

ECE 373 Project 1: Card Game Design
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Rules of Gin Rummy

- Overview

Gin rummy is a version of Gin for two people. Each of the players attempts to organize as many of his cards as possible into runs and sets, and tries to keep the point value of the remaining cards low.

- Game Play

The dealer begins the game by shuffling the deck and dealing each player ten cards. The next card from the deck is then turned face up to begin the discard pile. The first player can choose to draw either the face-up card from the top of discard pile, or the face-down card from the top of the deck. To finish his turn, he must discard one card from his hand and place it face-up on the discard pile. Note that if a player draws from the discard pile, he cannot discard that same card. Once he discards a card onto the top of the discard pile, it is the next player's turn to draw.

As the players take turns, they attempt to organize their cards into runs and sets. A run is defined as three or more cards of the same suit in consecutive order, while a set is three or four cards of the same rank. A single card can only belong to one run or set at a time. It is important to note that in Gin Rummy, Aces are always low.

Ending the game

A player can end the game, called "knocking", after drawing a card, if they can arrange their hand into sufficient sets and runs. In order to "knock", the player must discard one card, and organize the rest of his cards into sets and runs such that the total value of remaining unmatched, or "deadwood", cards is 10 points or less. Cards have point value as follows:

Face cards:	10 points
Ace:	1 point
2-10:	2-10 points (2 is worth 2 points, 3 is worth 3 points, etc.)

Note that if a player is able to include all ten cards in sets and runs, this is known as "going gin". In addition, a player doesn't need to knock as soon as he can, he may choose to continue playing in order to improve his score.

Once one of the players knocks, the other player must spread his cards face-up, and organize them into sets and runs. He is now allowed to "lay off" any of his unmatched cards by extending the runs and sets of the knocker. Note that if a player "goes gin", the other player is not allowed to lay off. In addition, the knocker is never allowed to lay off any unmatched cards after his opponents places his sets and runs on the table.

Finally, if the deck is reduced to 2 cards and the current player cannot end the game, then the cards are reshuffled and the game restarts.

Tallying Score

If a player goes gin, he gets 20 bonus points, plus the value of the opponent's unmatched cards. If a player knocks without going gin, then each player counts the value of their unmatched cards. If the knocker has a lower count, then he receives the difference between the two counts in points. If the opponent's count is greater or equal to the knocker's count, the opponent receives the difference between the two counts in points, plus a 10 point bonus for "undercutting" the knocker.

Play continues until one of the players reaches 100 points, and wins the game.

Game Operation

The user will interact with the game entirely with the mouse. He will draw by clicking on either the discard pile or the deck. At the bottom of the screen will be 11 slots for cards in the players hand. The player can click to organize (swap cards), and discard. There will be a button to click to knock, if the player cannot a message is displayed and if they can they are asked to order there cards into combos and

click a new submit button. At the top will be 3 slots to put cards into for combos, after the first card is placed in the only new cards that can be added will need to satisfy a run or set. Once the players remaining deadwood is valid, the submit button is clickable. There is also a cancel button if the player changes their mind.

The computer player will use very basic artificial intelligence to play the game. Initially the AI will only know how to properly draw and discard cards, but if there is enough time, the AI will be able to calculate its current hand and knock when possible.

Making the Game Stateful

Every time a player discards a card to end their turn, the following information will be updated and stored:

- The remaining deck
- The discard pile
- All players
 - Points
 - Hand cards
 - Any combos that had been played when knocking

If the game crashes in the middle of a turn, play will restart with the player drawing the same card that they had drawn before the game crashed, and play will continue. The client itself will not be stateful and will only pull information from the database on the server and then post that information to the display. The game will also be saveable by storing the current information to the server and restoring a game by pulling what is currently on the server.

Making the Game Distributed and Multiplayer

Each player will run their own client instance that will communicate with the main stateful server to get and post information as turns progress. The client will show this information to its players UI. Each client instance will be set to poll the server at set intervals to update itself with the current state of the game, ensuring that each player knows all of the current information and when it is their turn.