COSC2659
iOS Development
Assignment 2

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Introduction

My iOS game for this assignment is called “Tic Tac Toe Expansion”, which is an upgraded version from the original Tic Tac Toe game. Here, users can choose to play the game with larger board sizes, and high goals to win the game. In addition, I also created an AI with 2 levels of difficulty to play against users.

Motivation

When I was a student in high school, I used to play Tic Tac Toe with my friends on our notebook pages. As a reminiscence of the old memories, I decided to make a Tic Tac Toe game on iOS, with some upgrades.

How to play

At first, users can configure the board size, goal, AI difficulty and current user at “Game Configuration”. After that, users can select “Play Now” to play the game, or “Game History” to view the results of completed matches.

To play the game, according to chosen board size and goal, users need to fill up an entire line to beat the AI. This can be a vertical, horizontal, or diagonal line. The AI will try to beat the users, the smartness will depend on the chosen difficulty.

Features

Splash screen: An animated GIF is displayed when launching the game, before navigating to the menu screen.

Implementation: I use an external library call “Lottie” to display an animated GIF to the screen.

Game Configuration: User can configure board size, goal, AI difficulty and user selection. In addition, users can add new users to the game.

Implementation: I use SwiftUI’s Picker component to allow user to choose preferred values, then pass them to game view. For adding new users, I use a TextField component to take user input and save users in SwiftUI’s UserDefaults storage.

Game History: User can view results and information of previously completed matches.

Implementation: I use UserDefaults storage to store all the matches. After completing a match, the result and information is saved to the UserDefaults storage. Then, I display them in form of a List.

AI: an AI with 2 levels of difficulties is created to play against user.

Implementation: With the easy difficulty, the AI will only create random moves. For normal difficulty, AI's decision is cleverer with if else statements. Specifically, AI will try to take the middle slot first, then randomize moves. If user is closed to getting a win, AI will try to stop the user, and if AI is closed to getting a win, AI will take the move to win the game.

Game Play:

Implementation: LazyVGrid is used for creating a game board, and can expand for more game slots, depending on the chosen board size. User can tap on a slot to make a move, and after 0.5s, the AI will make a move reacting to user's move.

Checking for win condition:

Implementation: Depending on the board size, I calculate all the patterns for winning a game. If user, or the AI completes on of the calculated patterns, the game will have a result. On the other hand, if all slots are filled, and neither the player nor the AI have a winning pattern, the game will result in a draw.

Dark mode and light mode compatibility:

Implementation: I use "@Environment colorScheme" to keep track of system's color mode and alter some colorations depending on the current color mode.

Sound effects and background music

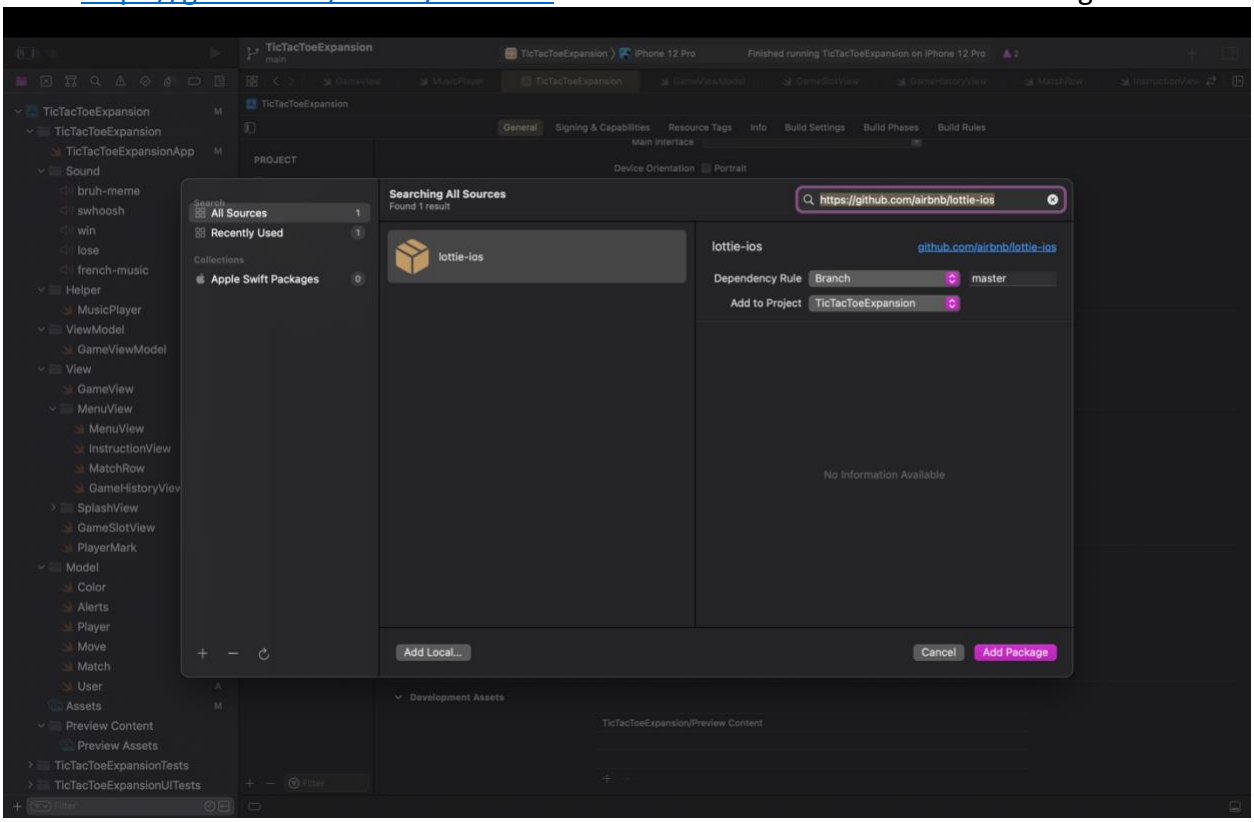
Implementation: I use AVAudioPlayer to play sound effects, and to loop a background music throughout the game operation.

External libraries:

Lottie: Steps to add library:

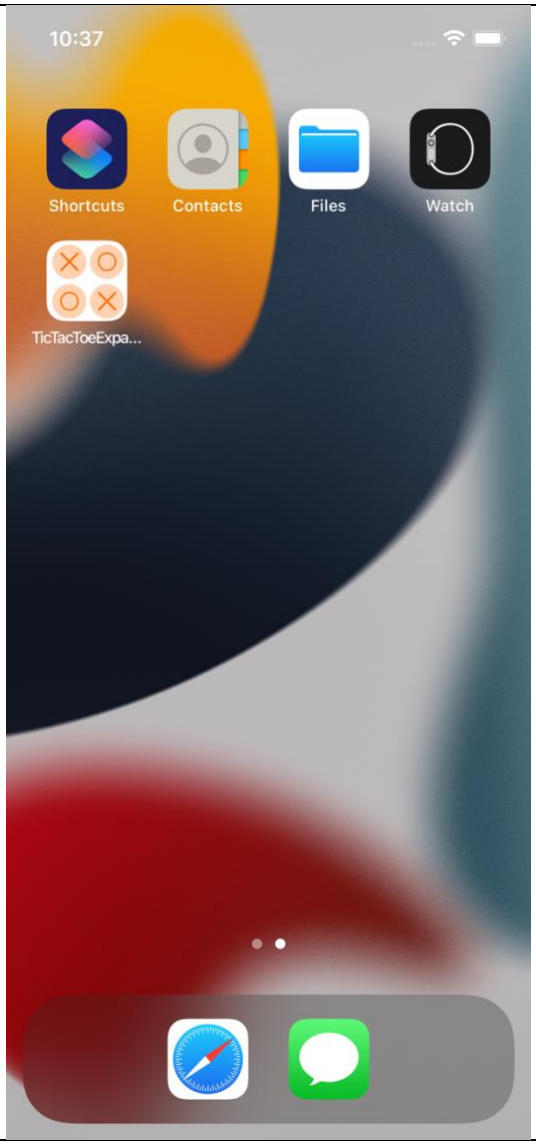
- Under "File" selection at the top bar, select "Add Packages…"

- Paste https://github.com/airbnb/lottie-ios to the search bar and select “Add Package”

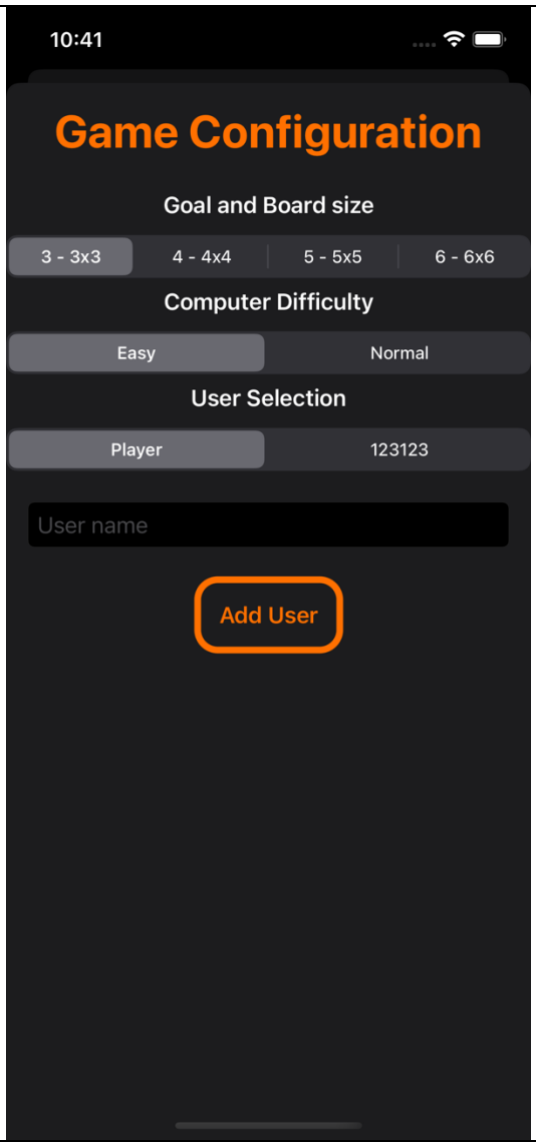


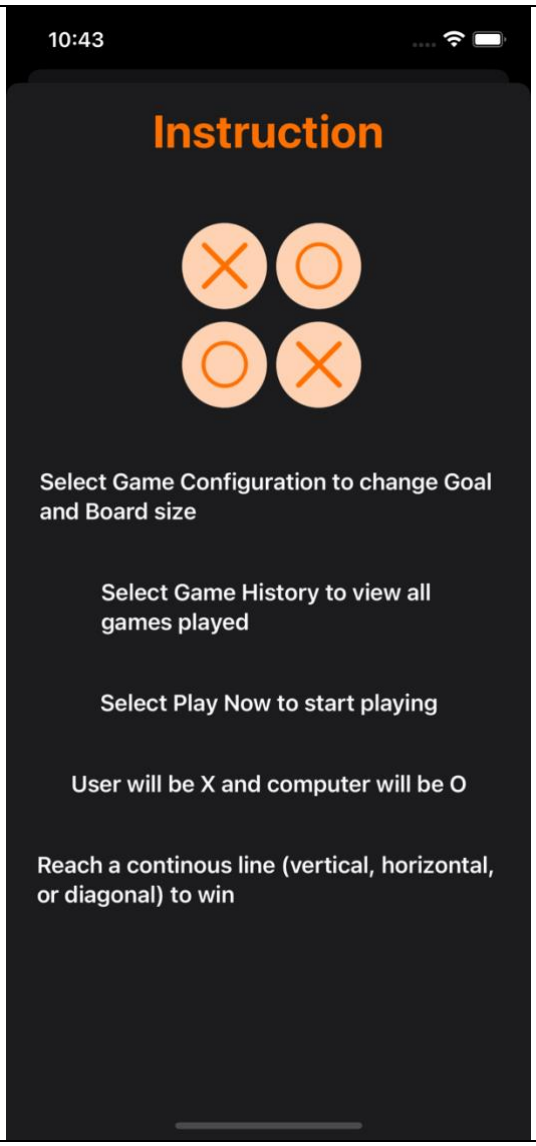
If the there is an issue with package, select File -> Packages -> Reset Packages Caches

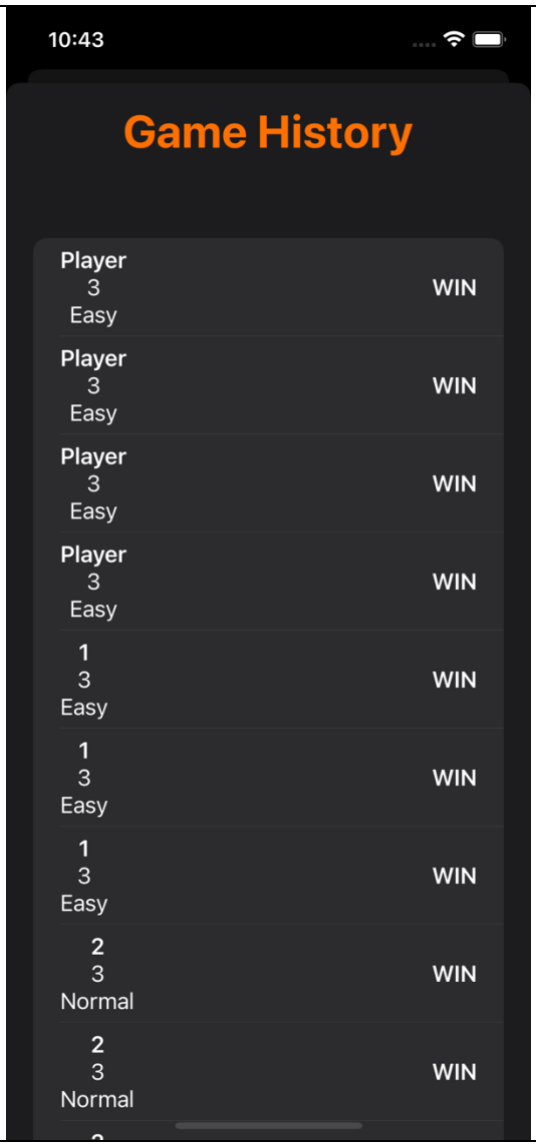
Screenshots

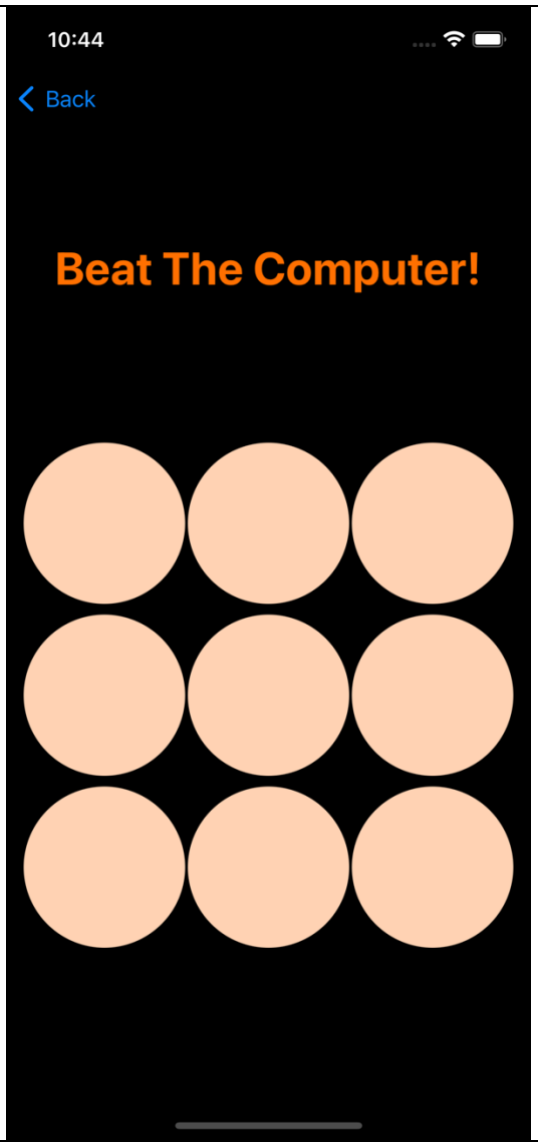
App Icon in home screen	

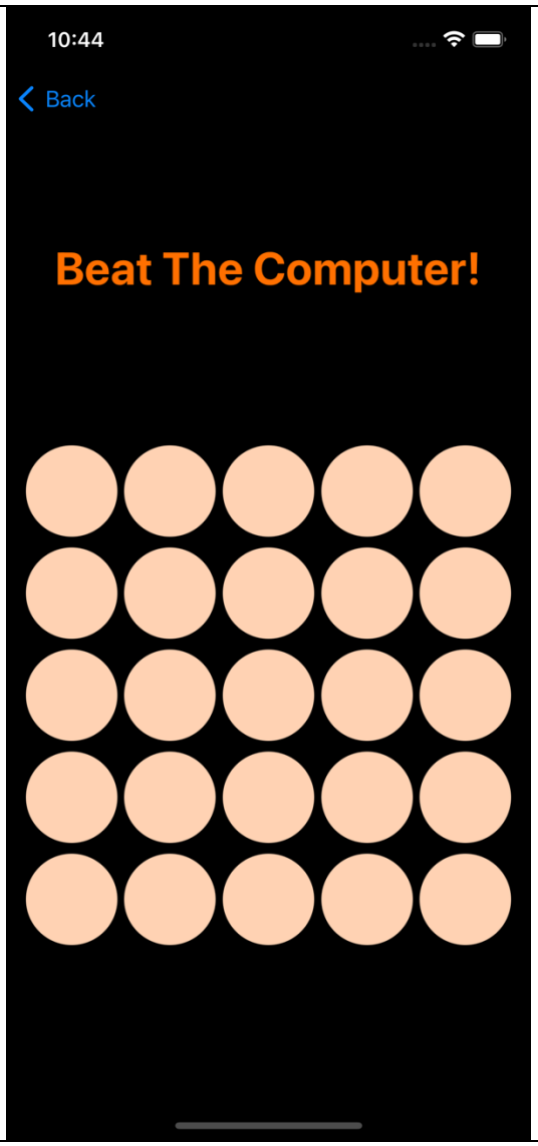
Menu View	 10:40 Tic Tac Toe Expansion Play Now Game Configuration Instruction Match History

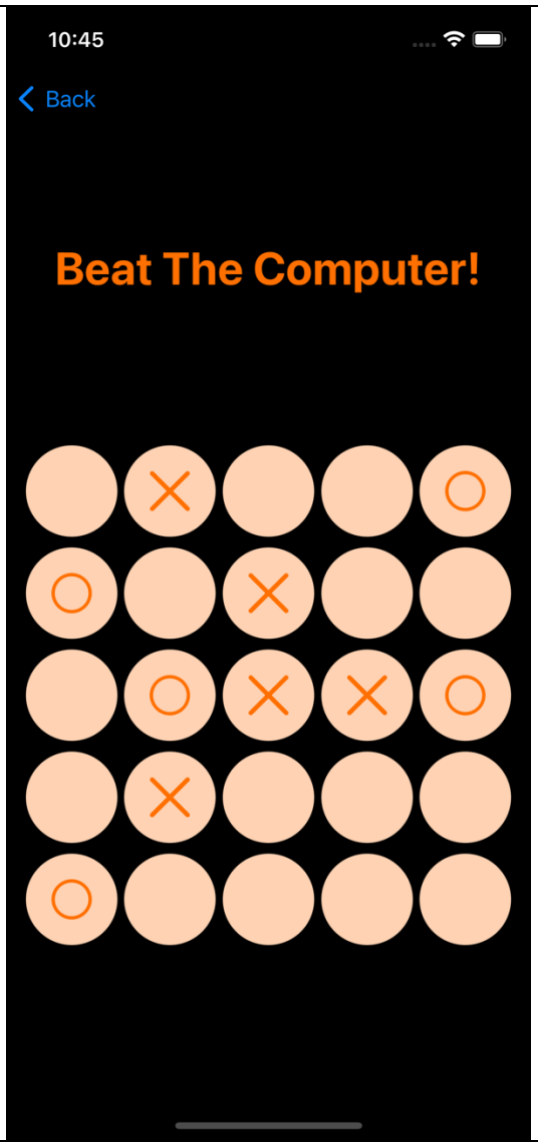
Game configuration view	

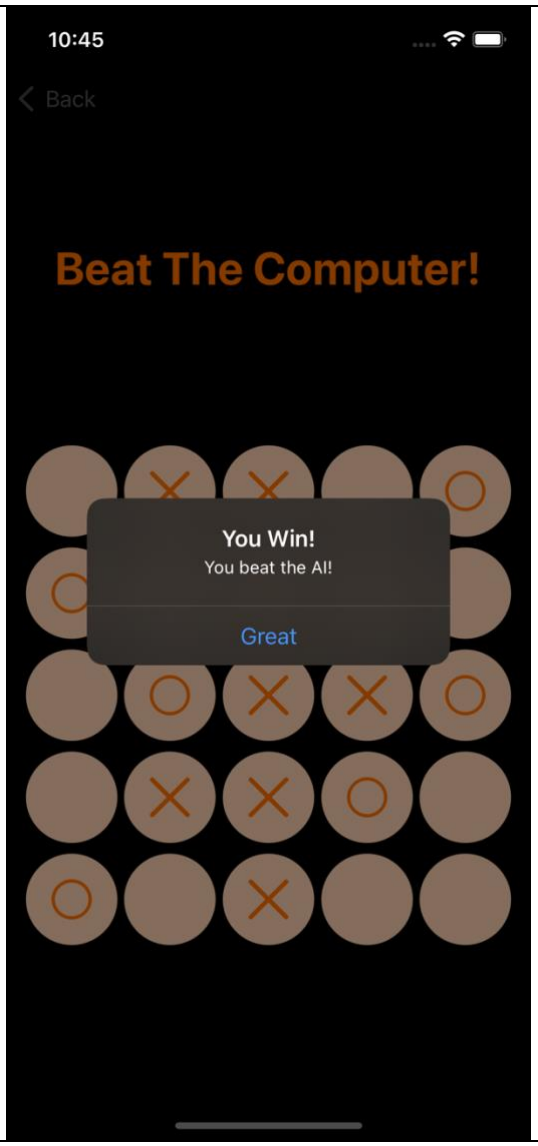
Instruction View	

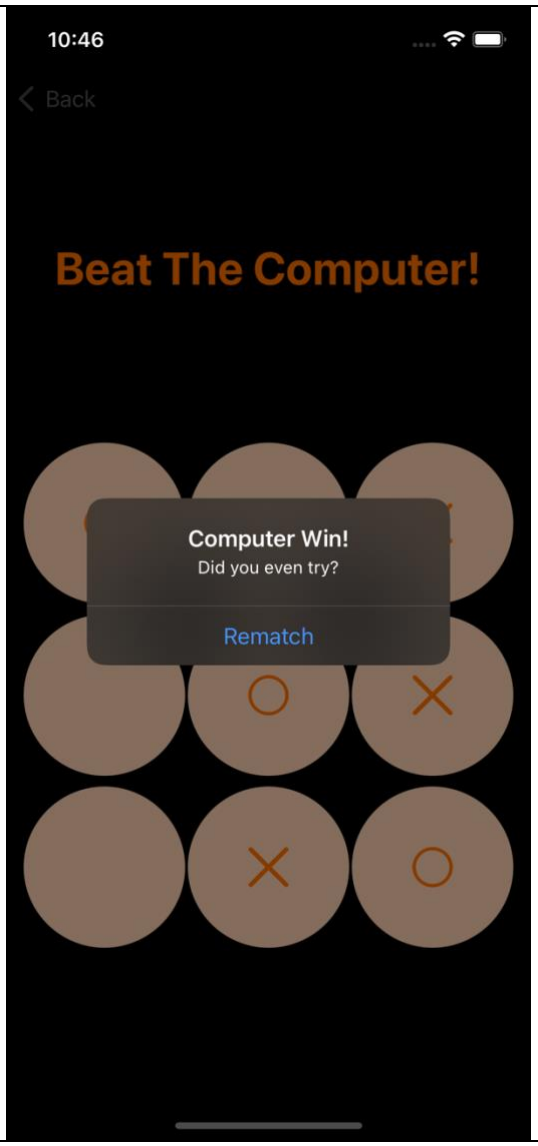
Game History View	

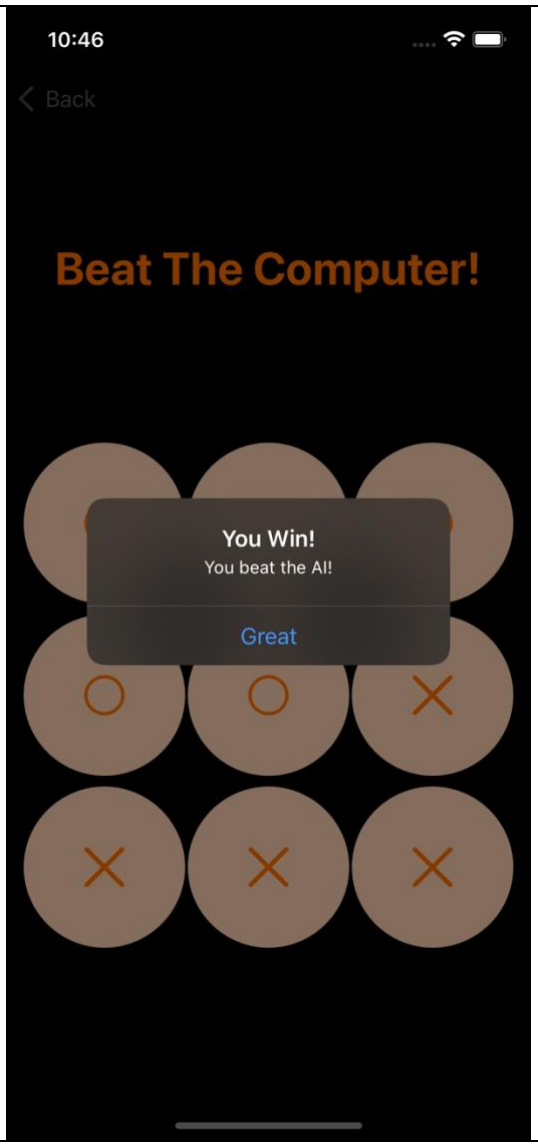
3x3 Board View	

5x5 Board View	

5x5 Board View while playing	

User Win View	

AI Win View	 10:46 Back Beat The Computer! Computer Win! Did you even try? Rematch

Draw Result View	

Visualizations

Link: [Screen Recording 2022-08-29 at 23.29.33.mov]