

Gin Rummy

TECHNICAL REPORT

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I. ADTs

A. Stack

Stacks will be used to store the deck of cards in the game, the discard pile and the stock pile. A stack is the most appropriate choice for piles of cards because you always take the top card first. For the discard pile, since the cards are face up, we can use the peek operation whenever we want to see what the value is without disrupting the stack.

B. Queue

A queue will be used to determine which player's turn it is. The queue will contain up to four player names (Strings). For example, say the queue contains the names "Ann" and "Barb." If Ann is in the front of the queue, it is Ann's turn. Ann will be enqueued to the queue so that she's in the back again and then next time it will be Barb's turn. This makes sense since players typically take turns in a queue format, where the first person in line takes a turn and then goes to the back of the line.

II. Classes and Methods

1. Card.java

This class contains a single card. A card has a suit and a value. It implements the Comparable interface so that Card objects can be compared to other Card objects. It is necessary in this case to compare Card objects by value and suit. Note that the important point of comparison with suits is whether they are the same suit or not.

2. Deck.java

This class contains a Deck of cards and is a Collection of Card objects. The Deck will be stored in a Stack. The constructor should make a standard Deck of 52 Card objects. A random-shuffle method is necessary here to shuffle the deck before each new game starts.

3. Player.java

Represents a Player in the game. A Player has the following:

- Name (String)
- Hand (Vector)
- Type (String, computer or human)
- Score (int)
- Number of wins (int)

4. GinRummy.java

A GinRummy game has the following variables:

- Number of players (4 max)
- PlayerQueue
- Deck of cards (Stack)
- Stock pile (Stack)
- Discard pile (Stack)
- Boolean gameOver

One and exactly one player should be a human.

- **Deal the cards:** Set up each player's hand with 10 cards each. Pop the first card on the remainder of the deck after the deal and add it to the discard pile. Add the remainder of the deck to the stock pile.
- **Computer Player's turn:** computer Player will draw a card from either the stock pile or the discard pile (which pile is chosen randomly) and the highest deadweight card will be discarded into the discard pile.
- **Your turn:** Displays your hand to you. A scanner prompts you to draw a card from either the stock pile or discard pile. The card is added to your hand. After that, you must specify which card to drop (by declaring the Card's value and suit). That card is removed from your hand and put on the discard pile. Your score is also declared (the total value of deadweight cards). If your score is less than 10, you are offered the chance to knock.
- **Knocking:** Takes the cards of the player's opponents and checks whether they can be added to the knocker's sets or runs. Creates a temporary vector to do so. From that, each Player has a new score. The Player with the lowest score wins. Wins variable for the player is incremented by one. Game ends, gameOver is set to true.
- **Check for "gin status:** If the player's hand can be comprised of only sets and runs with no deadweight cards, their score is 0 and they can declare gin. Computer players will

automatically declare gin but a human player must declare it. From that, the Player with gin wins the game. Wins variable for the player incremented by one. Game ends, gameOver set to true.

- **Play the game:** Rotate turns between players by using the PlayerQueue while the gameOver variable is false. If the Player's type is human, call the yourTurn method. If the Player's type is computer, call the computerTurn method.

5. GinRummyDriver.java

- Consists of a main method to play the game.

6. GinRummyInterface.java

- An interface consisting of all of the public methods in GinRummy.java. This allows the GUI implementer to see the functionality of the Gin Rummy game without actually having to go through the code.

7. GinRummyDemo.java

- Sets up the Graphical User Interface for the Gin Rummy game. Make a JTabbed pane to store the four panels that will be on the Gin Rummy GUI and add the panels.

8.. AboutPanel.java

- GUI Panel containing instructions for Gin Rummy and instructions on how to use the GUI to play the game.

10. Game.java

The GUI for the actual game:

- Select buttons on the cards so that users can interact with their cards by selecting them. Select buttons also on stock pile and discard pile to pick which one to draw from.
- Buttons to: 1.) Knock, 2.) Declare gin. 3.) Start a new game.
- There will be 10 labels and an additional label to hold the temporary 11th card while a player is in between drawing from a pile and discarding. Labels also to display the stock pile (face down) and the discard pile (face up). Label also to display the player's score.
- Message panel with a label displaying whose turn it is. During the computer's turn, it will tell the player whether the computer drew from the draw pile or stock pile.

12. BoundedQueue.java

- A class contained in javafoundations that implements a queue. This will be used for all of our queue ADTs. Only will allow a maximum of numPlayers in the queue.

13. ArrayStack.java

- A class contained in javafoundations that implements a stack. This will be used for all of our stack ADTs.