

Ishido

ARTIFICIAL INTELLIGENCE, PROJECT 3

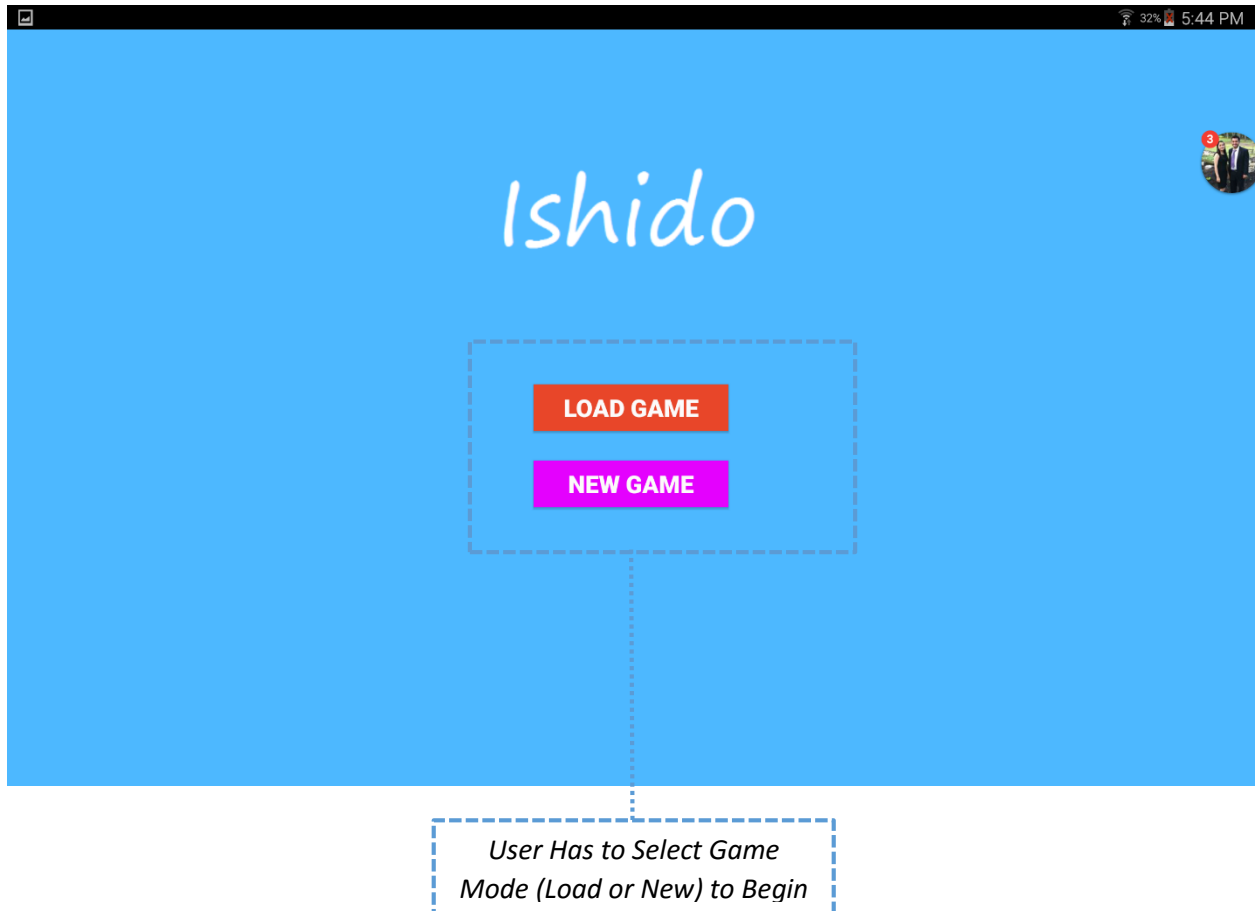
Arjun Bastola

RAMAPO COLLEGE OF NEW JERSEY |
COMPUTER SCIENCE DEPARTMENT

Activities:

1. `activity_main`:

This activity has been used a welcome screen for the app. The activity has the game logo and a buttons that lets user select if he/she wants to load new game or load the game from saved state.



2. activity_board

This activity has the most of the things and is the backbone of the app. Nested layouts have been used in this activity to place contents in right place. The screen has been divided to two vertical parts. First one has the board and second one has elements like radio buttons to select mode, drop down, score labels and generated tiles. Description of each elements can be found below.



Activity board ScreenShot

- **Preview Stock:** Lets user browse the stocks
- **Current Stock:** Previews the stock type that will be placed next
- **Next Player:** Shows whose turn is next
- **Enter Depth:** Let's user enter play cut off
- **Use Alphabet Pruning:** User can select if he/she wants to use alpha-beta pruning
- **Next Stock:** Users can press this button to browse through stack
- **Activate Algorithm:** Activate Minimax or Alpha-beta Pruning
- **Human Score and Computer Score:** Show scores of respective users
- **Time Taken:** Shows the time taken for the algorithm in milliseconds
- **Get Next Best Move:** Suggests the best move for the user
- **Save Game:** Saves the current file
- **Stop Animation:** Stops any animation that is present

Classes/Java Files:

- **Mainactivity**
 - Handles onButtonClick Intent and redirects user to board activity and initializes setState() method which prepares the board.
- **Board**
 - Holds tiles as 2D array
 - Changes the preview button according to next Stock.
 - When user presses Activate AI Algorithm Button, this class finds out next appropriate tile where the stock can be placed and puts it there or suggests the place depending upon the condition
 - Blinks the tiles.
 - Handles button click for save file, stop animations.
 - Updates score accordingly to button placements.
- **Deck**
 - Holds stock's information
 - Also has setters and getters for stock values.
- **Tiles**
 - Stores information about each tiles' like grid values, whether or not it is filled up.
 - Stores tiles' color and symbol/shape of the tile
 - Also has setters and getters to above mentioned variables
- **Player**
 - Holds player's score
 - Has setter and getter for player's score.
- **State**
 - Gets state file from sdcard
 - Reads the file and sets existing tiles' state, stock values and current score.
 - Also has getters to above mentioned variables
- **MoveTile**
 - Holds the row and column of the made move in the board
 - Holds tile combination of the move (symbol/string)
 - Also has getters to above mentioned variables
- **Placement**
 - Holds all valid moves for the stock
 - Returns null if there are no valid move
- **Node**
 - Provides information like heuristic, co-ordinates, scores and available moves for the AI algorithm.

AI Algorithms used:

The following algorithms being used:

1. Alpha-beta Pruning
Used In: board class
Method: ComputerAlgorithmActivated
2. Minimax Algorithm
Used In: board class
Method: ComputerAlgorithmActivated

Bug Report:

1. Bug when changing mode.
 - Error when ply is greater than 1
 - Program has to be restarted in order to Select new search mode.

Features:

1. Added: welcome Screen, toast Messages to inform users about events like button clicks, errors etc.

Log:

Date:	Work Completed	Time Spent
March 11	<ul style="list-style-type: none">• Changed to layout of the layout files to accommodate all user inputs and outputs.	3.5 Hours
March 12	<ul style="list-style-type: none">• Setup load game state and save current game state	2.0 Hours
March 15	<ul style="list-style-type: none">• Set up turn taking• Worked on Minimax	2.5 Hours
March 16	<ul style="list-style-type: none">• Continued Minimax• Started Working• But failed to go above 3 ply	4.0 Hours
March 17	<ul style="list-style-type: none">• Continued Minimax• Found the problem• Problem was with Null Pointer Exception• Fixed the problem	4.0 Hours
March 21	<ul style="list-style-type: none">• Finished Minimax• Added Alpha-beta Pruning• Alpha-beta Pruning• Alpha-beta Pruning Failed• Testing	3.5 Hours
March 22	<ul style="list-style-type: none">• Finished documentation	2.0 Hours
	Total Hours	21.5 Hours