

FIT2102 Assignment 2 Report

Strategy

The strategy in my Gin Rummy game is making valid plays and prioritising straights over sets and choosing the most optimal melds among them. My AI will call Knock if the total deadwood value in my melds is less than or equal to 10 and will call Gin if there are no deadwood present in my melds.

Heuristic strategy

The heuristic strategy in my AI is to select cards at discard pile if it forms a meld and making melds which will ensure the total deadwood value of the hand is minimal as possible.

PickCard

In this function, I chose the heuristic strategy of selecting the card at the discard pile if it forms any melds in my hand (straights or sets). If it cannot form any melds, I will choose the card at the stock pile.

This function will make use of the makeMelds function and check if any straights or sets can be made with the card at the discard pile.

This strategy is effective as it tries to minimize as much deadwood in the hand as possible.

PlayCard

Based on the fact that Gin or Knock is not allowed in the first turn of the game. In the case for Gin, my function selectively chooses the longest meld (e.g. straight5, straight4 or set4), considering one of them has to be present if all ten cards were to form melds. It will discard the card in the longest meld (straight 5, straight 4 or set 4), and it will still remain a meld. For all other cases, my function will selectively choose the highest deadwood (e.g. Ten, Jack, Queen or King) card in my melds to be discarded.

Selecting card to be discarded

This process of selectively choosing the highest deadwood card will ensure the total deadwood value for each round is minimal.

This function along with PickCard make uses of the makeMelds in order to get the melds formed and determine the highest deadwood card.

MakeMelds

The process of selecting of melds is based on prioritisation of straights over sets and choosing the most optimal among them. The order is as follows

Straight 5 > Straight 4 > Straight 3 > Set 4 > Set 3

The key to selecting valid melds was brute forcing all possible combination of melds and filtering for the valid melds at each step.

The above said method for prioritising straights over sets may not guarantee the lowest deadwood value for the melds possible but it does ensure the amount of deadwood is as minimal as possible in most cases.

Handling overlapping cards

- One issue of brute forcing was that the same card in the hand may appear in more than one meld.
- A function removeDuplicate was created to ensure overlapped cards are removed at each step for easier handling and maintenance in the later part of the code

Functors and Applicatives

One instance of functors were used was when applying Deadwood over a list of cards in the makeMelds function when no straights or sets were formed.

Another instance is the isElem function where lifting was used to check if any elements in list1 appeared in list2 and it will return a Boolean statement. Lifting combines both fmap of Functors and apply of Applicatives and chain the methods together.

How the memory was used

The memory was used to keep track of the scores between each round. In pickCard Function, the current score will be written to the memory and playCard function will check the memory to indicate if it was the first turn of a new round and overwrite the current memory with the new score.