

KALAH

Basics

Kalah is two-player turn-based strategy board game. It is played on a board consisting of **seeds** placed in two rows of **pits** with each player having one special pit called the **store** to their right (From here onwards, pit and store shall be two separate entities). **At the beginning of the game all pits have an equal amount of seeds in them.** Each player is said to own the pits in the pit row nearest to them (See Figure 1). The number of seeds and pits utilized varies. **A standard nomenclature for versions of the game is (p,s), where p is the number of pits per row, and s is the number of stones in each pit at the start.**

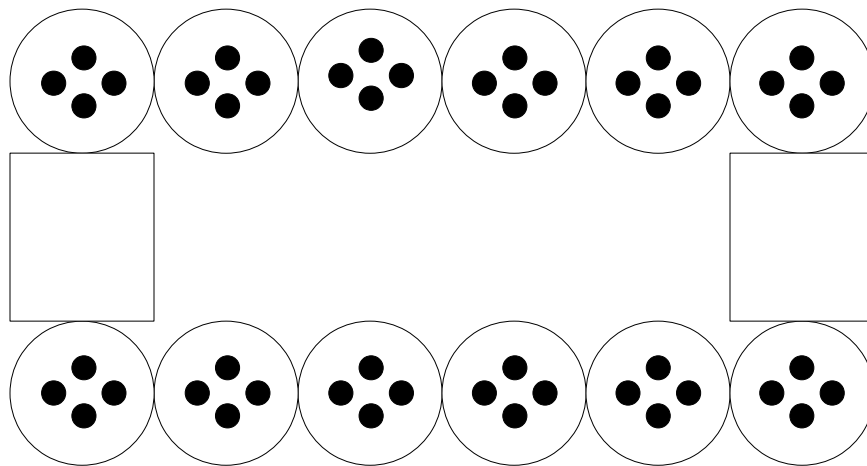


Figure 1: Initial Setup of (6, 4) Kalah

Gameplay

1. The objective of the game is to have the most seeds in your store by the end. It is possible for the game to end in a draw.
2. Players take turns sowing their seeds. On a turn, a player removes all seeds from any one of the pits under their ownership. Moving counter-clockwise (See Figure 2), the player drops one seed in each pit in turn, including the player's own store but not their opponent's.
 - a) If the sowing ends in your own store: you take another turn.
 - b) If the sowing ends in an empty pit under your ownership: All seeds in the opposite pit (on the opponent's side) along with the last seed of the sowing are captured, placed into your store and your turn is over.
 - c) Otherwise (the sowing ends on the opponent's side or in a nonempty pit on your own side): Your turn is over.

3. The game ends in one of two ways. First, whenever one of the players cannot take anymore turns (no more seeds in any of their pits). In this case, the other player captures all remaining seeds (all of which should be in pits they own). Second, when one of the players has accumulated a majority of seeds in their store, a majority being a number $> \frac{\text{pits} \times \text{seeds}}{2}$.

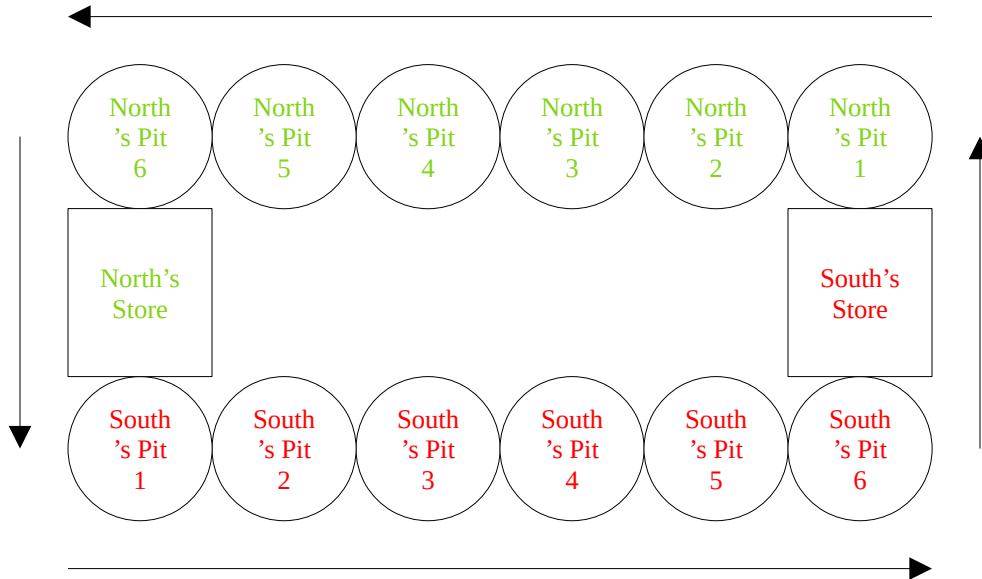


Figure 2: Annotated 6-Pit Board

Added Variation

It has been proven that assuming perfect play, the starting player always wins⁽¹⁾⁽²⁾. As such, the **pie rule**⁽³⁾ can be implemented to make the game fair. The pie rule stipulates that after the first move is made, the second player can choose to either let the move stand or switch places. In theory, this should motivate the first player to make his first move exactly average. This is because if he chooses to play a strong first move, the second player can just steal it from him but since there is a chance the second player might let the move stand he should also not play a weak first move.

Proposed Future Variations

- Add the option of a time constraint on turns to speed up game play.
- You can't perform a capture unless there is at least 1 stone in the opposite pit. Increases complexity?

[1] https://naml.us/paper/irving2000_kalah.pdf

[2] <http://kalaha.krus.dk/>

[3] https://en.wikipedia.org/wiki/Pie_rule