You Just Got Yaniv'd - GRP_3

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Abstract

The Game Yaniv: `https://en.wikipedia.org/wiki/Yaniv_(card_game)`

The game is played with a standard deck of 52 cards. Each card represents a digit from 1-13, where an ace would represent 1 and a king would represent 13. Each player of the game is dealt 5 cards to begin. The remaining cards are placed in a pile face down. To begin the game a single card is faced upwards creating a new pile. The goal of the game is to be the first person with cards that sum to 7 or less. To do this players on their turn must replace their cards. Each players hand can be split into one of 2 groups.

1. Cards in a sequence containing the same suit

2. Same card in different suits.

A single card or a group of cards satisfying these requirements can be replaced with either the existing known flipped card already present, or a new card can be taken from the deck. To reiterate, the user has two choices to replace a single card or group of cards (as previously outlined). Note that the player will only substitute a group for one card back, so it is possible to have a hand less than 5.

Summary: a single scenario of a hand given the players perspective. This includes the 5 or less cards their values and the cards that have been placed upwards. This frame of the game can be represented by a decision tree and logical arguments.

Propositions

Propositions:
n: number value of a card.
s: suit of a card.
p: position of a card in hand plus face-up pile.
e_{nsp}: This is true if some card in hand plus face-up pile is value n, suit s, and position p.
w: This is true when the sum of the n of the cards in hand is 7 or less.
h_{nsp}: This is true if e_{nsp} has a higher n than any other card in hand.
q: number of cards that have the same n and different s and p to e_{nsp}.
i: number of consecutive cards with the same s surrounding e_{nsp} throughout the hand plus the top of the pile.

m_{qn}: This is true if e_{nsp} has q.
f_{is}: This is true if e_{nsp} has i.

Constraints

f_{4s}, f_{3s} || m_{3n}, f_{2s} || m_{2n}, m_{1n}, h_{nsp} in descending order is the order of what takes precedence in deciding a move.

- $1 \leq n \leq 13$

- $S := \{diamonds, clubs, hearts, spades\}, s \in S$

- $0 \leq p - 1$

- $p - 1$ is the face-up pile card, and $p - 1 \leq 5$

- $1 \leq q \leq 3$

- $2 \leq i \leq 5$

- When w is true, then the face-up pile card must be taken out of the equation, and only the cards in hand are counted.

Model Exploration

List all the ways that you have explored your model – not only the final version, but intermediate versions as well. See (C3) in the project description for ideas.

First-Order Extension

Describe how you might extend your model to a predicate logic setting, including how both the propositions and constraints would be updated. There is no need to implement this extension!

Useful Notation

Feel free to copy/paste the symbols here and remove this section before submitting.

$$\land \quad \lor \quad \neg \quad \rightarrow \quad \forall \quad \exists$$

Requested Feedback

What can we do to improve the constraints we have? How can we make better use of logical operations in our draft?