

Fob Rules

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Abstract

This document describes the rules for Fob, or DFA Bob. The concept is simple, and it is my hope that the rules will seem intuitive to anyone who knows what a deterministic finite automata is. Blame should go to Jesper Brix Rosenkilde for having inspired the creation of these rules. He told me that the absence of a set of rules for the Bob game in F-klub had instigated the ad hoc creation of a set of rules that were “so complicated they may have been turing complete”. While this is probably not true, who is to say it is not actually possible? This version of the rules for Fob are not actually turing complete, but it is the intention that a later version of these rules will include a type of Fob which is truly turing complete.

Overview

Fob is a little more advanced than ordinary Bob. The basic idea of Fob, is that it should simulate the execution of a DFA on one or more strings, defined by the color of the pucks shot into the four holes of the board. Fob has two playing areas:

1. A standard Bob board (square, a hole at each corner, etc.)
2. A deterministic finite automata where $\Sigma = \{\bullet, \bullet\}$, printed or drawn on something (a piece of paper, or perhaps cardboard)

The dropping of a puck into one of the holes on the Bob board, is equivalent to the addition of a character to the end of the string that is linked to that hole.

Common Rules

The following rules are common for all types of Fob.

To initiate the game, place all the pucks inside the middle ring on the Bob board. Then do a break as by the traditional Bob rules (i.e., get the pucks spread out on the board somehow. The method is not too important as long as it spreads the pucks fairly randomly.)

General rules:

1. Fob is strictly turn based. One shot for each player, every round. A player can **not** get extra shots.
2. Each shot is taken from consecutive sides in the clockwise direction.
3. A shot consists of placing the black puck somewhere on the line or the two corner rings at the player's side of the board, and shooting it off with the cue.
4. Each hole on the board has a string linked to it (multiple holes may have the same string linked to them). Whenever a green or red puck is dropped into a hole, that puck is appended as a character to the end of the string linked to that hole.
5. When there are no more pucks on the board, all strings are considered complete, and the final states achieved by running the DFA on each string may be read.
6. If more than one puck is dropped into a hole by a shot, the opposing player may choose the sequence in which they are appended to the corresponding string.
7. If a green or red puck is shot off the board, it is considered lost for the rest of the game, and will not be able to affect any strings.
8. If the black puck is dropped into a hole, the shot is invalidated, no strings are affected, and any red or green pucks dropped into holes by that shot must be placed in the middle ring of the board.

Since any characters already appended to a string can not be changed, appending a character can be represented by moving a playing piece on a representation of the DFA for each string. So the evaluation of each string by the DFA, can be simulated during the game.

2 Player Tug Of War

A tug of war is the simplest type of Fob. There is only a single string which is linked to all holes of the board. One player wins if the DFA ends in an accepting state, the other wins if the DFA ends in a non-accepting state. Which player is which may be decided by a coin toss.

This type can also be played by two teams of two people each, where the two members of each team occupy opposing sides of the board.

2 Player Reject Match

A 2 player reject match involves two strings. Each string is linked to two holes in opposing corners. The fate of each player is tied to the evaluation of each

of these strings by the DFA. Each player has “ownership” of a string, so to speak. As the game starts, the upper right and lower left corner holes, from the perspective of each player’s starting position, is linked to that player’s string. The upper left and lower right holes is linked to the opponent’s string. Since each shot is taken from consecutive sides, each player will occupy two opposing sides of the board, and thus, the upper right and lower left corner holes, seen from the perspective of a player, will always be the ones linked to that player’s string. Likewise, the upper left and lower right corners will always be the ones linked to the opponent’s string.

This type of play may have three outcomes:

- The strings of both players is accepted by the DFA. This may be seen as a draw.
- The strings of both players are rejected by the DFA. This may also be seen as a draw.
- The string of one player is accepted by the DFA, the string of the other player is rejected by the DFA. The player whose string was accepted, has won.

If it was not made clear enough, please note that there is no restriction on which holes any player may shoot a puck into. A player may affect his own, as well as the opponent’s string.

As with the tug of war type of play, a 2 player reject match may also be played by 2 teams.

4 Player Reject Match

In a 4 player reject match, there are four strings, each owned by one player. Each player occupies one side of the board, and that player’s string is linked to the upper right corner, from that player’s perspective.

Since this game type has more than 2 players, rule 6 is replaced by the following rule: “If more than one puck is dropped into a hole by a shot, the owner of the string linked to that hole may choose the sequence in which they are appended to the string”.

Alliances are allowed, but beware of the following point system, and of treachery, as there are several levels of winning, and no rules governing alliances. Essentially, there is one “winning point”, which is distributed amongst all players whose strings are accepted by the DFA, except in the case where the strings of all players are accepted:

- The string of one player is accepted. The strings of the rest are rejected. The one player receives 1 point. The rest, 0.
- The strings of two players are accepted. The strings of the rest are rejected. The two players receive $\frac{1}{2}$ point each.

- The strings of three players are accepted. The string of the last is rejected. The three players receive $\frac{1}{3}$ point each.
- The strings of all players are accepted. Each player receives 0 points.
- No strings are accepted. Each player receives 0 points.

Note that this point system may be most useful in the case of several consecutive games being played.