ap1_propro_JEM
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Proposal: Recreation of UNO
HW #44: Orienting Your Up Goer . . .
LEEEERRROYYYJJENKINSSS!!!!!!!
Title: Re:UNO!

JEM proposes to recreate a game of UNO. Complete with computer players and a single human player. When starting to play, the user will be able to choose the number of computer (AI) players he or she would like to go up against. Hopefully, we will be able to create AIs with different difficulty levels, but we won't be implementing it for our MVP. Below is the data structures we will use and the flow of the UNO game. Player will always be the first one to place the initial card down unless they choose not to

One other idea we would like to implement is having a DLL of Players (UserPlayer and AIPlayers) in a circle format. This would make the Skip and Reverse Action Cards easier because we could more easily access the players or change the order that they play cards in simply by changing the indices of the DLL.

Finally, we plan on creating special UNO features in Processing such as an UNO button that the Player has to click on within a certain time frame (penalty is drawing four cards) and an EndTurn button that can allow Players to end their turns if they choose to skip their turn without playing any cards.

Data Structures We Will Use:
1. Deck of cards - deque
● Total number of cards in the Deck = 108
   a. DrawPile will extend Deck.
      i. Automatically add 7 cards to the player's hand and the AI hand.
      ii. After the first 14 cards are dealt, the next card is placed in the PlacePile.
         ● If that card is not a number card, it is shuffled back into the DrawPile .
   b. PlacePile will extend Deck.
      i. Player places card on top of pile.
   c. When DrawPile becomes empty, PlacePile is shuffled and becomes the new DrawPile.
2. Card - card class. Each card will have number, color, and action attributes. Action cards include Draw 2, Reverse, and Skip, Wild, and Wild4 cards
   a. There are 4 colors: Red, Blue, Yellow, Green
      ● Each color suit has one number cards and some action cards
      ● One 0, and two 2's, 3's, 4's, 5's, 6's, 7's, 8's and 9's.
      ● Each color suit has two Draw2 cards
   b. Draw2 cards makes the next player draw 2 cards
      ● Each color suit has two Reverse cards
   c. Reverse cards reverses the order of the players

- Each color suit has two Skip cards
  d. Skip cards skip the next person
    - The Wild and Wild4 Cards have no color
    - There are four Wild and four Wild4 cards
  e. Wild cards allows a player to place down any card after the wild card is played
  f. Wild4 cards allows a player to place down any card after the card is played and forces the next player to draw 4 cards
3. Player - Player class
  a. Will have an place method and draw method
  b. User will extend the player class
    i. Will have an auto-sort method
  c. AI will extend the player class
    i. (Not fully hashed out yet) Some kind of recursive method to choose best card to place

Flow of Uno:
1. Each player is dealt 7 cards, face down
2. Show player's hand
3. Autosort player's hand using heapsort.
4. Player will place first card in PlacePile', placing the card face up.
5. Next player will then place a card. This card has to match the previous card in color or number.
6. If a player can't match a card, draw from DrawPile. If card can be played, play it.
7. Continue steps 4 and 5 until one player has one card
8. If a player has one card, they shout UNO! (simulated by a button)
9. AIPlayers will use a heapsort method to choose the best course of action.
10. Game ends when a player places down their last card.