

COSC2659 - iOS Development

Assignment 2

Documentation

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Application Introduction

My game application is called MrFlipper. It is a flipping card game. The motivation of this app is just simply because I sometimes play this kind of memory game with my family and I quite enjoy it. It is not just simply a game but it can be considered as a memory training app. Again, I am very bad at memorizing hence I find this game useful and fit my demand.

How to play

The rules of this game is as follows:

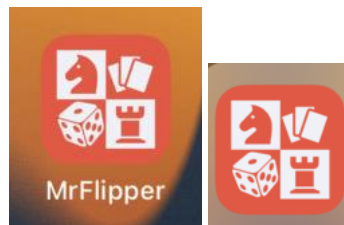
- You need to match 10 pairs of cards to win.
- There are 3 mode: easy, medium, hard
- A matched pair of cards will bonus you:
 - 10 points (easy mode) (aka. at this mode, you can only achieve maximum $10 \times 10 = 100$ points)
 - 20 points (medium mode) (aka. at this mode, you achieve up to $20 \times 10 = 200$ points)
 - 30 points (hard mode) (aka. at this mode, you achieve up to $30 \times 10 = 300$ points)
- An unmatched pair of cards will deduct you:
 - 3 points (easy mode) → only deduct 30% of bonus points (3 pnts deduct/10 pnts bonus)
 - 10 points (medium mode) → deduct up to 50% of bonus points (10 pnts deduct/20 pnts bonus)
 - 20 points (hard mode) → deduct up to 66.67% of bonus points (20 pnts/30 pnts)

- For the game to be fair, you always have 5 free moves, which an unmatched will not deduct your point, at the beginning. This is to avoid the situation where user suddenly gets a match right at first move and next move is unlikely to get a match anymore and all bonus point he/she has got is deducted.
- There is a timer. The harder the game, the less time you have:
 - 90 seconds (easy mode)
 - 60 seconds (medium mode)
 - 30 seconds (hard mode)
- To achieve badge:
 - Bronze (you need at least 50 points)
 - Silver (you need at least 100 points)
 - Gold (you need at least 200 points)
 - Diamond (you need at least 290 points)

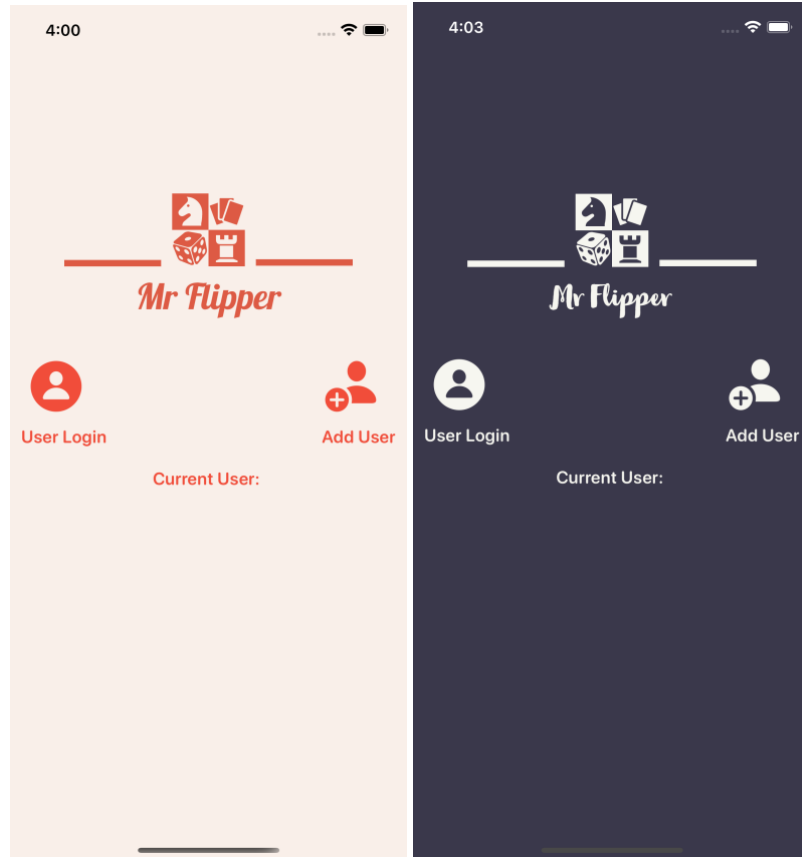
Here are the screenshots of the app

Notes: Views will be provided for both Light mode and Dark mode (light mode on the left, dark mode on the right – except for App icon)

1. App icon



2. User View (for user to login or register new user). User just needs to register username, which will do. Note, user must login in to play.
 - 2.1. When user is not login

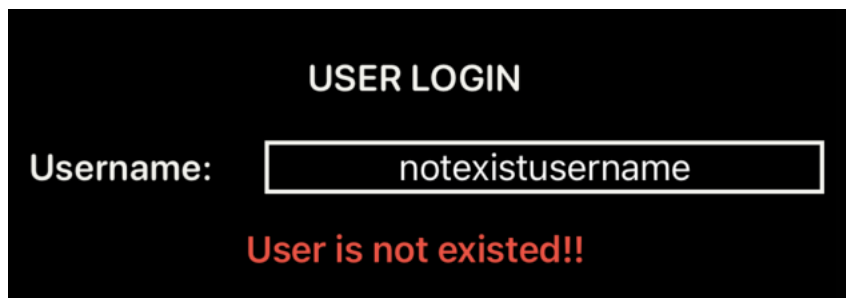


2.2. User login/registration

USER LOGIN

Username:

User is not existed!!



USER REGISTRATION

Username:

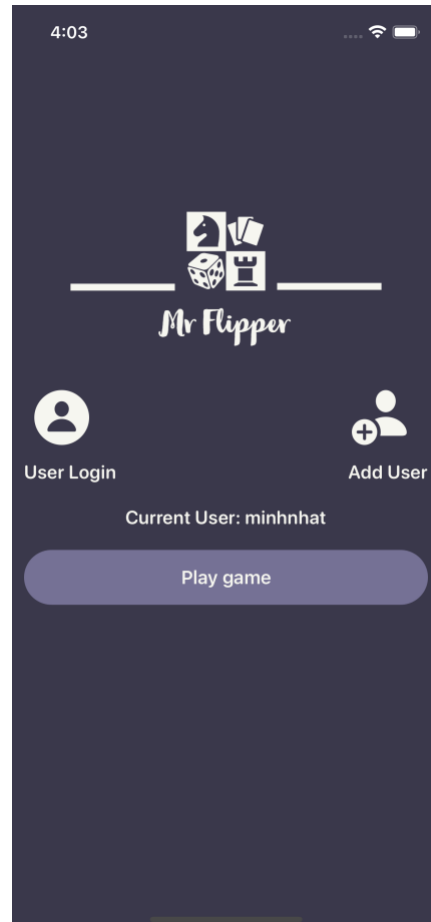
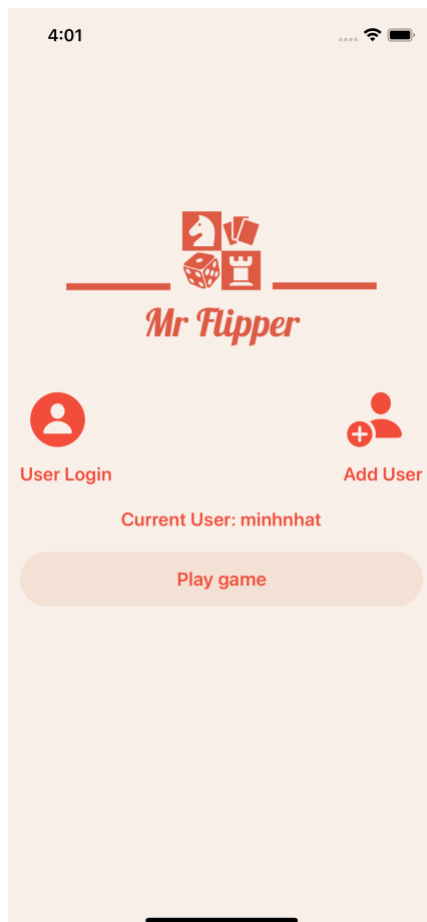
User is already existed!!

USER REGISTRATION

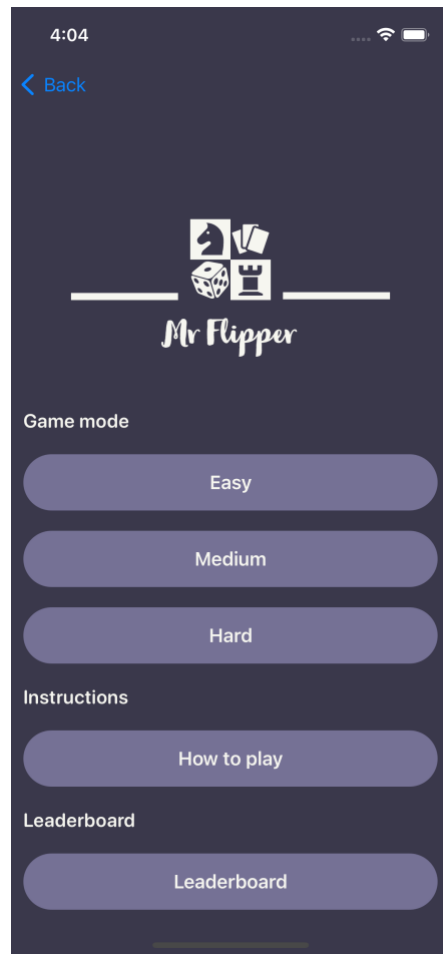
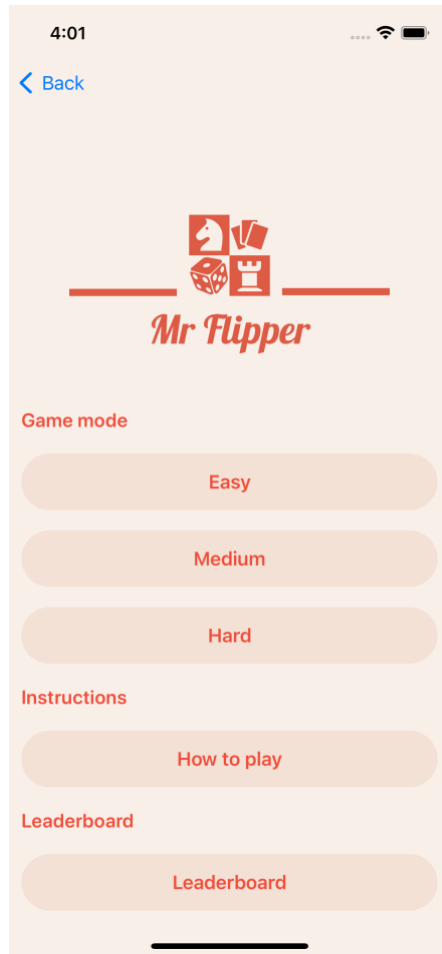
Username:

User is already existed!!

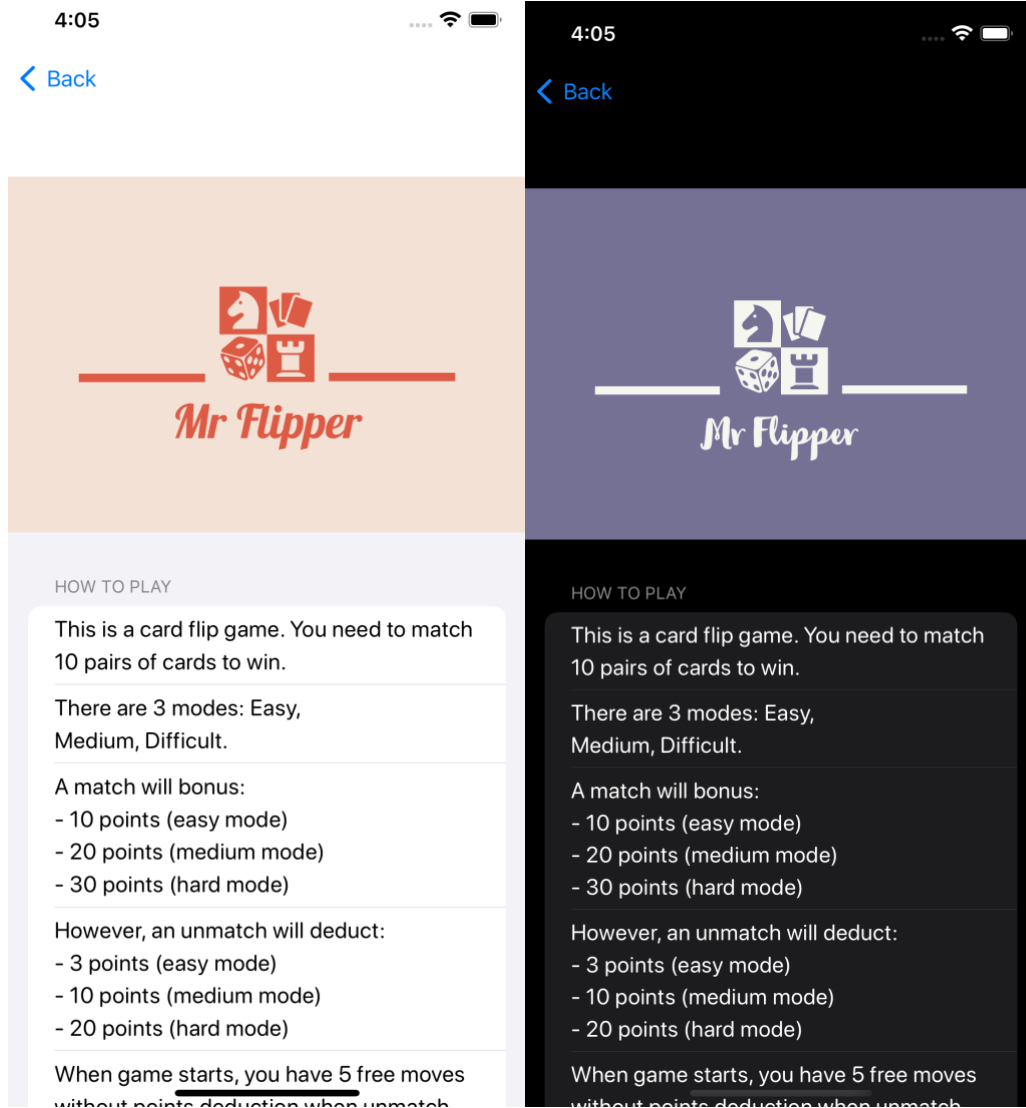
2.3. When user login successfully (as “minhnhat”)



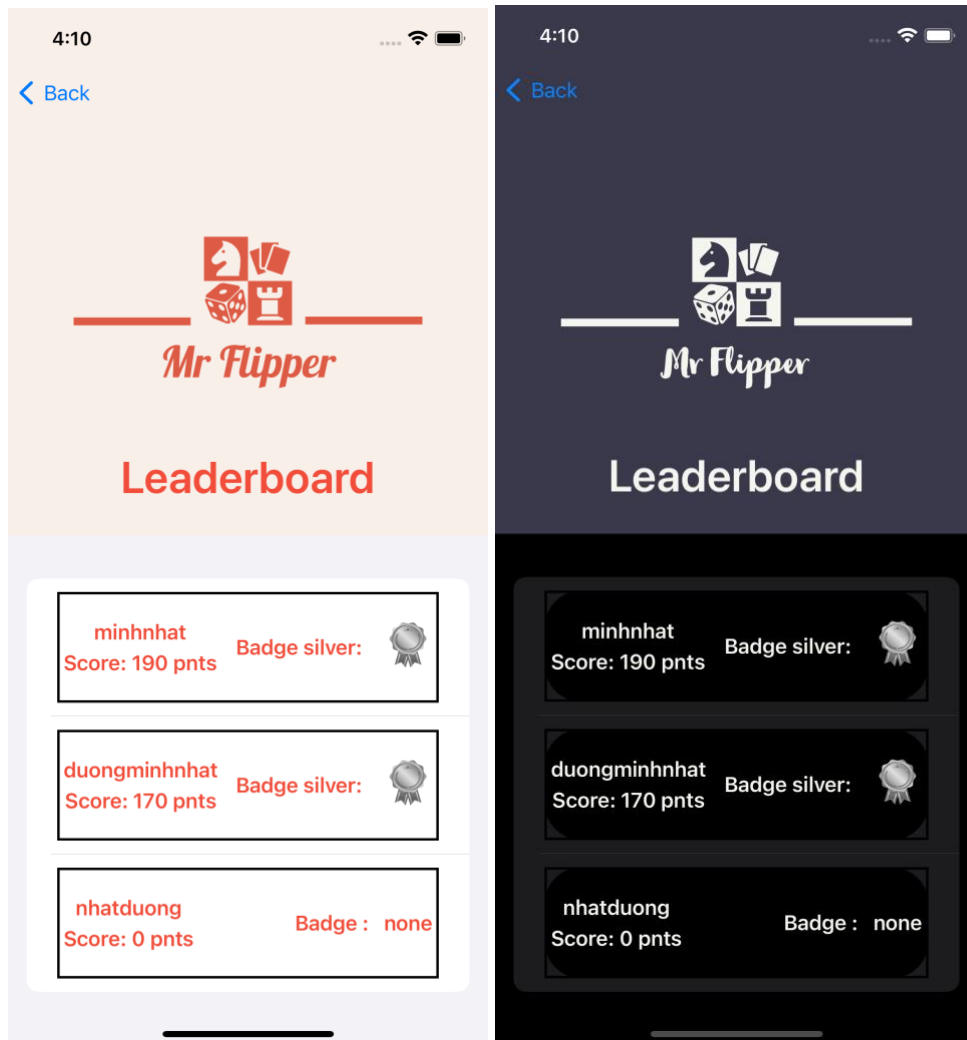
3. Menu view (this view has background music)



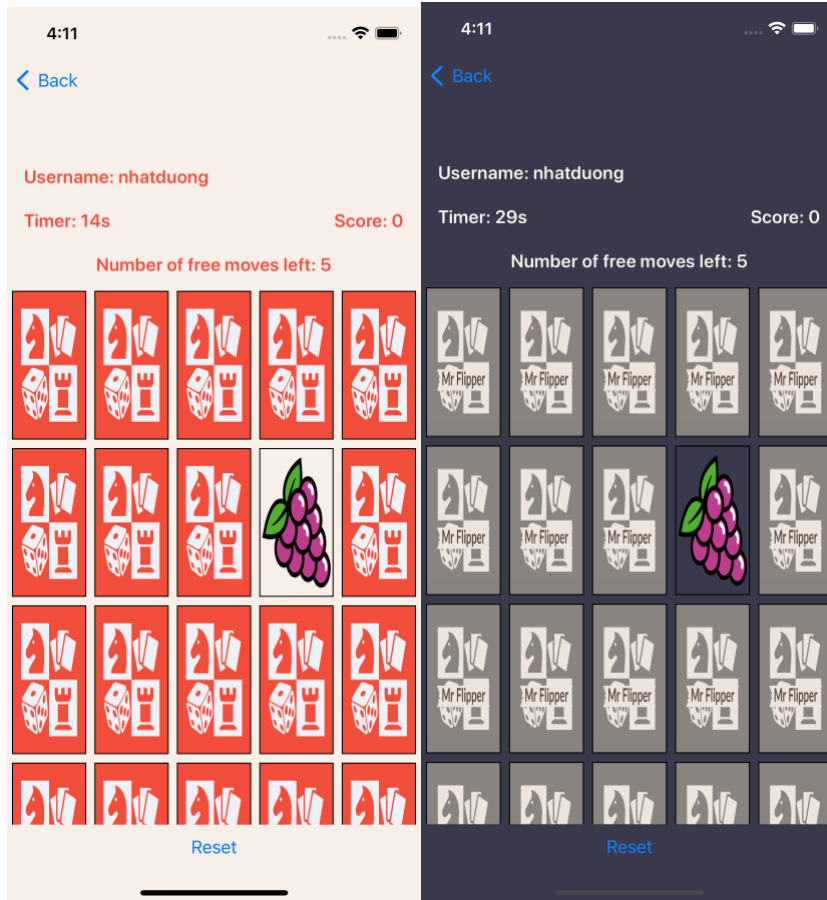
4. How to play View (this view has background music)



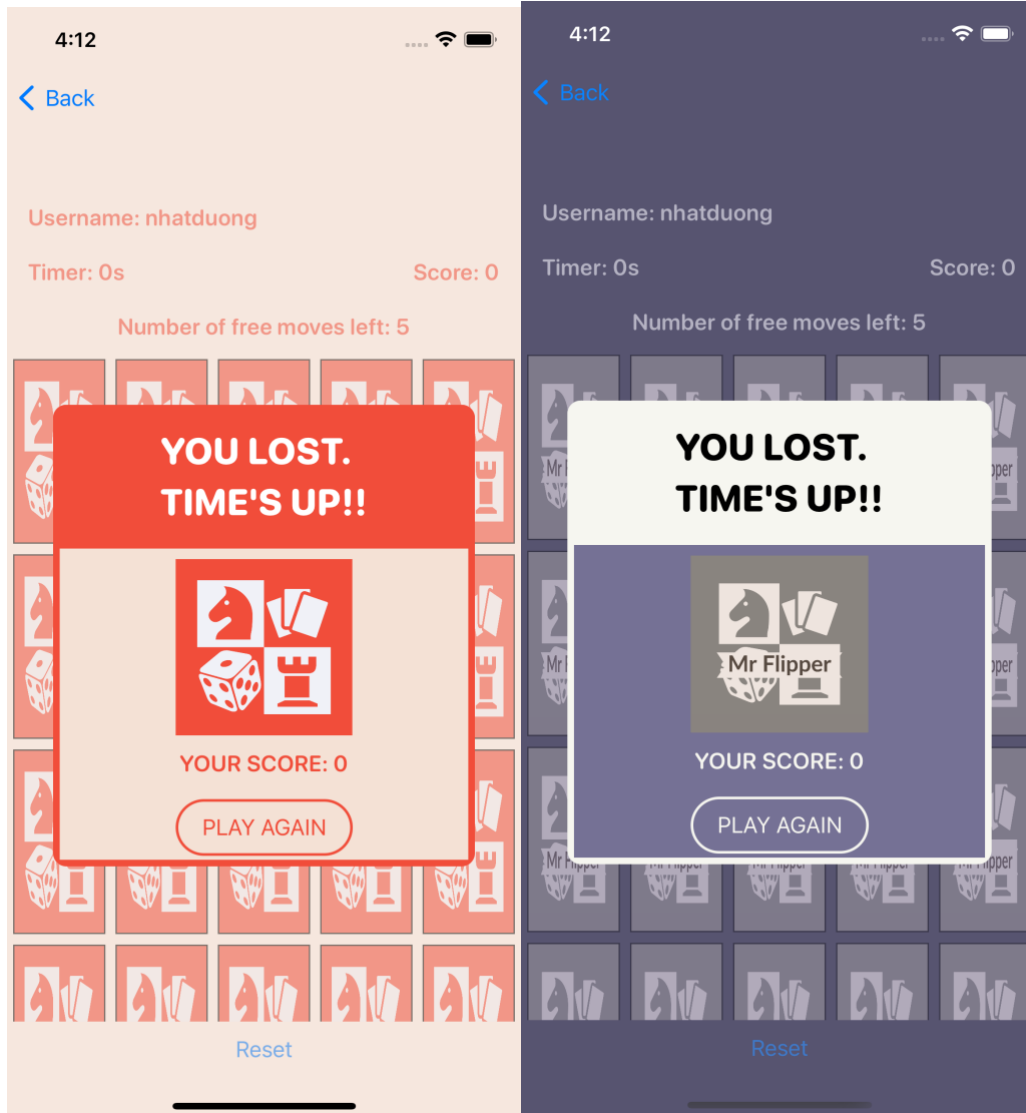
5. Leaderboard View



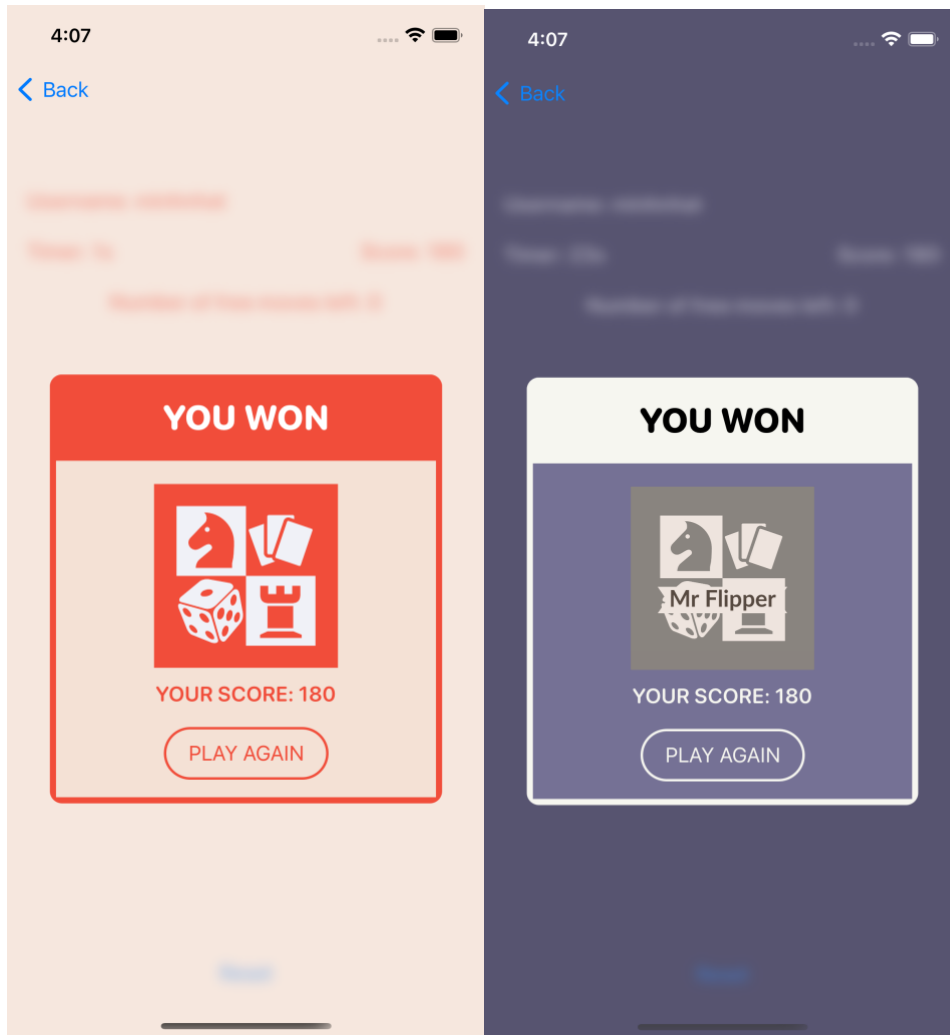
6. GameView (there is sound when flipping card, card matched, card unmatched)



7. GameView when losing (there is sound when losing)



8. GameView when winning (there is sound when losing)



Access this link to see the video demonstration of this app

<https://drive.google.com/file/d/1BzvstV7mgF57IYMftXI5LZY3uZss1n1p/view?usp=sharing>

Summary of app features

Main features:

All of main features for this assignment has been completed, including:

- The app contains all 4 views: Menu View, Leaderboard View, Game View, How to play view
- Each view satisfies all requirements.
- In Game View, animations include flipping card, fading cards when matched
- Background music exists in Menu View and How to play View
- Sounds effect occur when:
 - User flips a card
 - User matches a pair of cards
 - User finds an unmatched pair of cards
 - User wins (when he/she matches all cards)
 - User loses (when time's up)
- UI works for Iphone ≥ 11 with iOS 15.5

Extra features:

- User registration – user can register new username. When they play, their names and scores will appear on leaderboard.
- User login
- Leaderboard shows badges if users achieve scores at certain milestone.
- Difficulty settings where users can play game at easy mode, medium mode and hard mode.
- The app works well with Light Mode and Dark mode
- Timing features where users lose if running out of time
- Game logics features include:
 - Card match check
 - Card unmatched check
 - Losing condition check (when timer's up)
 - Winning condition check
 - Animation of flipping and fading cards
 - Store user high score
 - User badge calculation
 - Game reset
 - Cards shuffle

Features implementation description

1. Card match logics

The idea is to get the index of 2 flipped cards users select and then compares if they show the same image. If yes, it is a match, otherwise it is an unmatched.

2. Timer logics

I use the following code:

```
let timer = Timer.publish(every 1, on: main, in: common).autoconnect
```

to set up timer to identify when the time's up.

3. User registration/login/leaderboard show logics

To store user persistently, I utilize UserDefaults which store list of registered Users objects. This will help when even the users turn off the app, the phone is still store user details for next playing.

The user object contains information about badge, score and username.

```
9
10 struct User: Identifiable, Codable {
11     var id = UUID()
12     var username: String
13     var highScore: Int = 0
14     var badge: String = ""
15 }
```

When user registers, I save it to UserDefaults. When user logs in, I check if the username exist in UserDefaults. When leaderboard view is shown, I load all users from UserDefaults and display on screen.

4. Badges achievement

This feature is quite straightforward. Whenever user win/lose, we check if their score reaches a specific milestone for the badge. All badges will be displayed on leaderboard.