



SYSC 3110 UNO Flip Milestone 4 Documentation

Group 16:

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A. Design Decisions

In Milestone 4, the majority of the structures were retained, as Milestone 1 was deliberately designed for cohesion, i.e., carefully separating the concerns for each class, Milestone 2 was for the GUI implementation and Milestone 3 was for the AI player implementation.

The following changes were made to the original design:

1. The UNOModel class was updated to include Undo/Redo features.
2. The UNOModel class was updated to include Save/Load features.
3. The UNOModel class was updated to include a Replay feature.
4. An additional GameState class to store important parameters from the model.

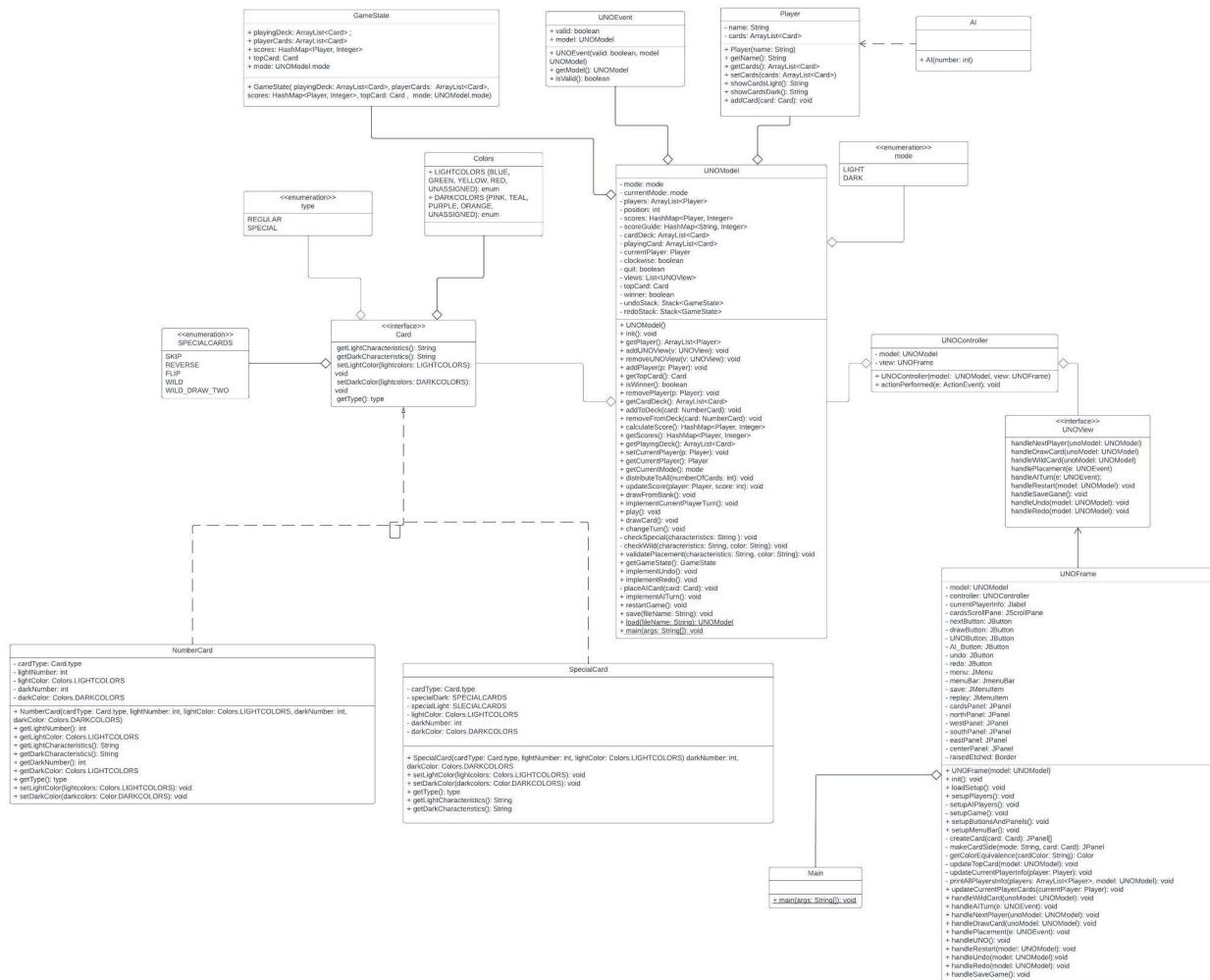
Class Breakdown:

- **UNOModel:** This class is responsible for the logic and data of the game. The model maintains a list of views and communicates its state to these views based on the updates made to the logic/data.
- **UNOView:** This interface defines methods each UNOView should implement.
- **UNOFrame:** This class implements the UNOView interface. It is responsible for displaying data from the model class.
- **UNOController:** This class is responsible for taking inputs for the user and modifying the data in the model class. It contains all the Action Listeners of the components in the frame class.
- **UNOEvent:** This class contains the relevant information needed for the view class. It contains two Boolean indicators for invalid move and a winner.
- **Card:** This is an interface for the card object. The reason for this choice stems from the types of cards used in the UNO Flip game (i.e. the NumberCard and SpecialCard). The Card class holds a set of enums - the type of the card (Regular or Special), and the Special cards implemented (Skip, Reverse, Wild and Wild_Draw_Two).
- **NumberCard:** The NumberCard class implements the Card interface and models a number card in the UNO Flip game. Number cards contain a colour (from the Color class) and a number (range 1 - 9). The cards have a light and dark side. The light side is implemented in this milestone, and the dark side - currently a placeholder for further milestones.
- **SpecialCard:** The SpecialCard class implements the Card interface and models a special card in the UNO Flip game. Cards like Wild_Draw_Two, Skip, Reverse, Wild, and Flip.

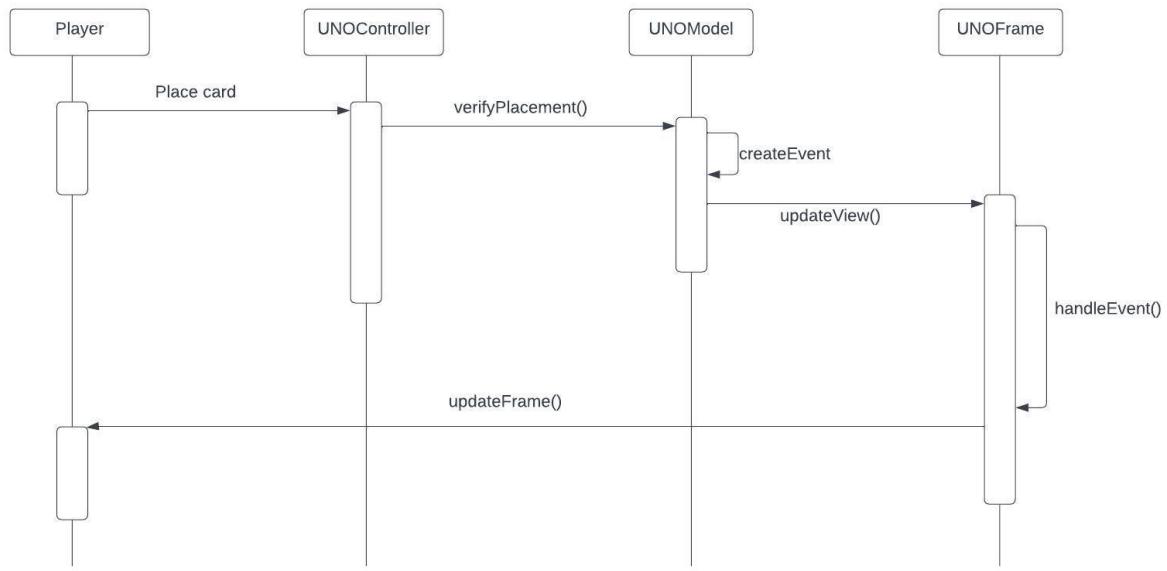
- **Colors:** The Color class is a container for all the possible assigned colours in the game. It contains the two enums - DARKCOLORS (Pink, Teal, Orange,Purple) - for the dark mode and LIGHTCOLORS (Red, Blue, Green, Yellow)- for the light mode.
- **Player:** The Player class models a player in the UNO Flip game. They have an identification (a name), a number of cards, and a turn index which is controlled by the game.
- **AI:** The AI class extends the Player class. It serves as a representation of Artificial Intelligent players in the UNO Flip game.
- **GameState:** The GameState class stores important information from the model to be used for the undo/redo feature of the game.

B. UML Diagrams

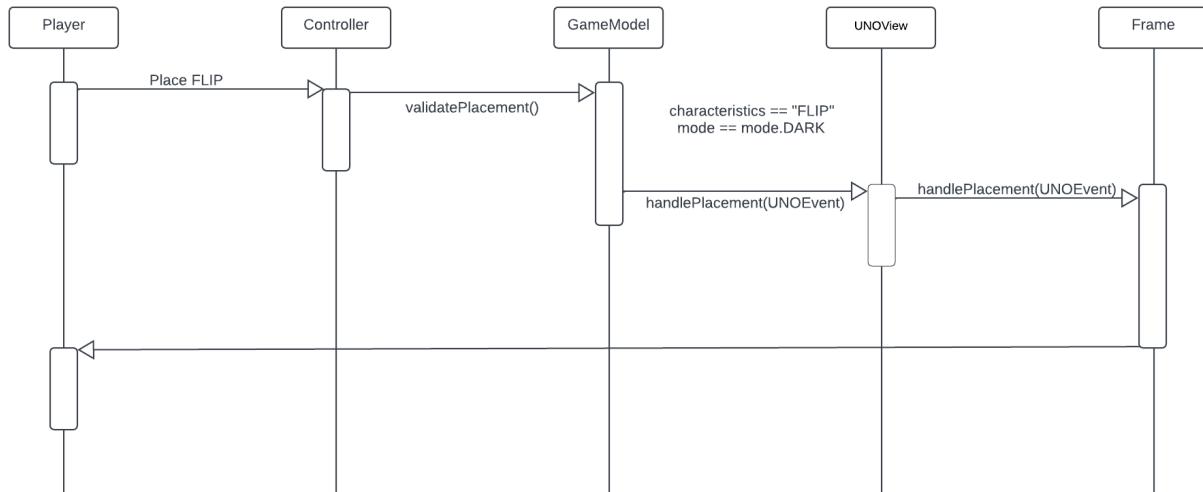
Class Diagram:



Sequence Diagrams:



Overall Game sequence

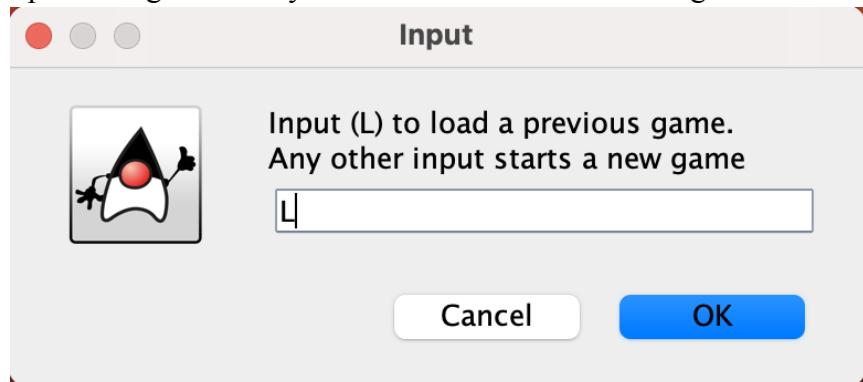


FLIP Card action sequence

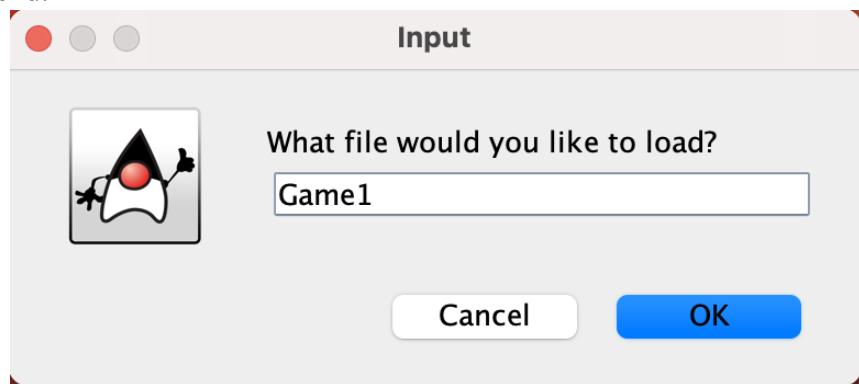
C. User Manual

To Play the UNO Flip game:

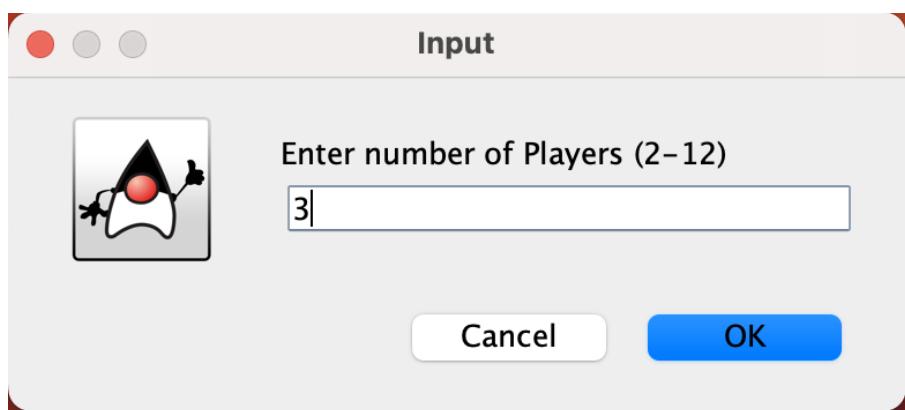
- To start the game, click on the jar file or load the project into your IDE and run it.
- You will be prompted by the game to load a previous game or start a new game. Type L to load a previous game or any other character to start a new game.



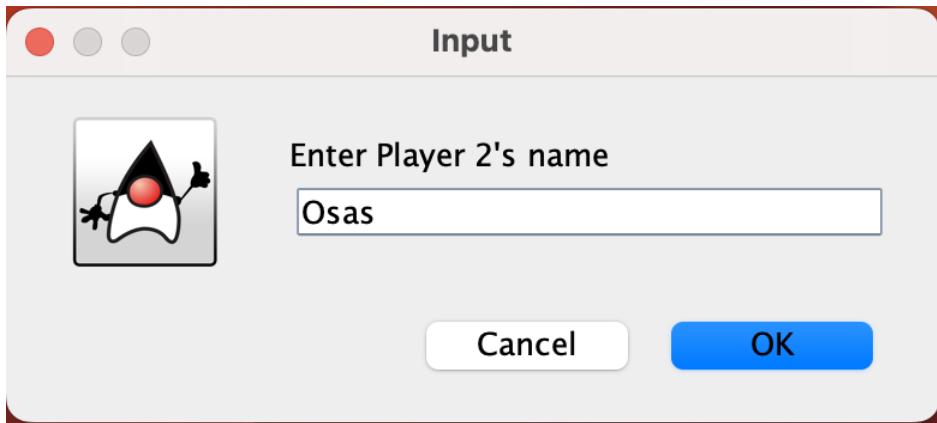
- If you typed L, input the filename to load the saved game. Filename must be valid or the game will end.



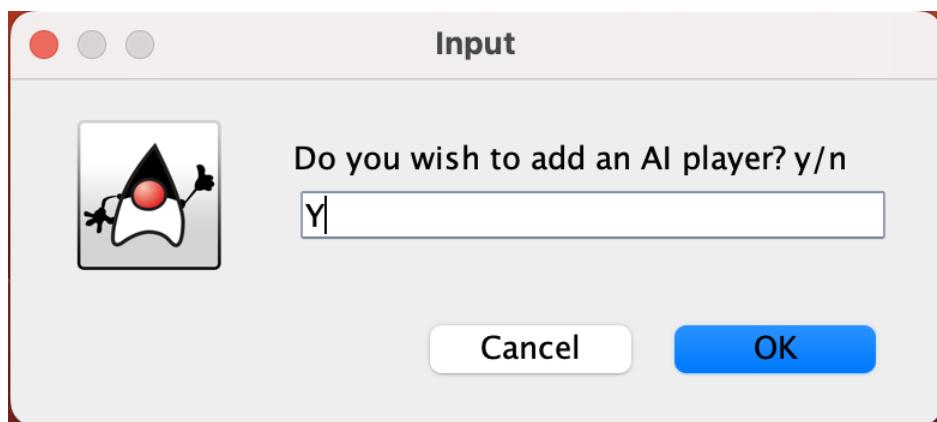
- You will be prompted to enter the number of players you want to join the game (minimum 2 maximum 12).



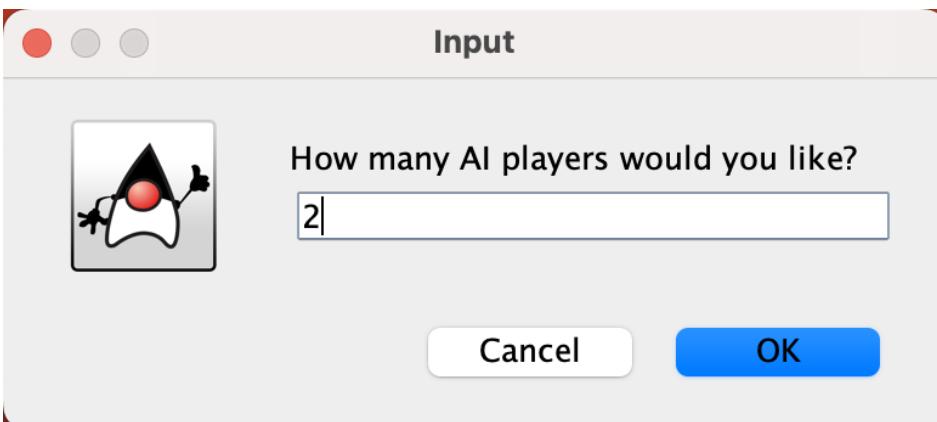
- Enter the names of the players. This will help to keep track of the turns.



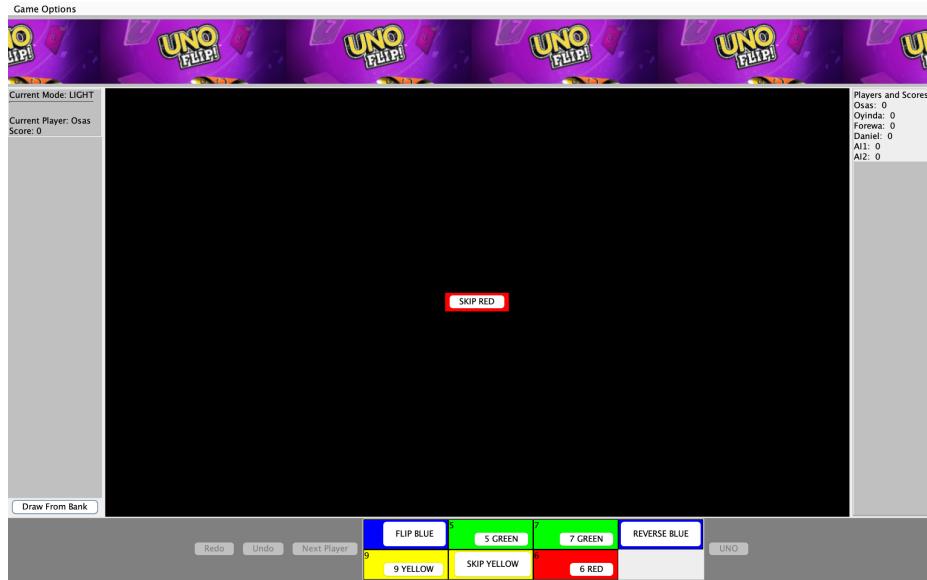
- Type Y/N if you want to add AI player(s) to the game.



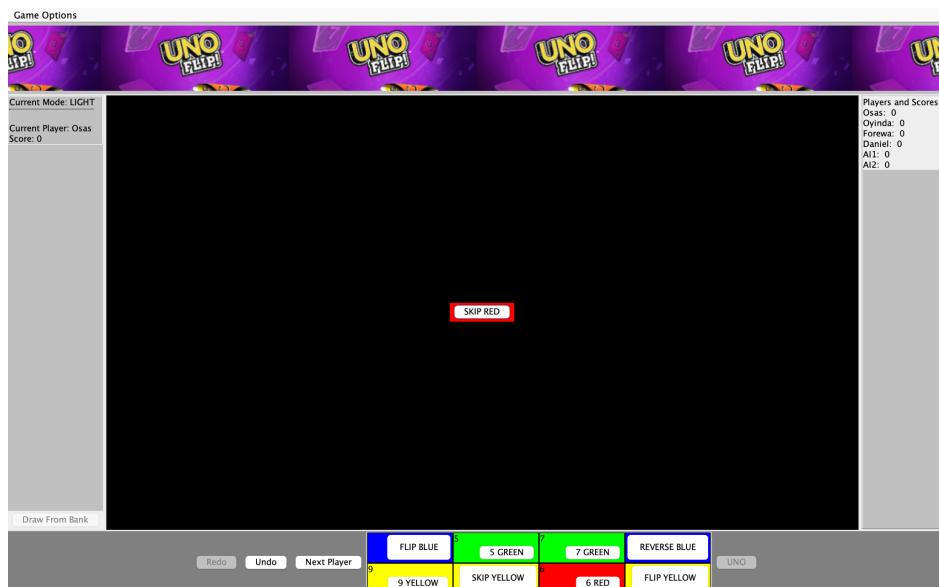
- Type the number of AI players you want to add to the game.



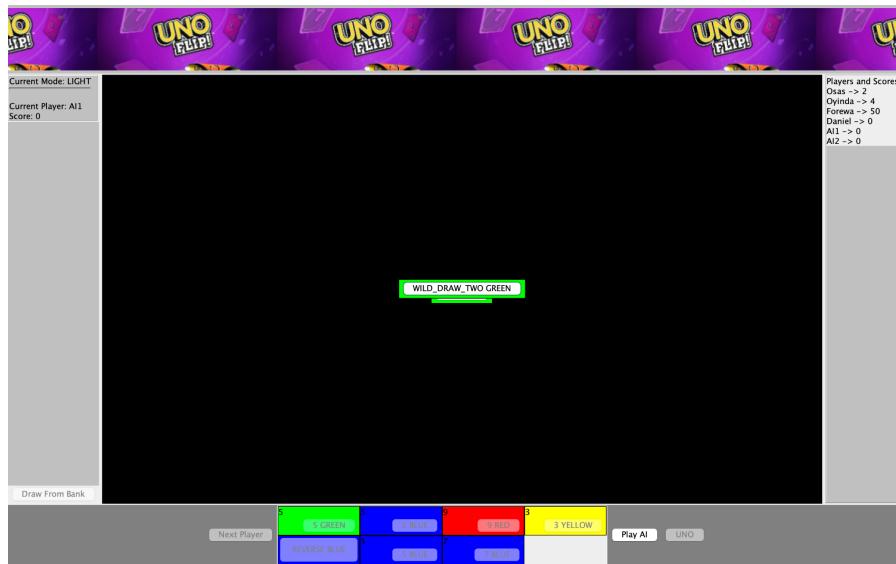
- When all the players are inputted, the first player's name, score, and deck of 7 random cards will be displayed. Additionally, the game mode (LIGHT or DARK), the starting top card in the centre of the screen, the useful game buttons and the scoreboard will also be displayed on the right of the screen.



- To play a card from the deck, the player will have to click the card in the deck (the cards have been implemented as buttons, and will need to be clicked). The card selected will be validated (checks if either the number/ card type or colour matches) with the top card.
- If the card selected is invalid, an error message pops up, prompting the player to make another move.
- If the player has no card option to play or does not want to play a card from their deck, they can click the Draw From Bank button on the left to draw from the market. This will add a random new card to their card deck.

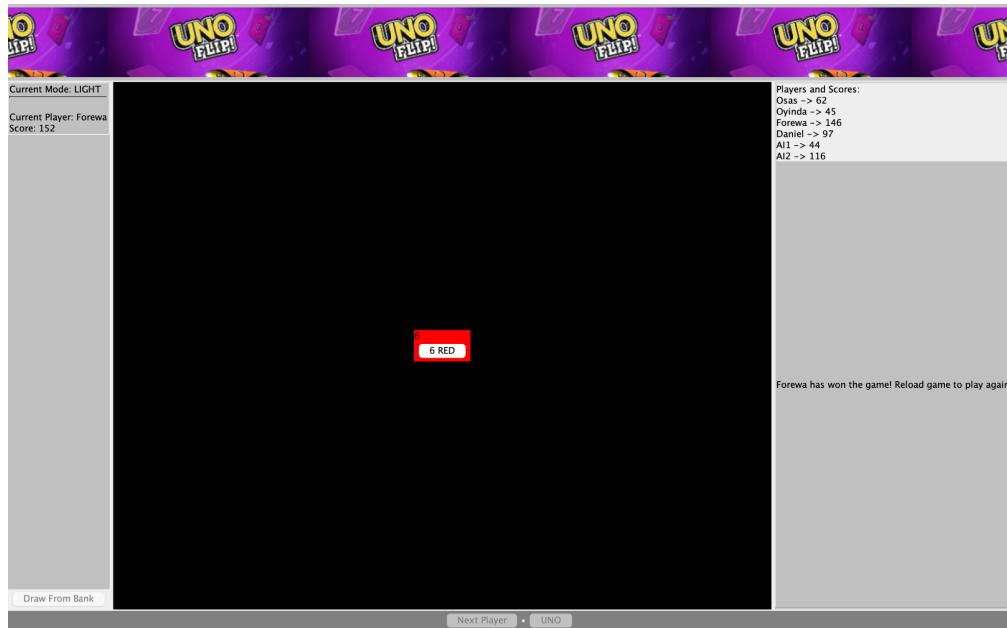


- After the player makes a move, the player's score is calculated based on UNO Flip rules. Scores are as follows:
 - All number cards (1-9): Face Value
 - Reverse: 20 Points
 - Skip: 20 Points
 - Flip: 20 Points
 - Wild: 40 Points
 - Wild Draw Two: 50 Points
- Players can Undo/Redo their last move by clicking the available buttons. Redo will only be available after undo has been clicked.
- To end their turn, the player must click the Next Player button.
- During the AI player(s) turn, their deck will be displayed but disabled to not allow Human play. A button will also appear on the left of the UNO button, to play the AI's turn. When the Play AI button is clicked, the game will pick the first valid move from the AI's deck. The game rules still apply.

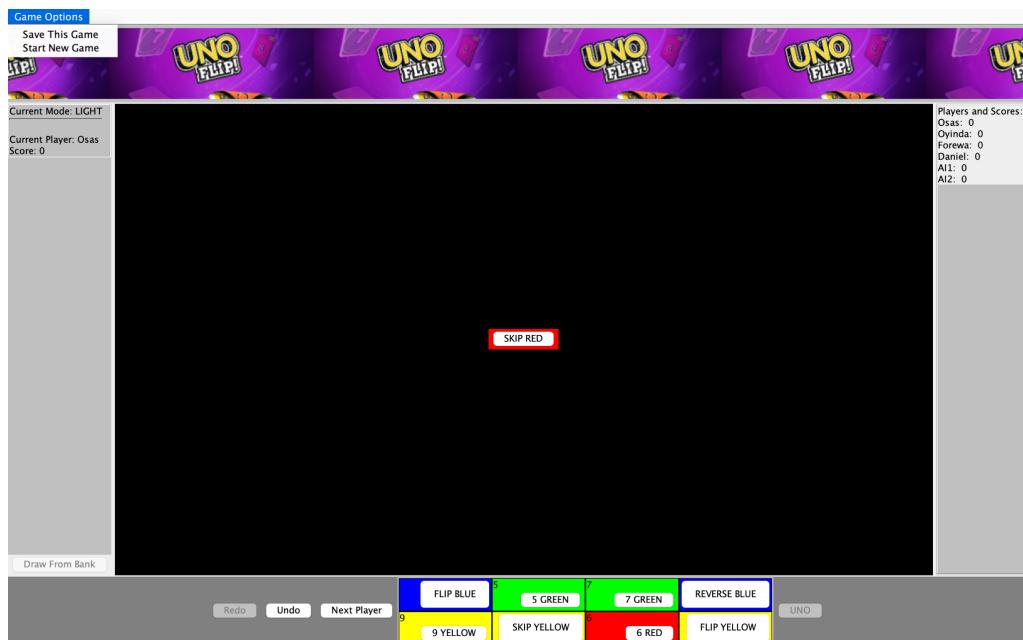


- The game play continues.
- If the player selects a Wild Draw Two card, the next player is automatically distributed two random cards from the market. Normal game validation rules still apply.
- If the player selects a Skip card, the next player misses a turn and the game continues. Normal game validation rules still apply.
- If the player selects a Reverse card, the game completely reverses the order of the game. Normal game validation rules still apply.
- If the player selects a Wild card, they can input the colour they would like the top card to be based on the option that pops up: Light side (Red, Blue, Green, Yellow) or Dark side (Teal, Pink, Orange, Purple). The next player continues with the selected colour.
- If a player selects a Flip card, all the players have to automatically switch to the opposite side. Which means all players will have a deck of brand new card values and have to change their game play.
- The game play continues.

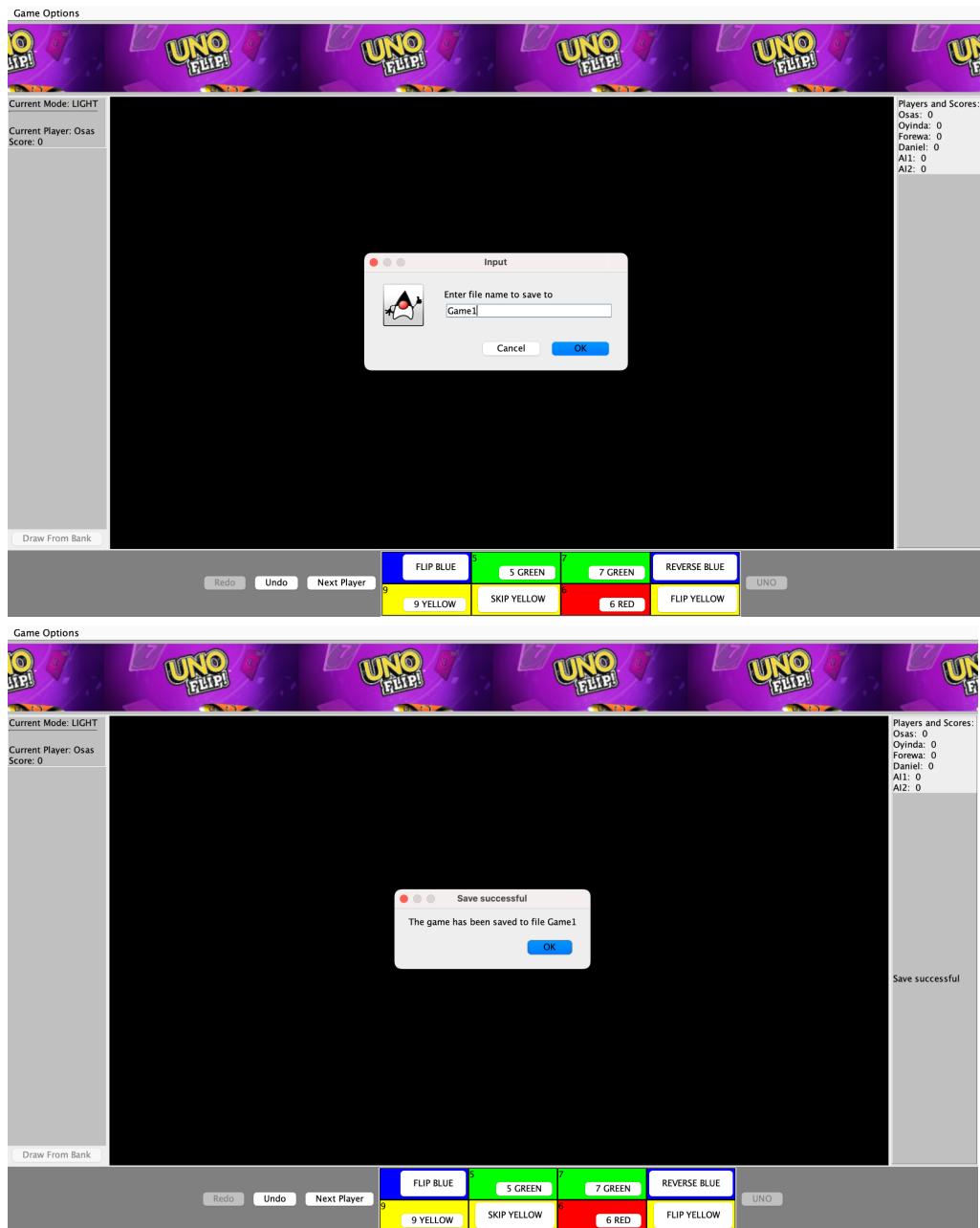
- When a player has just one card left in their deck, they must click the UNO button to declare UNO.
- To win the game the player must have clicked UNO at least once and played all the cards in their deck.
- The first person to play all the cards in their deck is declared the winner!



- Players can select the Game Options menu bar and choose to save the current game or start the game again. These two options can be selected at any point of the game.



- If the Save This Game option is selected, a pop-up will appear, prompting the user to enter the filename they would like to save the game as.



- If the Start New Game option is selected, the game will reset to the default form.

