

TP0: Project Proposal

Project Description:

Name: ATLA Solitaire

Description: A game of solitaire with cards that have characters from Avatar: The Last Airbender.

Similar Projects:

There are currently multiple different variations, in terms of both themes and rules, of Solitaire found online. My project will be similar to most of the online versions as it will follow the Klondike set of rules. However, my project will differ from the other versions in that it will be Avatar themed.

Klondike rules:

(Description taken from: <https://www.solitaire365.com/tips/types-of-solitaire-games>)

Klondike uses a 52-card deck. The goal is to arrange them by suit, starting with the Ace and ending with the King, on empty areas called the foundations.

The cards are dealt into 7 piles on the tableau (the game area). All the cards are facing down, except for the upper one in each pile. To access and reveal the bottom cards, the players have to build sequences and move them within the piles. Sequences on the tableau are built in descending order (from King to Ace) and with alternating colors. Only Kings can be moved into empty spaces on the tableau.

The remaining cards that were not dealt into the piles are arranged in a Stock pile. These can be called into play to help players build their sequences.

Structural Plan:

Files:

- main.py

Functions:

- `playerIsLegal()`: check if the player's move is legal
- `isGameOver()`: check if the game is over
- `getHint()`: returns a hint for what the next move could be
- `autoNextMove()`: check what the next possible move could be
- `autoMove()`: perform the next possible move
- `onMousePress()`: detects when the player presses a card
- `onMouseMove()`: detects when the player moves a card
- `onMouseRelease()`: detects when the player releases a card
- `onKeyPress()`: detects when the player wants to restart the game

Classes:

- Card (attributes: number, color, suite)

Algorithmic Plan:

The trickiest part of the project is the `autoNextMove()` function. The purpose of this feature is for the program to automatically add cards to the suite stack once the user adds one card to the stack. To approach this part, I will most likely be iterating through all of the current upward facing cards to see what cards can be added to the suite stack that the user just moved a card to.

Timeline Plan:

11/22 - start project

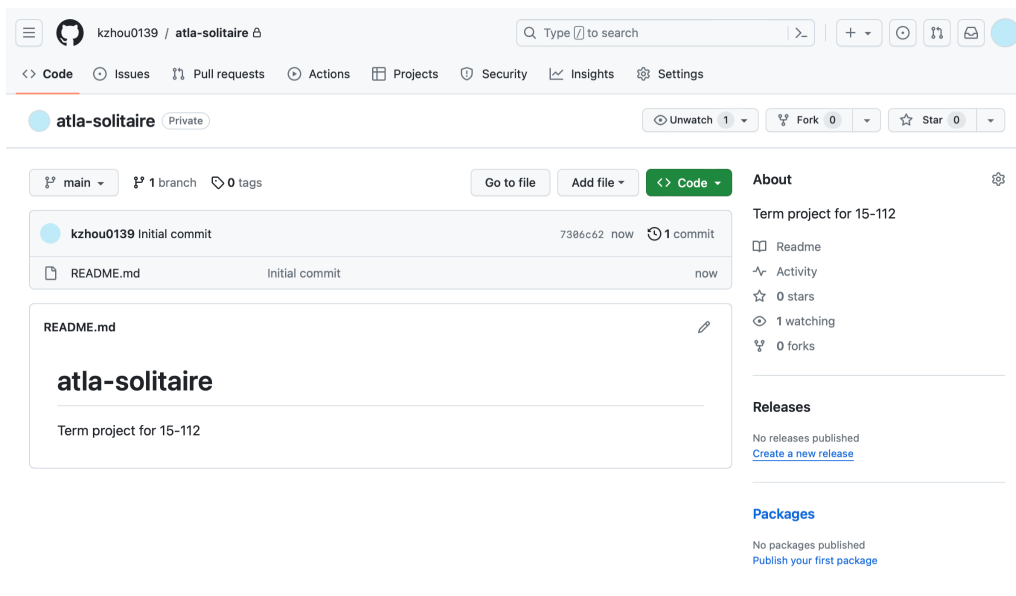
11/25 - finish making graphics, start coding

11/29 - finish basic game, start implementing automatic component

12/3 - finish project

Version Control Plan:

I plan to use GitHub for version control. Below is a picture of my repository for this project.



Module List:

Not using any additional modules.

TP1 Update

New Functions:

- onAppStart(app): initializes and declares the app variables
- initialSetup(app): sets up the coordinates for the original board
- drawBoard(app): draws the board
- redrawAll(app): draws the background and board after each update
- getCard(app, mouseX, mouseY): gets the selected card
- resetStack(app): resets the stack one all cards have been drawn
- deselectPrevCard(app): deselects the previous card once a new card is clicked
- checkSingleTableauLegality(app, card, colInd): checks for valid move when a single card is added to the tableau
- checkGroupTableauLegality(app, card, colInd): checks for valid move when a group of cards are added to tableau
- checkFourRectsLegality(app, card, colInd):

New Class:

- CardGroup (attributes: cards, selected, leftTopCornerX, leftTopCornerY, prevLeftTopCornerX, prevLeftTopCornerY)

TP2 Update

New Functions:

- cardGroupOnRelease(app, mouseX, mouseY)
 - Helper function for onMouseRelease. Moved for code organization
- stackCardOnRelease(app, mouseX, mouseY)
 - Helper function for onMouseRelease. Moved for code organization
- foundationOnRelease(app, mouseX, mouseY)
 - Helper function for onMouseRelease. Moved for code organization
- tableauOnRelease(app, mouseX, mouseY)
 - Helper function for onMouseRelease. Moved for code organization
- getHint(app, level)
 - Gets all of the current moves available
- getTableauHints(app)
 - Helper function for getHint()
- getStackHints(app)
 - Helper function for getHint()
- getFoundationHints(app)
 - Helper function for getHint()
- findTableauMove(app, card, cardCol)
 - Helper function for getFoundationHints(), getTableauHints(), getStackHints()
- findEmptyFoundation(app)
 - Helper function for getTableauHints()
- findFoundation(app, card)
 - Helper function for getTableauHints(), getStackHints()

- nextBestMove(app, hints, maxNextMoves, bestMove, level=0)
 - Finds the best move out of all current possible moves. Best move meaning the move that produces the most number of next moves
- tryMove(app, hint)
 - Performs the current hint on a test board
- moveCardGroup(app, hintList)
 - Helper function for tryMove()
- moveFoundationToCol(app, hintList)
 - Helper function for tryMove()
- moveColToCol(app, hintList)
 - Helper function for tryMove()
- moveStackToCol(app, hintList)
 - Helper function for tryMove()
- moveStackToFoundation(app, hintList)
 - Helper function for tryMove()

TP3 Update

New functions:

- resetTestStack(app)
 - Resets the test stack when empty
- undoBoard(app, hint, whichBoard)
 - Undoes the previous move on the real board or undoes the hint on the test board
- undoCardGroup(app, hintList, tableau)
 - Helper function of undoBoard(). Moves the card group back to where it was previously
- undoFoundationToCol(app, hintList, tableau, foundations)
 - Helper function of undoBoard(). Moves the card in the tableau back to the foundation
- undoColToFoundation(app, hintList, tableau, foundations)
 - Helper function of undoBoard(). Moves the card in the foundation back to the tableau
- undoColToCol(app, hintList, tableau)
 - Helper function of undoBoard(). Moves the card in the tableau back to its previous column
- undoStackToCol(app, hintList, tableau, drawnStack)
 - Helper function of undoBoard(). Moves the card in the tableau back to the stack
- undoStackToFoundation(app, hintList, foundations, drawnStack)
 - Helper function of undoBoard(). Moves the card in the foundation back to the stack
- allFront(app)
 - Checks if all cards in the tableau are face up
- foundationsFull(app)
 - Checks if all the foundations are full

Image citations:

- Appa: <https://youtooz.com/products/appa-sitting-plush-16-inch>
- Aang: <https://variety.com/2022/film/news/avatar-the-last-airbender-movie-release-date-1235429774/>
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- Katara: <https://tasw.fandom.com/wiki/Katara>
- Joodee: https://www.reddit.com/r/TheLastAirbender/comments/pdxvcr/joo_dee_azula_i_drew_after_my_katara_one_a_while/
- Long Feng: https://villains.fandom.com/wiki/Long_Feng
- Azula: https://www.reddit.com/r/TheLastAirbender/comments/pefdwd/no_way_no_freaking_way/
- Zuko: <https://hero.fandom.com/wiki/Zuko>
- Cabbage Man: https://www.ign.com/wikis/avatar-the-last-airbender-legend-of-korra/Cabbage_Merchant
- Momo: [https://hero.fandom.com/wiki/Momo_\(Avatar\)](https://hero.fandom.com/wiki/Momo_(Avatar))
- Suki: https://www.reddit.com/r/TheLastAirbender/comments/rcdvti/i_wish_suki_was_more_involved_with_team_avatar/
- Iroh: <https://the-youtooz.fandom.com/wiki/Iroh>
- Background: <https://twitter.com/korraandthekrew/status/1487149639279288328>