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Flagway App for the Algebra & Young People's Project

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Problem

The goal of the Flagway Game is to create environments where very young students can practice and celebrate learning math. There are many different ways to create a cultural context in which mathematics emerges naturally from students' experience. One method used by the YPP and the Algebra Project is to create mathematically rich games and experiences. The Flagway Game was developed by Bob Moses in 1995 and patented in 1996.

- Players navigate a Flagway or course of radial "paths".
- Can be played without knowing underlying mathematical principles.
- We are assigned to develop a Flagway Android Game

Current System

Status

Currently Flagway is played in physical track. In this game, Speed counts, so as students develop into skilled players several may be running through the course simultaneously, creating dynamics similar to that of a sporting event. But there is no computer or mobile application for this game. So this is version 1.0.

My Core Contributions

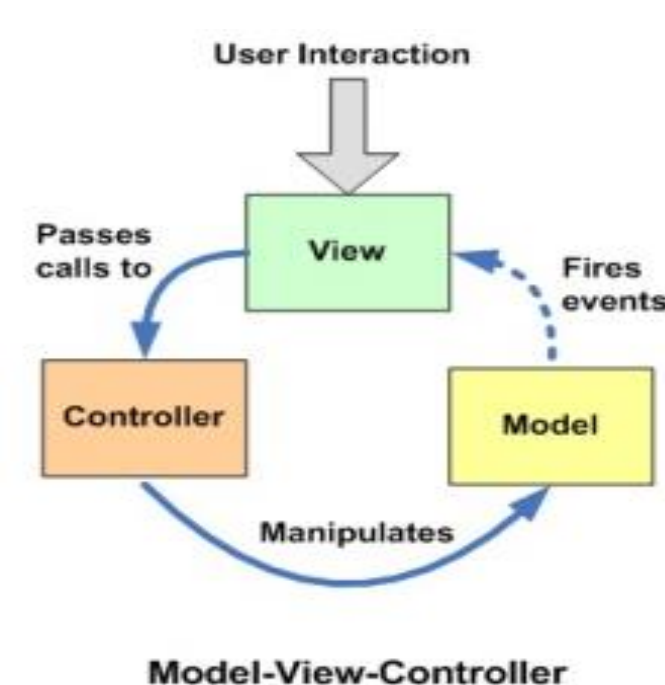
- New User Registration
- Login/Logout System
- Gameplay Settings Development & Design
- Handle Bags of Words and Phrases
- Mathematical Rules Validation
- Feedback to Users

Requirements

Functional/Non-functional Requirements

- A smartphone application
- Simple and child friendly UI
- Individual user profile
- Must have two modes
- Different levels and ranges
- Only symbol & color on the screen
- Strictly simulate the Flagway rules
- All the input should be accepted
- Player must get feedback at each step
- Feedback must be given in several steps
- Underlying mathematical principles must be kept implicit

System Design



Models:

- Region where the player can tap
- Area to select color of a number
- Algebraic rule input box

Views:

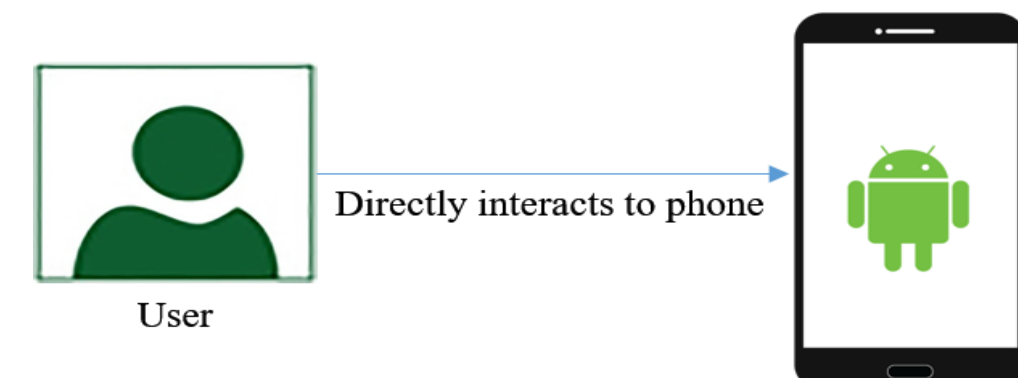
- Render objects into the screen
- Get feedback after input
- Notification about state changes

Controllers:

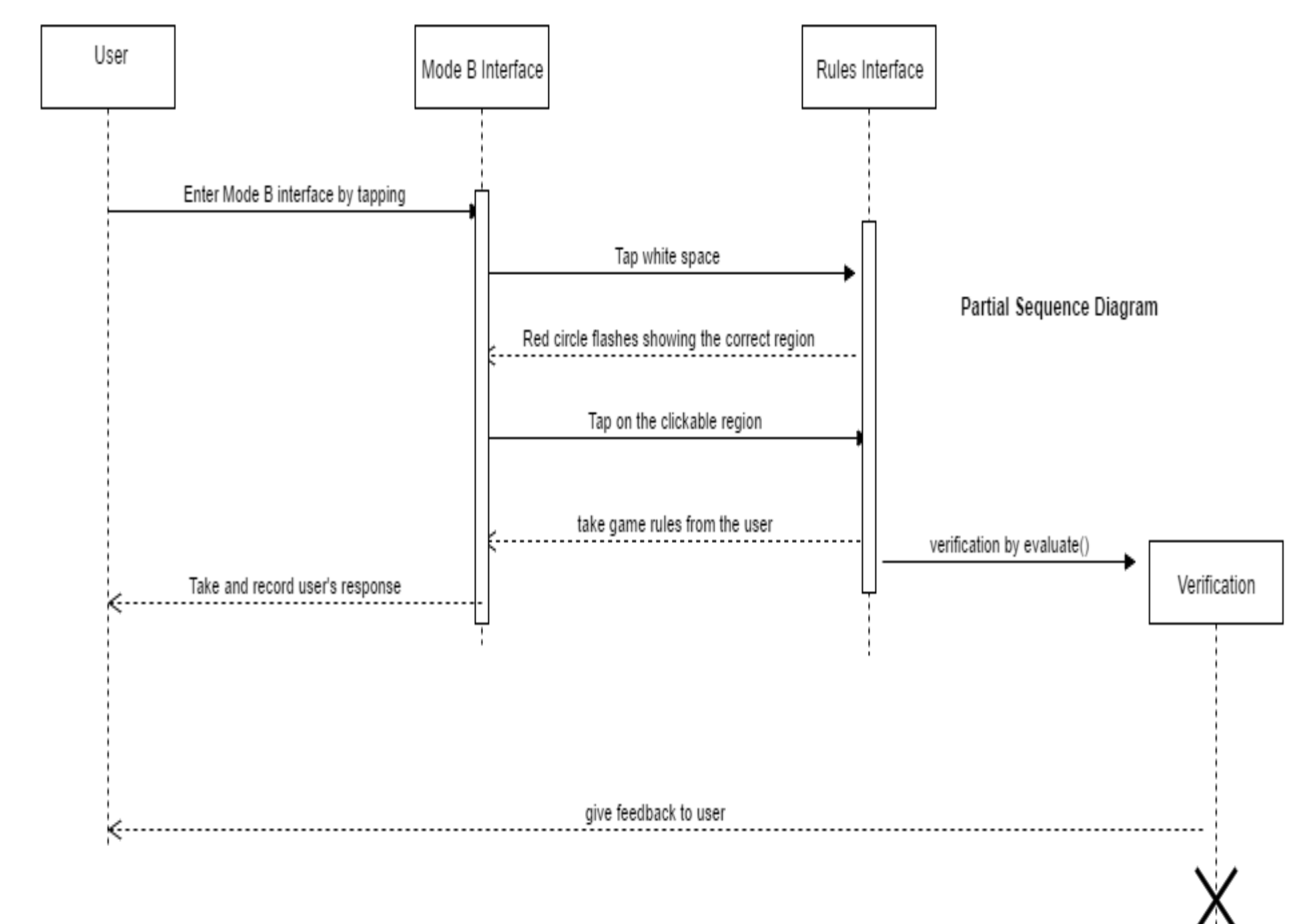
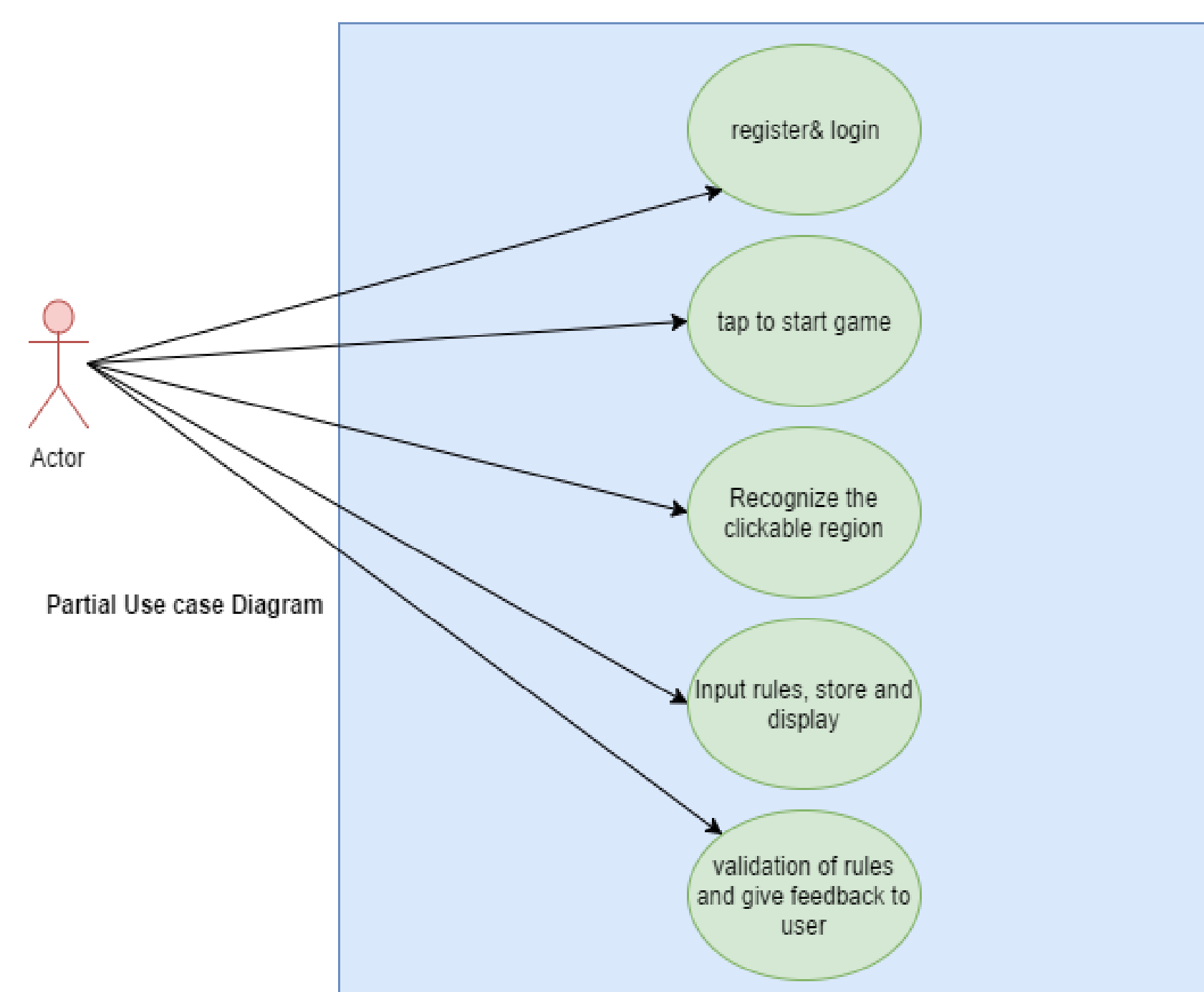
- Player's input handler
- Controller to process input
- Controller to perform actions

Design Patterns:

- View and view group: Composite
- View holder: Singleton
- Intent: Factory



Object Design



Verification

Test Case 1 (login)

Purpose

Ensure that the user is able to sign in with their correct credentials

Precondition

The app is running at its initial page

Input

The user credentials and user presses login button

Expected Result

If the credentials are a match, the user will have access to game. If the credentials are incorrect, the user will be prompted to re-input their credentials

Actual Result

When the credentials were a match, the user gained access to game. When the credentials were incorrect, the user prompted to re-input their credentials.

Test Case 2 (Rule Verification)

Purpose

To ensure that the rules entered by the user are correct and reflect the different patterns of numbers.

Precondition

The user is in Mode B of the game. The user clicks the rule-input circle

Input

The user inputs the rules, and submits them.

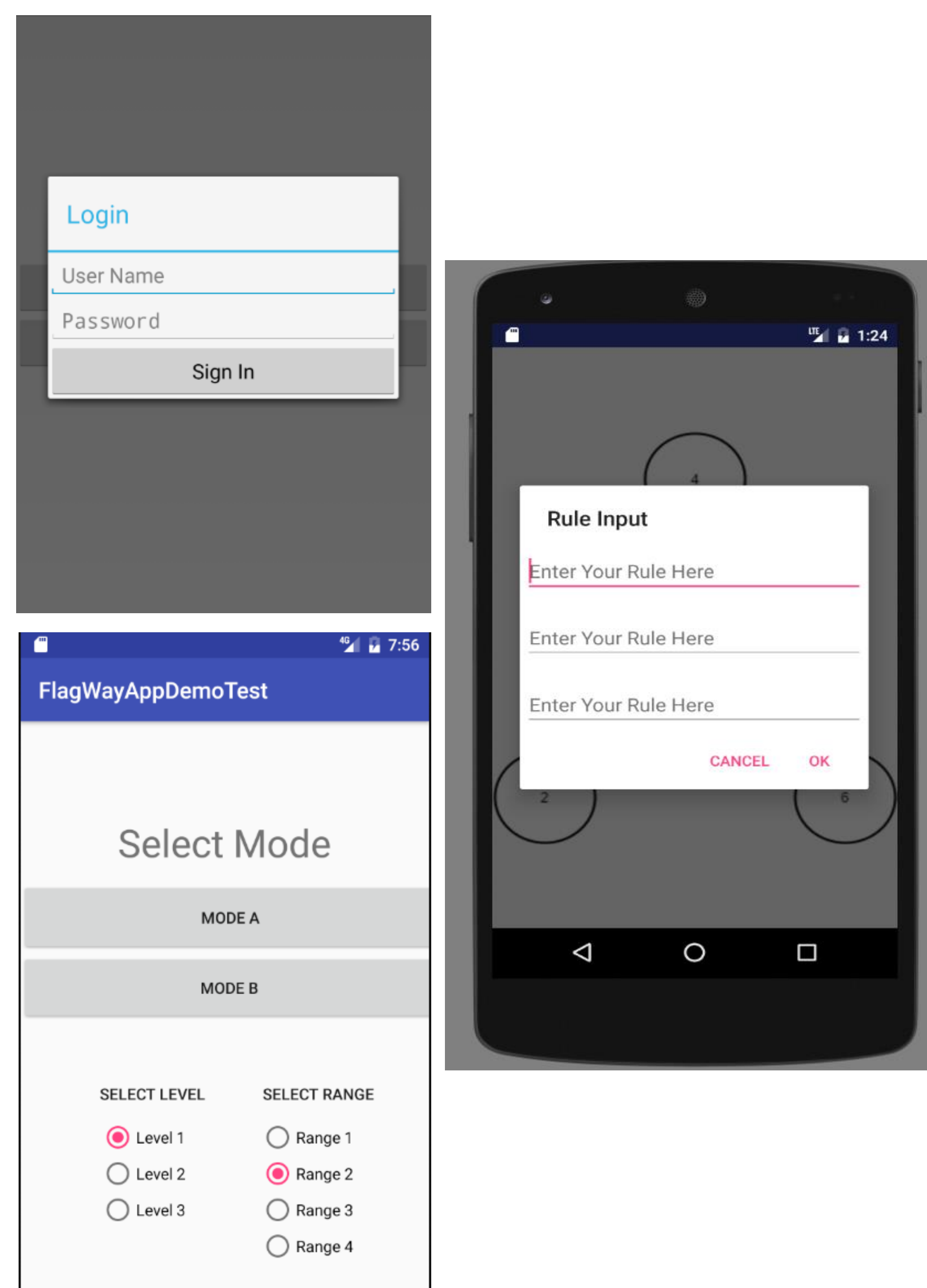
Expected Result

If the individual rules contain the certain keywords, the game will accept the rules and inform the user that they are correct. If they don't contain the correct keywords, the game discard the rules and prompts the user to re-try.

Actual result

When the individual rules contain the certain keywords, the game accepted the rules and inform the user that they are correct. When they don't contain the correct keywords, the game discarded the rules and prompts the user to re-try.

Screenshots



Implementation



App Platform



Coded in
JAVA



User Database
utilizes SQLite

Summary

The Flagway game app is now in its first version. The core gameplay and its supporting components have been completed for the first level of the game.

Future Work

The game will need to be extended to the second and third levels (using the same gameplay as the first level). The game UI will also need to be redesigned to be more user friendly and intuitive.

Acknowledgement

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