Fanorona

Fanorona (Malagasy pronunciation: [fə ˈ nurnə]) is a strategy board game for two players. The game is indigenous to Madagascar.[1][2]

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Genre(s)	Board game Abstract strategy game
Players	2
Random chance	None
Skill(s) required	Strategy, tactics

Introduction

Fanorona has three standard versions: Fanoron-Telo, Fanoron-Dimy, and Fanoron-Tsivy. The difference between these variants is the size of board played on. Fanoron-Telo is played on a 3×3 board and the difficulty of this game can be compared to the game of tic-tac-toe. Fanoron-Dimy is played on a 5×5 board and Fanoron-Tsivy is played on a 9×5 board—Tsivy being the most popular. Black and white pieces, twenty-two each, are arranged on all points but the center. The objective of the game is to capture all the opponents pieces. The game is a draw if neither player succeeds in this. Capturing is done by either approaching or withdrawing from opponent's pieces.

Fanorona is very popular in Madagascar. According to one version of a popular legend, an astrologer had advised King Ralambo to choose his successor by selecting a time when his sons were away from the capital to feign sickness and urge their return; his kingdom would be given to the first son who returned home to him. When the king's messenger reached Ralambo's elder son Prince Andriantompokondrindra, he was playing fanorona and trying to win a *telo noho dimy* (3 against 5) situation, one that is infamously difficult to resolve. As a result, his younger brother Prince Andrianjaka was the first to arrive and inherited the throne.[3]

Board

The Fanorona board consists of lines and intersections, creating a grid with 5 rows and 9 columns subdivided diagonally to form part of the tetrakis square tiling of the plane. A line represents the path along which a stone can move during the game. There are weak and strong intersections. At a weak intersection it is only possible to move a stone horizontally and vertically, while on a strong intersection it is also possible to move a stone diagonally. A stone can only move from one intersection to an adjacent intersection.
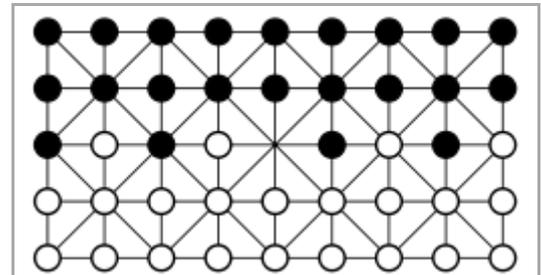
Rules

There exist variations of the rules; this is the main variant.

- Players alternate turns, starting with White.
- There are two kinds of moves: non-capturing and capturing. A non-capturing move is called a *paika* move.
- A paika move consists of moving one stone along a line to an adjacent intersection.
- Capturing moves are obligatory and have to be played in preference to paika moves.
- Capturing implies removing one or more pieces of the opponent, in one of two ways:
  - Approach—moving the capturing stone to a point adjacent to an opponent's stone, which must be on the continuation of the capturing stone's movement line.
  - Withdrawal—the capturing stone moves from a point adjacent to the opponent's stone, away from the stone along the continuation of the line between them.
- When an opponent stone is captured, all opponent pieces in line beyond that stone (as long as there is no interruption by an empty point or an own stone) are captured as well.
- An approach capture and a withdrawal capture cannot be made at the same time – the player must choose one or the other.
- As in checkers, the capturing piece is allowed to continue making successive captures, with these restrictions:
  - The piece is not allowed to arrive at the same position twice.
  - It is not permitted to move twice consecutively in the same direction (first to make a withdrawal capture, and then to make an approach capture) as part of a capturing sequence.
- However, unlike in checkers, continuing the capturing sequence is optional.[4]
- The game ends when one player captures all stones of the opponent. If neither player can achieve this—for instance if the game reaches a state where neither player can attack the other without overly weakening their own position—then the game is a draw.

Analysis

Using 10,000 games with Alpha-beta pruning players, the game-tree complexity and state-space complexity can be computed. It turns out that Fanorona has a game-tree complexity of 10^{46} and a state-space complexity of 10^{21}.

In 2007, the game of Fanorona and smaller variants was solved weakly. It turns out that this game is a draw. Both the moves f2-e3A and d3-e3A lead to a draw.[5]

See also

- Checkers

References

1. W. Montgomery (1886). "The Malagasy Game of Fanorona". *The Antananarivo Annual and Madagascar Magazine*. **10**: 148–156.
2. Bell, R. C. (1983). "Fanorona". *The Boardgame Book*. Exeter Books. pp. 150–51. ISBN 0-671-06030-9.
3. H.F Standing (1887). "The Tribal Divisions of the Hova Malagasy". *The Antananarivo Annual and Madagascar Magazine*. **11**: 354–363.

4. http://www.boardspace.net/fanorona/english/rules.html

5. M.P.D. Schadd; M.H.M. Winands; J.W.H.M. Uiterwijk; H.J. van den Herik; M.H.J. Bergsma (2008). "Best Play in Fanorona leads to Draw" (https://web.archive.org/web/20160304003200/http://schadd.com/Papers/2008FanoronaJNMNC.pdf) (PDF). *New Mathematics and Natural Computation*. **4** (3): 369–387. doi:10.1142/S1793005708001124 (https://doi.org/10.1142%2FS1793005708001124). Archived from the original (http://schadd.com/Papers/2008FanoronaJNMNC.pdf) (PDF) on 2016-03-04. Retrieved 2015-04-08.

External links

- Fanorona (https://www.boardgamegeek.com/boardgame/4386) at BoardGameGeek