



Assignment 2

COSC2659 – IOS DEVELOPMENT

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1. Introduction

Tic tac toe is a strategy game developed to help players have a relaxing time as well as train their brains through matches against the system. The game is developed for iOS devices using a programming language called Swift and SwiftUI, which is a Swift framework for building User Interface of the application

2. Motivation and Inspiration

In recent years, The development of technology such as computers, laptops, smartphones, etc. has helped people's lives to be improved and gradually become an indispensable part of society. With a hectic schedule, the demand for entertainment and relaxation from people also increases; thus, in order to solve this problem, developers have created games on these technologies. There are many genres such as action, puzzle, sports, etc., and because of the assignment requirements in my university, I decided to build Tic Tac Toe, a strategy board game application based on the old folk game that has the same name, to help people not only relax but also practice their brains during the game.

The idea of making this game is also very coincidental. When I thought about the game topic, I was doing a part-time job as an assistant teacher teaching English to children at the English centre near my home. I saw one of my students and his friend play Tic tac toe in my class and when I reminded them, I realized this game could be a great topic for me to do for the assignment. I started to research the topic to check if it fit with the requirements of the assignment and after searching some tutorial sources on the Internet, I decided to develop it.

3. Explain the app? How the app uses?

When users run the game, the screen will display a Menu page containing a game logo and 4 buttons directed to four main pages which are Play game, Leaderboard, How to play, and Settings.

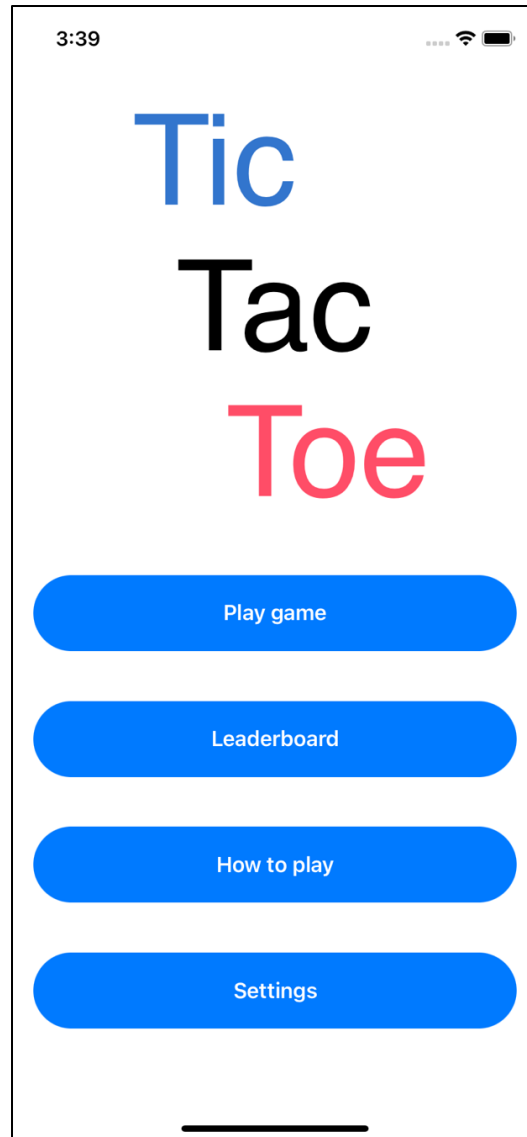


Figure 1: The Menu page

Before starting the game, users can choose the difficulty for the game by clicking on the “Settings” button and choosing the difficulty. If users choose “Easy” mode, they will play Tic Tac Toe 3x3. On the other hand, the “Hard” mode will be 5x5. If users do not set the difficulty, they will play “Easy” mode as a default mode if this is their first time playing this game. Otherwise, the game will choose the latest mode that users have played. Users can also choose to use the app in dark mode by turning off the “Use system settings” and clicking the toggle button

on the right below the “Display Settings” title. If users run simulator in Xcode, turning on the “User system settings” and pressing Shift + Command + A will change the app theme.

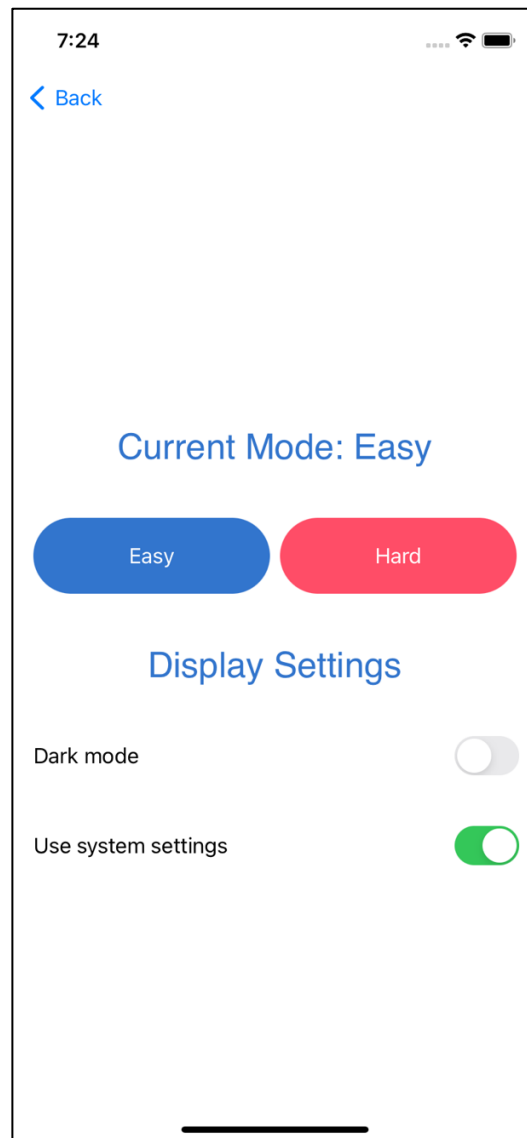


Figure 2: Settings page

When users click “Play game”, they will be directed to the Name Register page asking them to type their name before playing the game. If the name is valid, the “Continue” button will appear and they can tap on it to start the game.



Figure 3: Name Register page

After that, the screen will display the board based on the difficulty users have chosen. On the top of the board will demonstrate the current round, user's name and the score. In the game, users will go first and when they click on the square in the board, it will display the "X" image. In the "Easy" mode, whoever gets 3 of the mark in an up, down, across or diagonally row will be the winner while whoever gets 5 of the mark in the "Hard" mode. If the squares of the board are full and no one has 3 or 5 marks in a row, the game will end in a tie. If users win or tie, the screen will display a "Continue" button to play the next round and if they win, they will have 3 points while 1 point if they tie. The game will stop if the system wins and the screen will show 2

buttons which are “Try Again” and “Back to menu”. If users click on “Try Again”, they will start the game again while moving back to the Menu page if they click “Back to menu”.

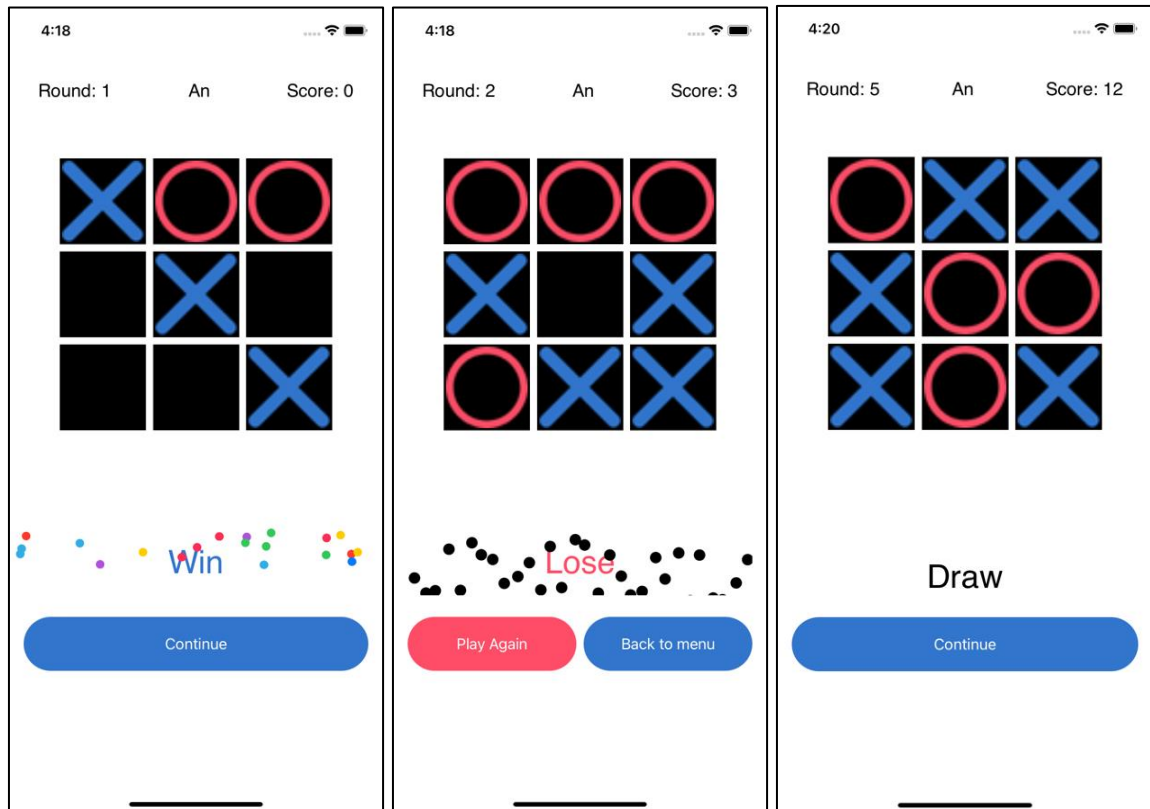


Figure 4: Play game page in 3 results

In the Menu page, if users want to see the history result, clicking on the “Leaderboard” button and the screen will display the list of results including the player’s name, the game mode, and the score.

Player	Mode	Score
An	Easy	7
An	Easy	16
An	Hard	1
An	Hard	0
An	Easy	3
An	Hard	0
An	Hard	1
An	Hard	1

Figure 5: Leaderboard page

Last but not least, if users want to know how to play and the rules, clicking on “How to play” button and the screen will illustrate all the rules.

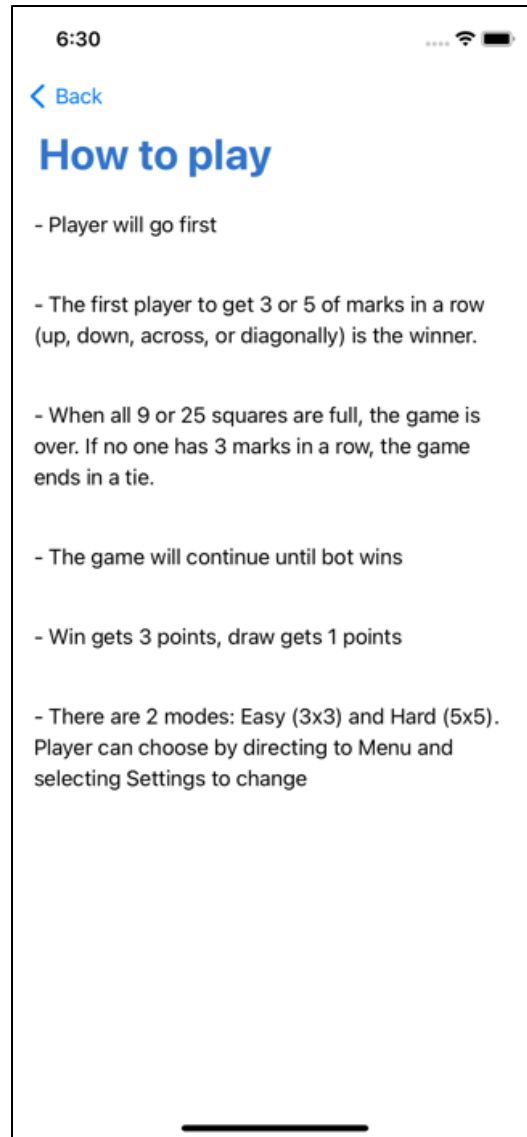


Figure 6: How to play page

4. Main features and extra features

In the app, there are 5 main features. Firstly, users can play Tic Tac Toe against the system by clicking on the “Play game” button. Secondly, after losing the system, the game will stop, save the result and users can see it in the “Leaderboard” page, where it will display all the results, by tapping the “Leaderboard” button. Thirdly, if users do not know how to play the game, clicking on the “How to play” button and the screen will display all rules and instructions of the game. Fourthly, while using the app, users can listen to the sound effects and background music. They can hear the music in the Menu page, Name Register page, and system’s action,

win, draw and lose sounds in the game. Lastly, when users win, it will have a fireworks animation effect and when they lose, it will have the snow animation effect.

Moreover, there are some extra features that I have developed in the game. To begin with, before playing a game, users can set up game mode by clicking the “Settings” button and choose the mode. In my game, there are two modes which are “Easy” and “Hard” modes. If users choose “Easy”, they will play Tic tac toe 3x3 while 5x5 if they choose “Hard”. If this is the first time a user plays this game, the game mode will be set to “Easy”. Otherwise, the mode will be set based on the latest result. Also, in the “Hard” mode, I have developed simple AI in the game and it will help the system play not randomly as usual. Furthermore, before playing the game, the system will ask users to type their name. This feature will help not only the owner of the device but also different people can play the game and they can view their result. Finally, users can also choose and play games in the dark mode.

5. Explain features

- Play game:

Firstly, I develop the User Interface (UI) including the board, the game status which demonstrates the round users play, their name, and the result, and the notification appearing when the game is ended. After that, I developed functions helping users to interact with the board, checking the result of the game based on the rules, and creating a bot to play against users.

- Leaderboard:

Firstly, as usual, I developed the UI for the page. After that, for each column in the UI, I created an array for each column to contain the data related to them and save it by using UserDefaults before rendering them in the Leaderboard page.

- How to play:

By using basic knowledge about SwiftUI such as ZStack, VStack, Hstack, Text, Color, etc. I added the rules and instructions before customizing font, size, text color, etc.

- Sound effects:

In order to play music, I create a function to play sound by typing the link video and the type of the video such as “mp3”, “mp4”, etc. After that, I download some videos on Youtube to get the sound and call the function to run the music in any pages.

- Fireworks and Snow Animation Effects:

In order to make the fireworks and snow animation effects, firstly, with the fireworks, I build the UI including circles, the color for them and the position of them in the screen. Next, I started to make the animation for circles which make them move from the bottom to top. After that, I make the explosion animation effects for the circles and on the page I want to use it, I will call the effects and type the number of circles to display on that page. On the other hand, with snow effects, I do the same thing as fireworks, except that the snow will go from the top and there will be no explosion effect.

- Setting game's difficulty:

As usual, I build the UI of that page including the title displaying the current mode and two buttons "Easy" and "Hard". After that, I make a button function that changes the mode status, save it by UserDefaults and send the status to the gameplay to run the game.

- AI in "Hard" mode:

Besides playing randomly, I add some functions to help bot know to block users winning path. For instance, if users get 4 marks in row, bot will block the last position to avoid users win. Also, if bot get 4 marks in row and users do not block the last position, bot will move in that position and get the win. Moreover, as a vital position, the person who go first in Tic tac toe is likely to choose the center position of the board so that he or she can take advantages to do their strategy to get the win. Therefore, if users choose the position which is not center of the board, the bot will take that.

- Register name:

Firstly, I create an input box for users to type their name. After that, I create and use the function to validate the input. If the input data is valid, the "Continue" button will display and when users click on it, the data will be sent to the "Play game" page and displayed on the center of the top board

- Dark mode

Firstly, I make two buttons called "Dark mode" and "Use system settings" buttons. In order to do it, I create a singleton and a function that changes the background color. After that, I set up the background color in the "Asset" and develop function for "User system settings" button and "Dark mode" button. Next, I will make the app check users can only use dark mode

by typing Shift + Command + A if the “User system settings” button is turning on. Otherwise, the dark mode will be turned on if the “Dark mode” button is on.

*** Some images about the game in “Dark” mode**

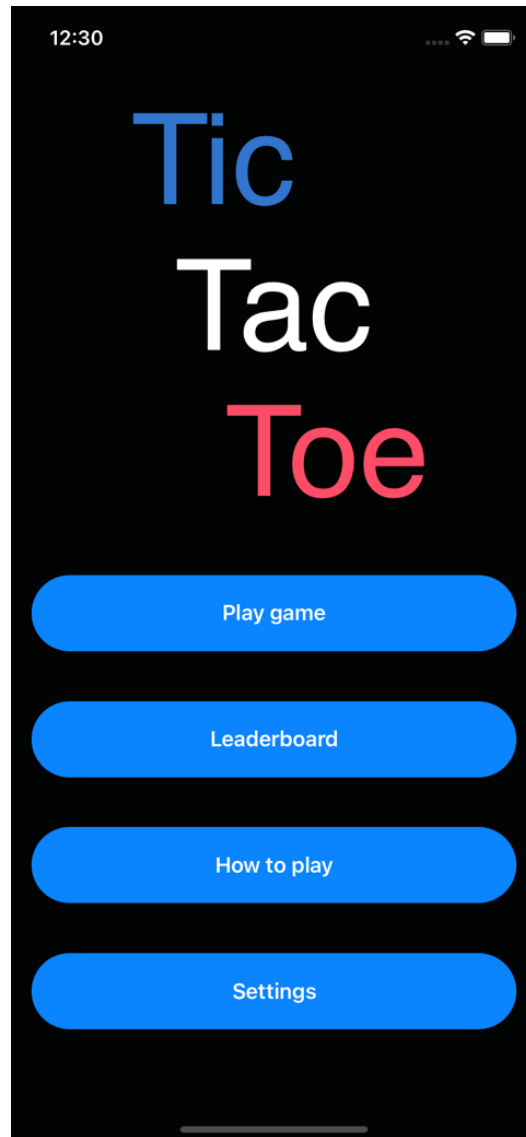


Figure 7: Menu page (Dark mode)

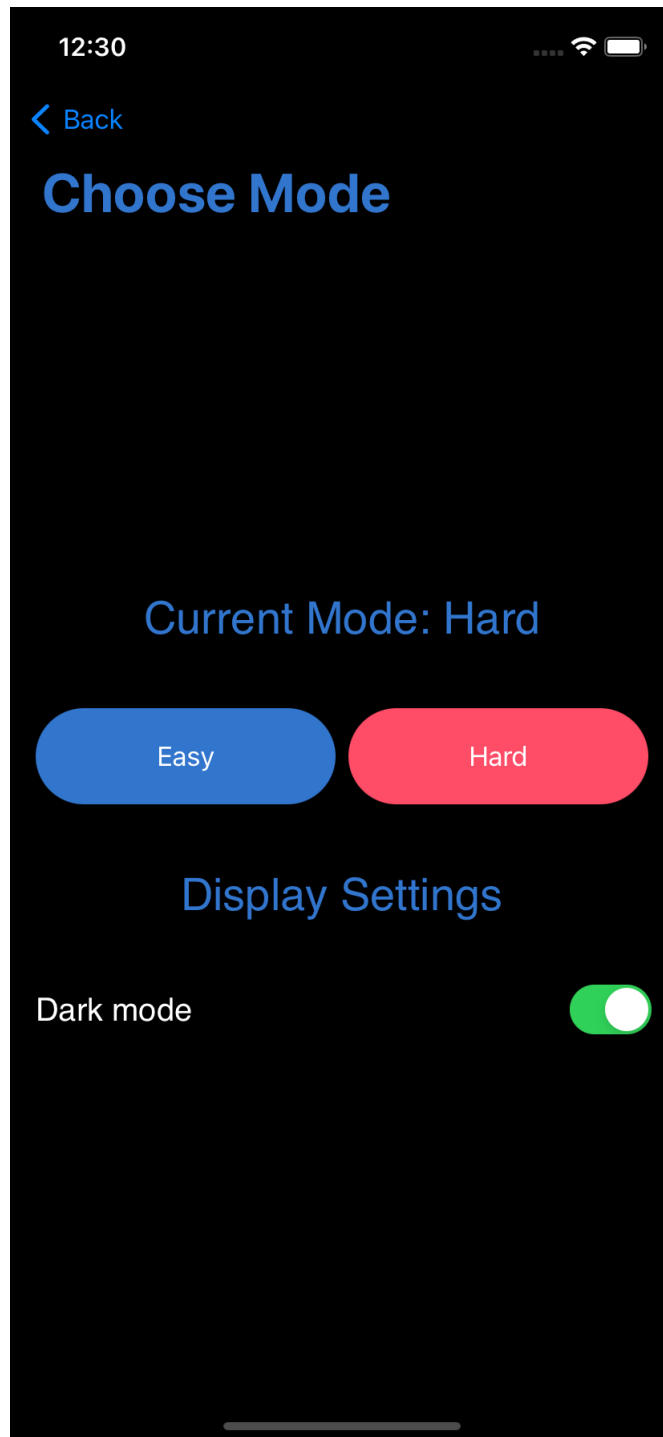


Figure 8: Settings page (Dark mode)

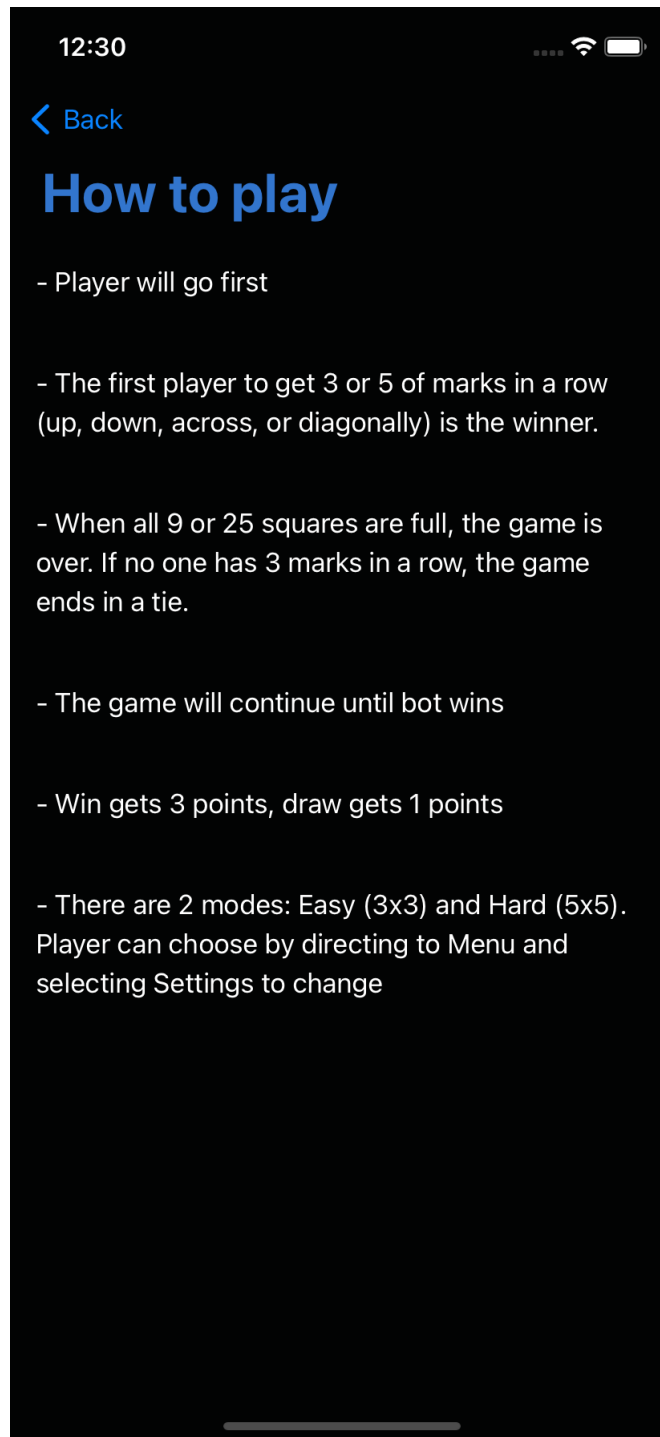


Figure 9: How to play page (Dark mode)

12:30		
< Back		
Leaderboard		
Player	Mode	Score
An	Easy	7
An	Easy	16
An	Hard	1
An	Hard	0
An	Easy	3
An	Hard	0
An	Hard	1
An	Hard	1
An	Hard	6
Hehe	Hard	0

Figure 10: Leaderboard page (Dark mode)

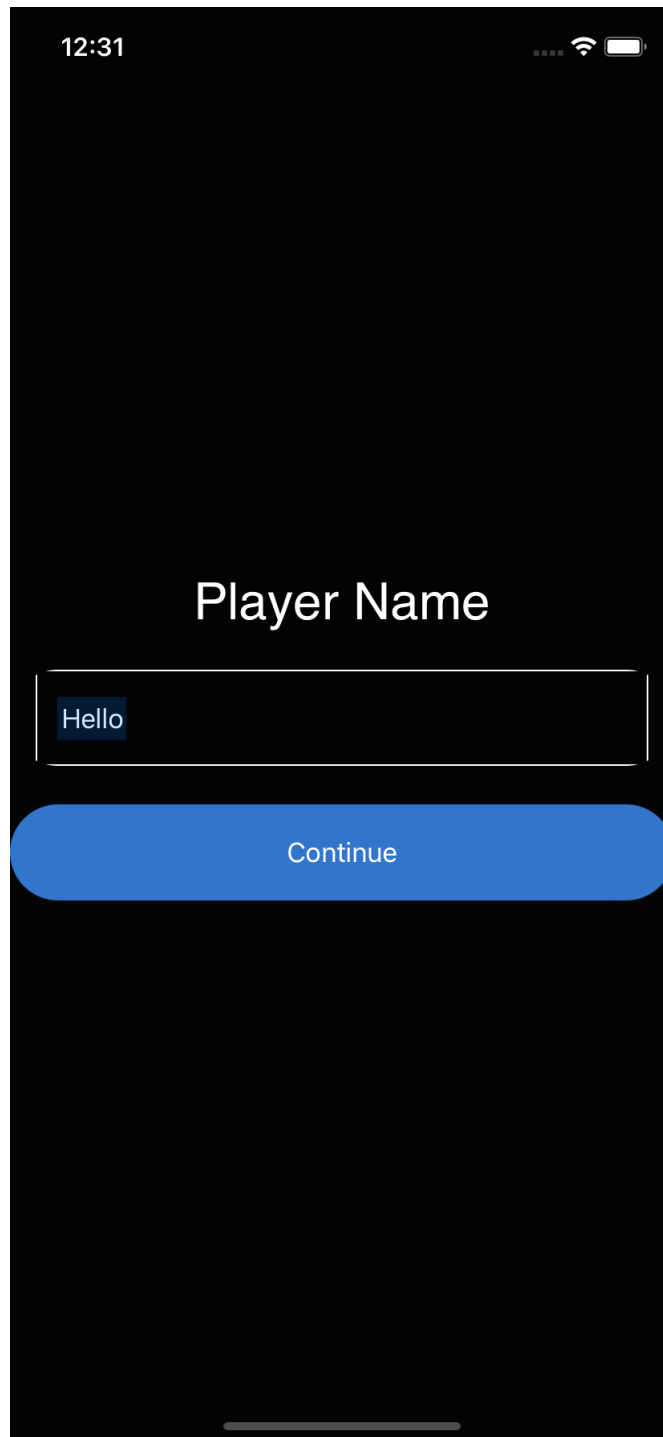


Figure 11: Name Register page (Dark mode)

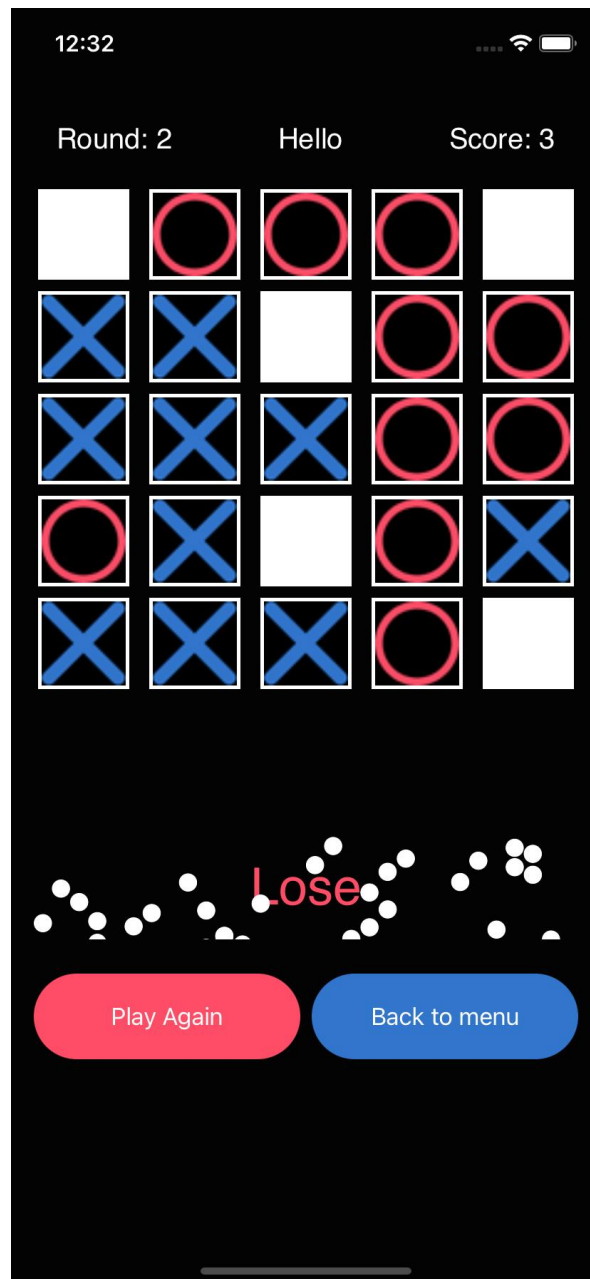


Figure 12: Play game page (Dark mode)

For more details, you can see how the app runs through this link:
<https://youtu.be/hyL4v1PeSRY>

The link source code of the app:
https://github.com/quangan186/COSC2659_Assignment2_s3877482