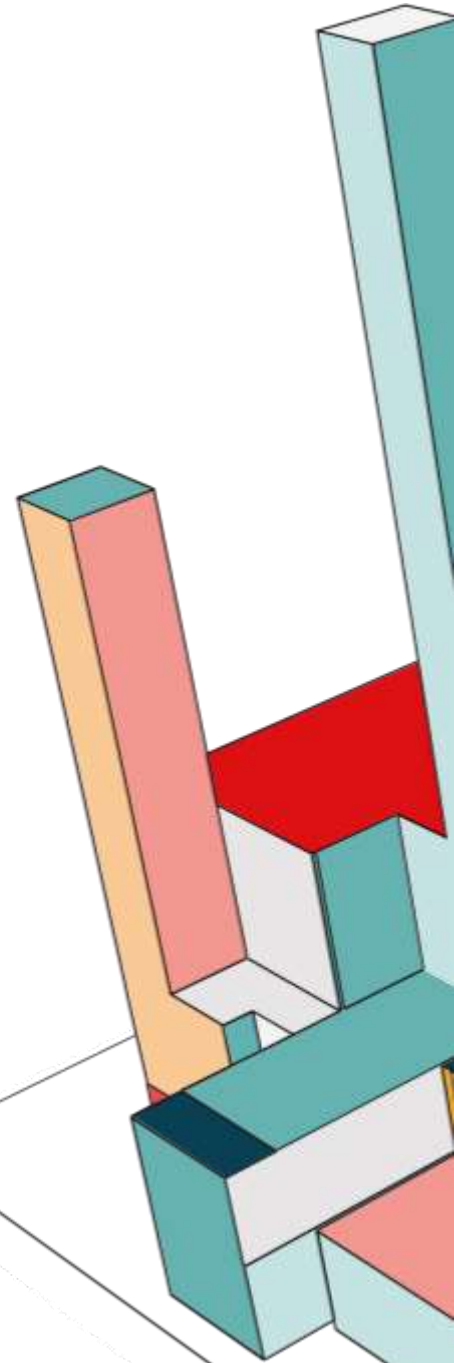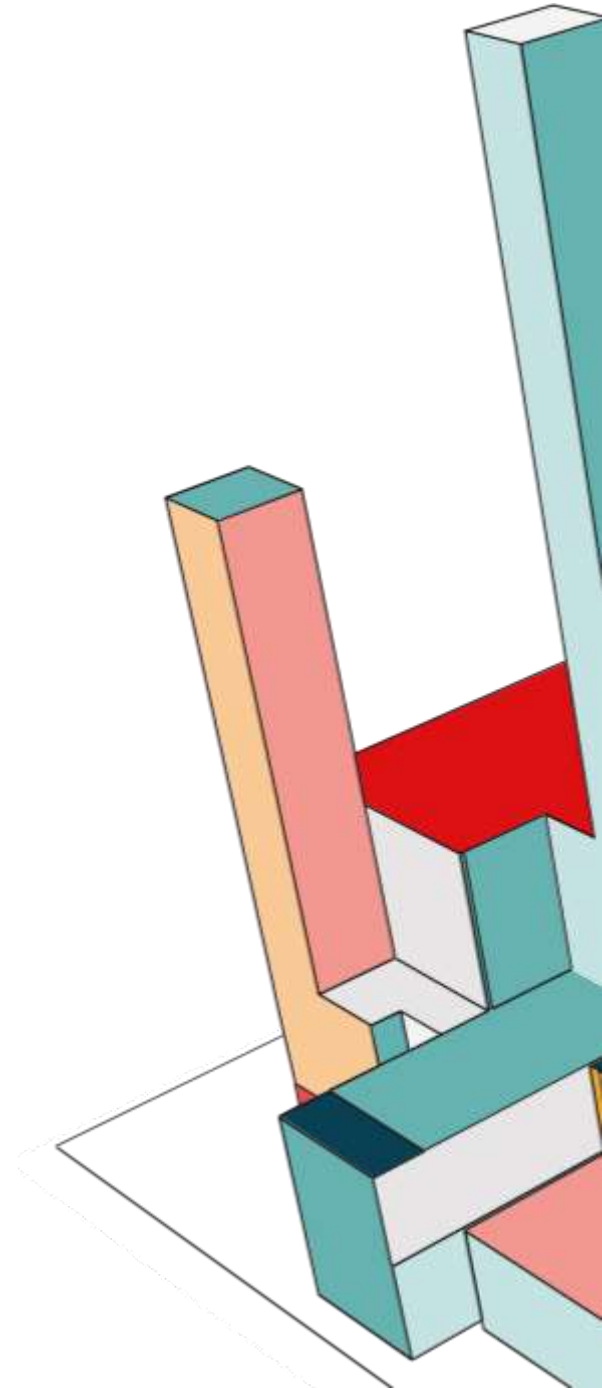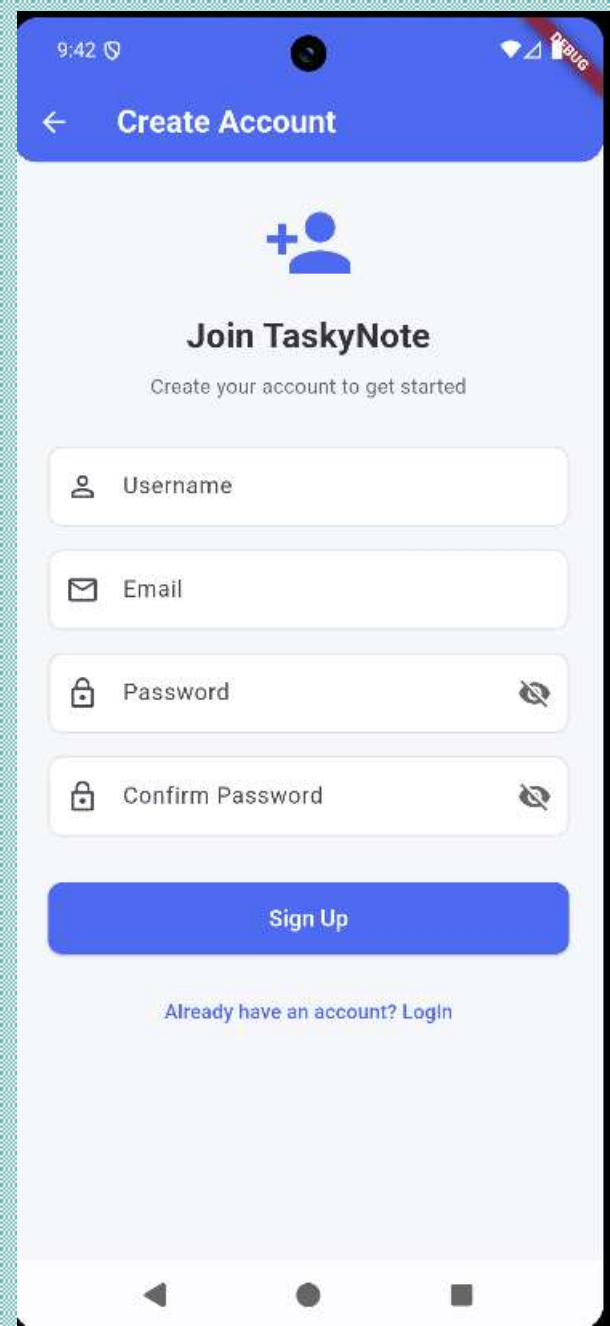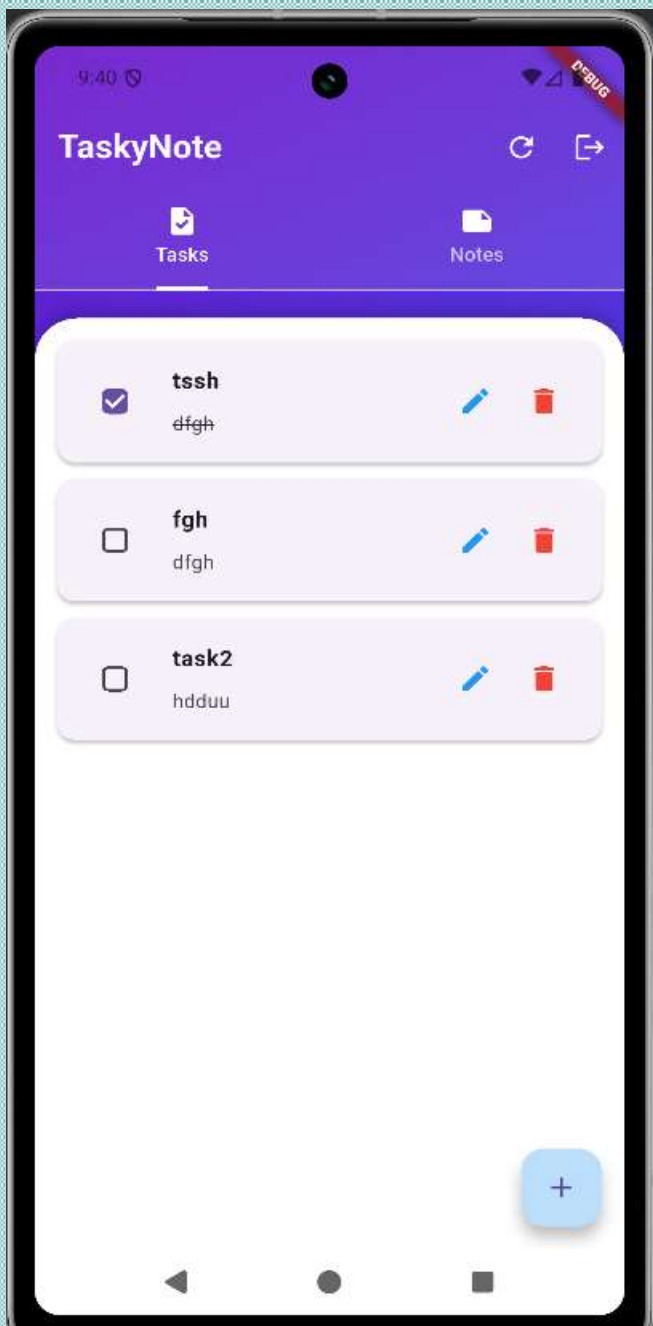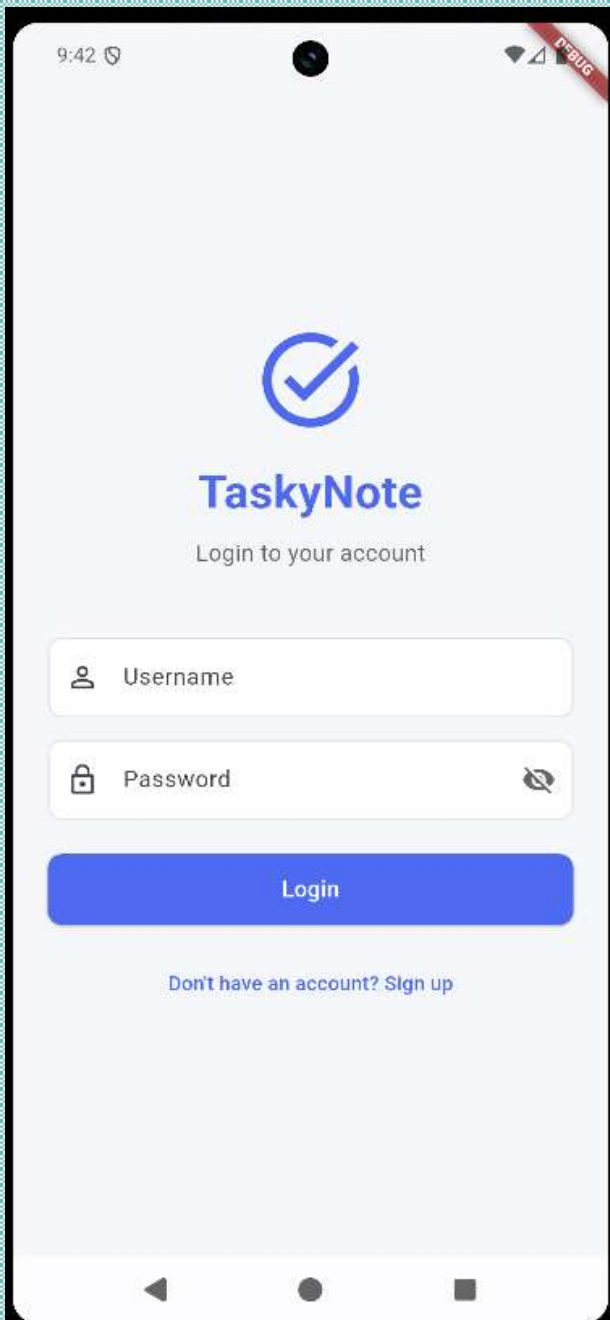
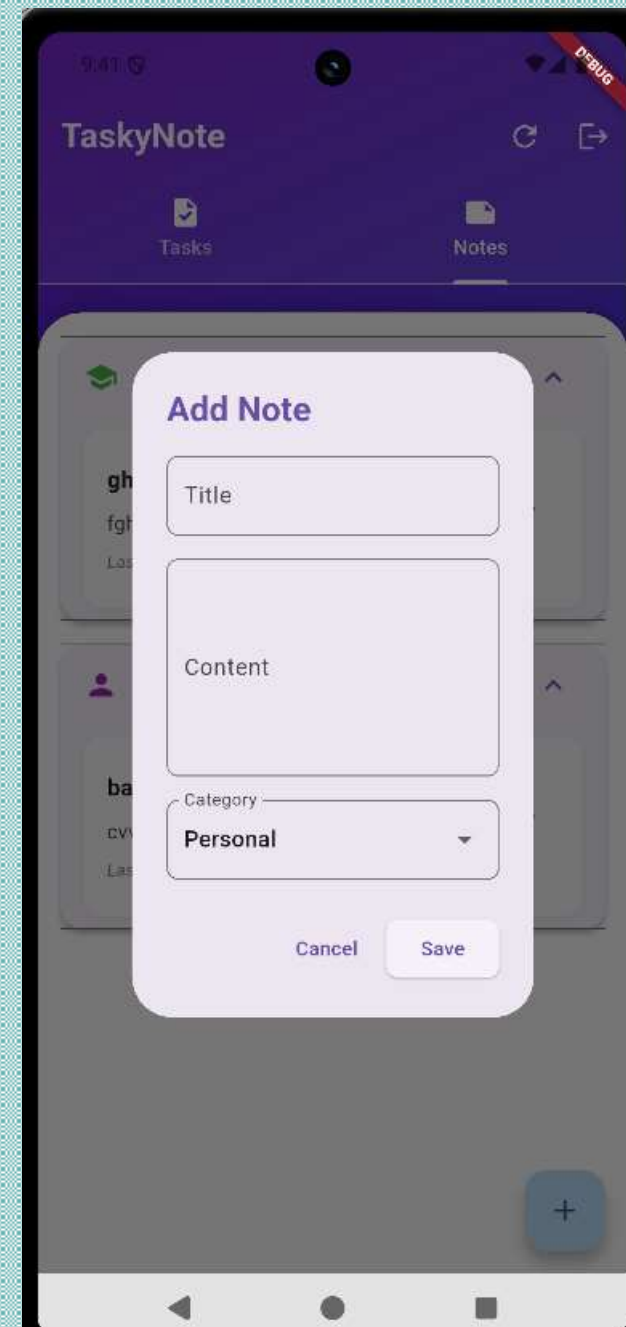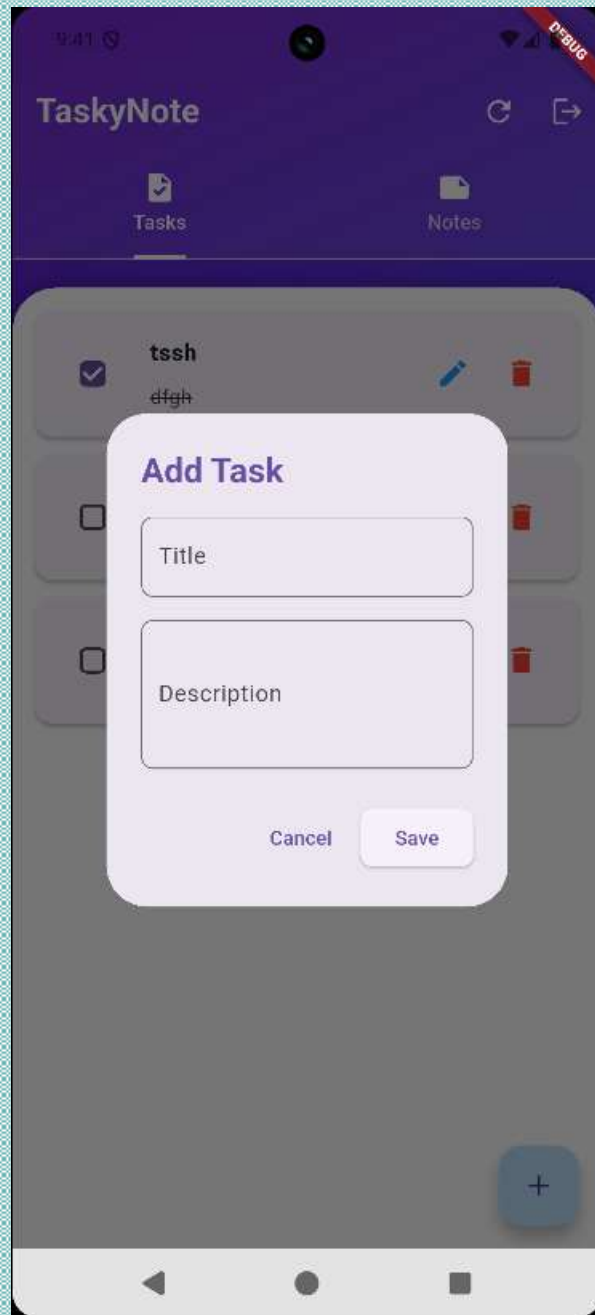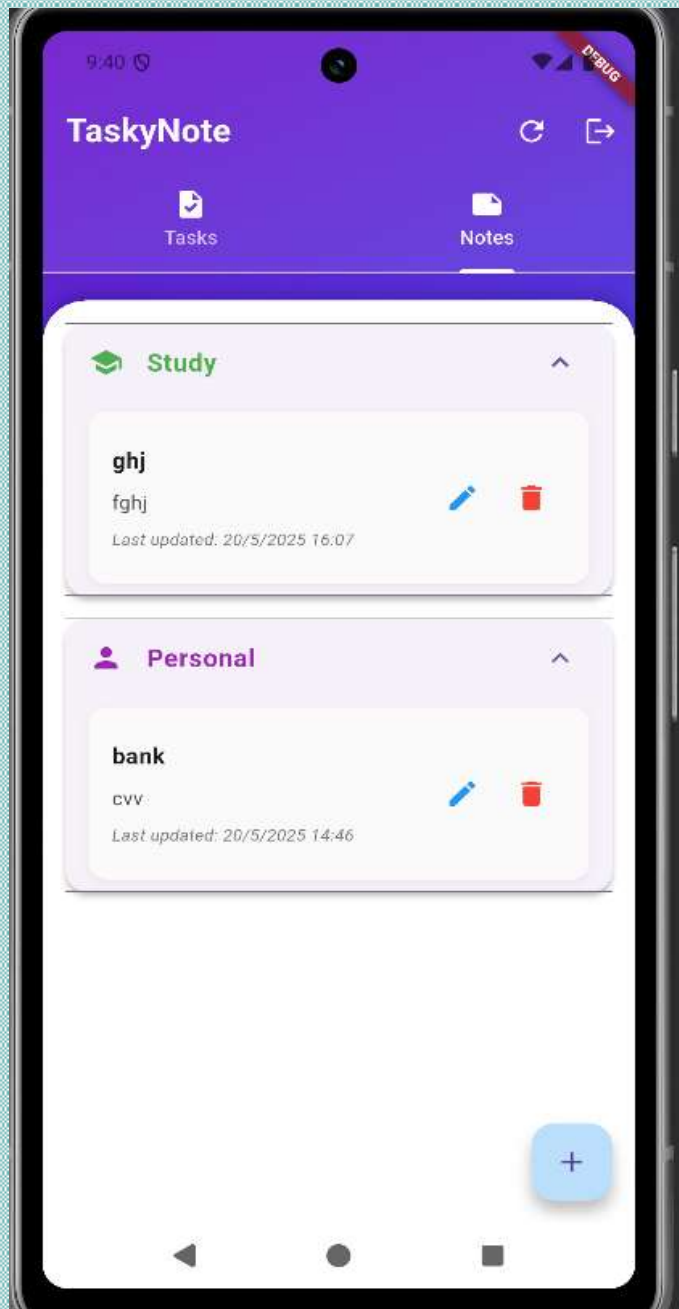# CHALLENGES ENCOUNTERED

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

Database 🔒 **_User**
Browser   2 objects

⊕ Row   ⊕ Column   🗑   ⟳ ▽ 👁 ⋮

First_App   ⌄ ◁▯

	objectId string	emailVerifi... Boolean	ACL ACL	updatedAt Date	authData Object*	username String*	createdAt Date	password String*	email String	Add a new column
☐	kNBNgqEnKC	(undefined)	kNBNgqEnKC	18 May 2025 at 16:2...	(undefined)	user2	18 May 2025 at 16:2...	(hidden)	user2@gmail.com	
☐	wXXP2S5e2F	(undefined)	wXXP2S5e2F	17 May 2025 at 16:5...	(undefined)	user1	17 May 2025 at 16:5...	(hidden)	user1@gmail.com	

□ Overview

▤ Database

Browser   ⊕ Add Class
  _Role   0
  _Session   1
  _User   2
  B4aVehicle   1
  Note   1
  Task   1

Index Manager

☁ Cloud Code

⋈ API

Database 🔒 **Note**
Browser   2 objects

⊕ Row   ⊕ Column   🗑   ⟳ ▽ 👁 ⋮

First_App   ⌄ ◁▯

	objectId string	createdAt Date	updatedAt Date	ACL ACL	title string	content string	category String	user Pointer <_User>	Add a new column
☐	T7senhDrql	20 May 2025 at 16:0...	20 May 2025 at 16:0...	Public Read + Write	ghj	fghj	Study	wXXP2S5e2F ↗	
☐	pdxuGq9DFm	20 May 2025 at 14:4...	20 May 2025 at 14:4...	Public Read + Write	bank	cvv	Personal	wXXP2S5e2F ↗	

□ Overview

▤ Database

Browser   ⊕ Add Class
  _Role   0
  _Session   1
  _User   2
  B4aVehicle   1
  Note   2
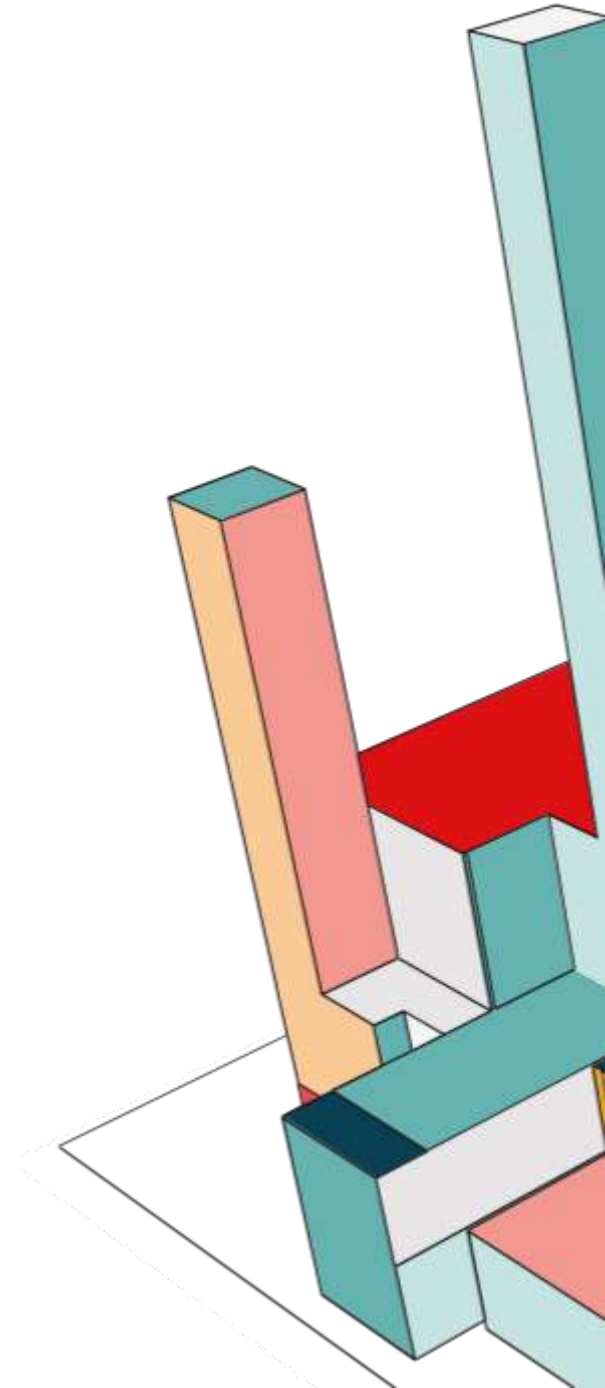 Task   3

Index Manager

☁ Cloud Code

⋈ API

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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