

## Permute: an abstract strategy game about twisting

**The basics:** Permute is a game about twisting things, inspired by twisty puzzles like the Rubik's Cube. The name comes from one of the two main things we can do with pieces in a twisty puzzle: permute them (shuffle their positions); or orient them (change their facing). In this game players take it in turns to rotate 2x2 sets of pieces ('faces') on the board, in an attempt to bring pieces of their colour together in larger groups. Once a face has been twisted, part of it is locked in place ('bandaged') and can't be twisted again. When no more twists are possible, the game is over and the players' largest groups of pieces are scored. To win the game, you must permute your pieces so that they form the largest connected group, and deny your opponent the chance to do the same!

**The rules:** Play proceeds on a square board with a 9x9 grid (or larger). At the start of the game, all squares are filled with alternating Yellow and Orange stones in a chequerboard pattern.

*Definitions:*

*Face:* a 2x2 subset of the board surface. A face may not extend off the board.

*Bandaged Stone:* a stone with a token, sticker, or other marker on it that indicates it has previously been twisted.

*Bandaged Face:* a face containing one or more bandaged stones. A bandaged face cannot be twisted.

*Twist:* a move in which all the pieces in a face are translated around that face simultaneously 90 degrees in either a clockwise or counterclockwise direction, as if rotating the face of a 2x2 Rubik's Cube.

*Group:* a group is a set of same-coloured stones connected orthogonally. The *value* of a group is the number of same-coloured stones it contains.

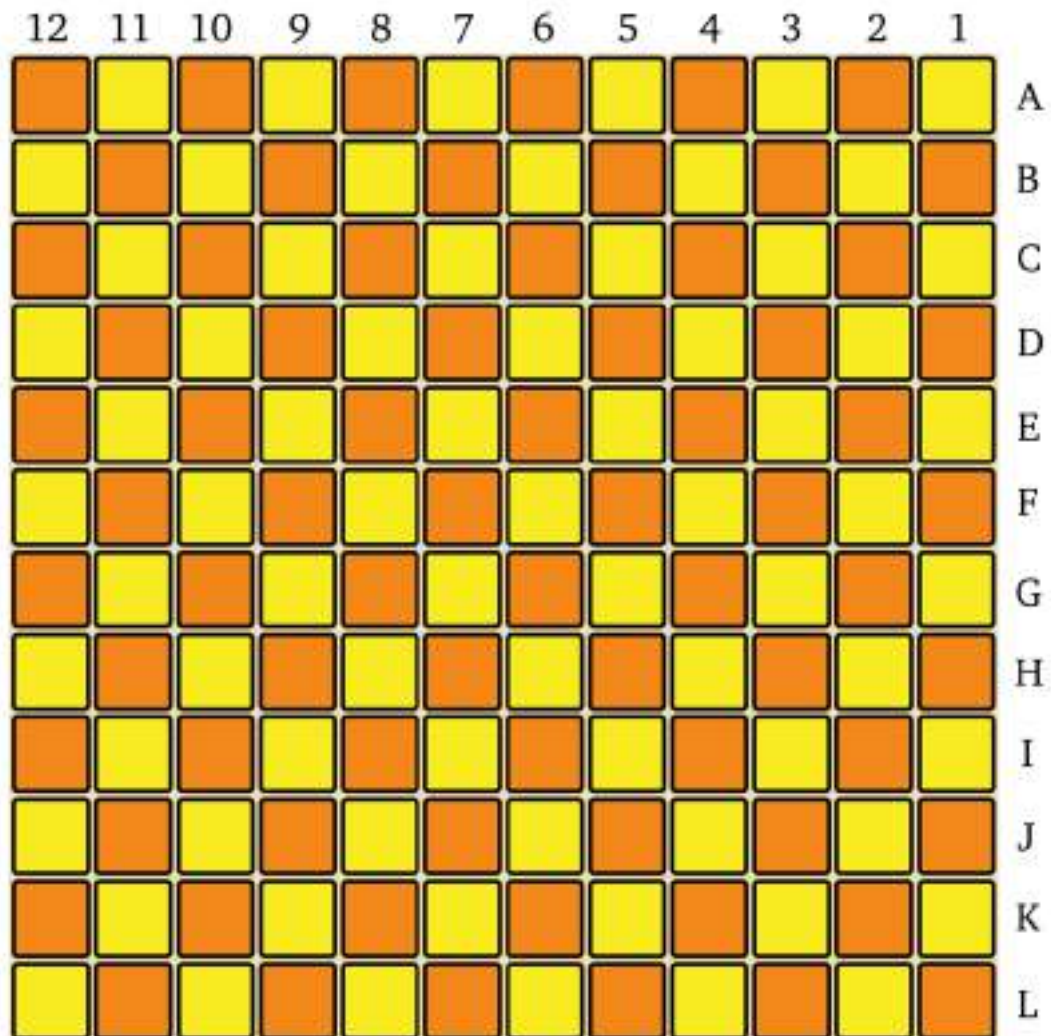
Orange plays first. The swap rule can be used – after Orange's first move, Yellow may choose either to play their first move or change their colour to Orange.

Players then take it in turns to twist one non-bandaged 2x2 face containing at least one of their colour stones 90 degrees clockwise or anticlockwise. Once a face has been twisted, the player who twisted it must select one of their stones in that face and place a token on it, thereby bandaging it. Faces containing a bandaged stone cannot be twisted. Faces consisting entirely of one colour cannot be twisted either, so this is not a way to pass a turn (but mono-colour faces can be disrupted by twists of neighbouring faces, of course).

The game ends when no more twists can be made. At this point scores are compared. The player with the highest-valued group wins; if both players' largest groups are equal in size, then compare the second-largest, then the third-largest, and so on until a winner is determined. If the board is even-sided and the scores are somehow equal all the way down, then the game is a draw, but this should be incredibly unlikely.

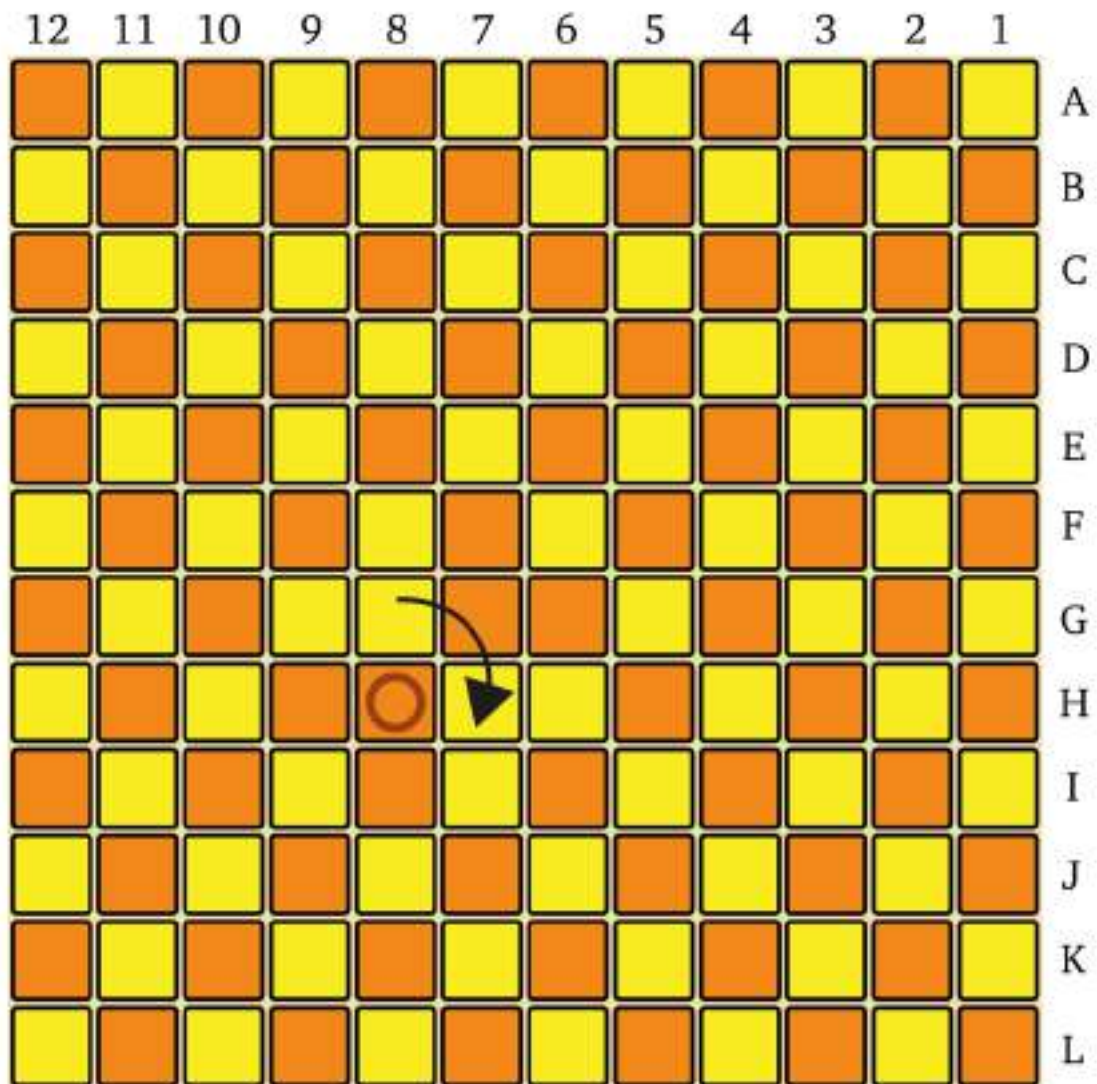
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Here's a 12x12 board set up for play:



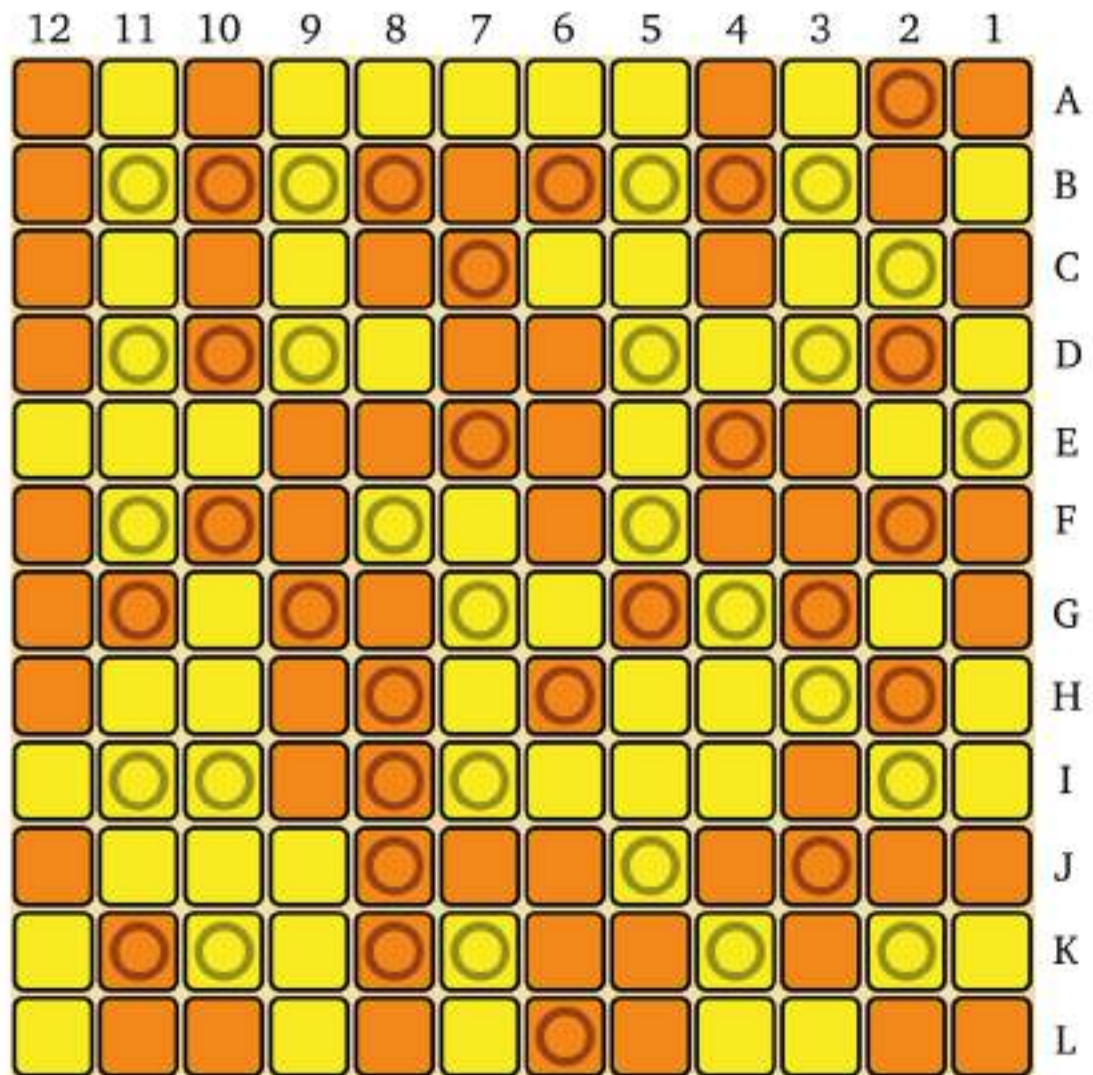
A game on a board this size typically lasts about 40-50 moves. A 9x9 or 10x10 board also works well for a quicker game.

Here's a sample opening move:

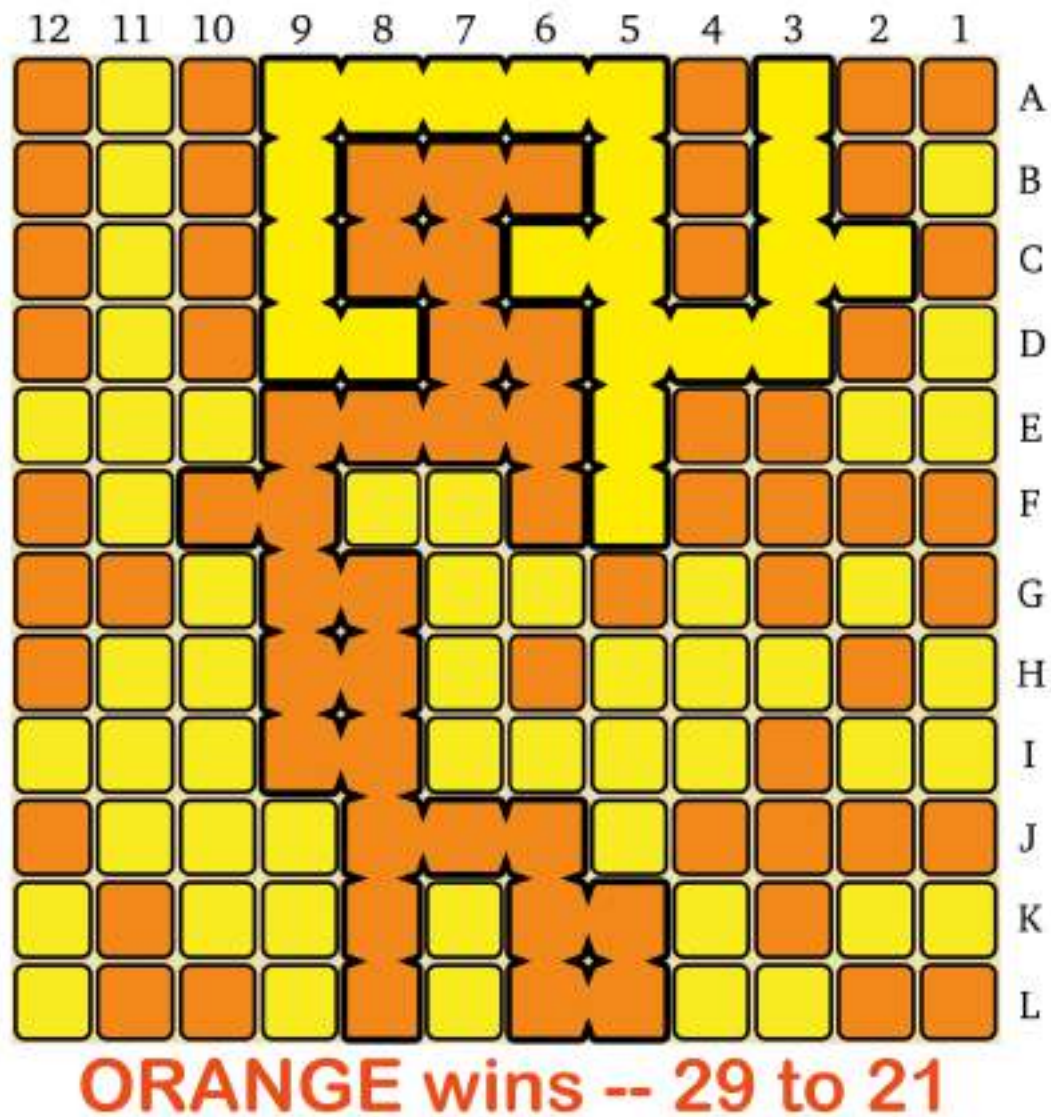


Here Orange has elected to twist the 2x2 face covering squares H7, H8, G7 and G8. This particular face is a crosscut so the direction of rotation actually doesn't matter here. Orange then chose to bandage their piece on H8, meaning that no further twists of faces including H8 can be made.

Here's what the end of a game looks like:

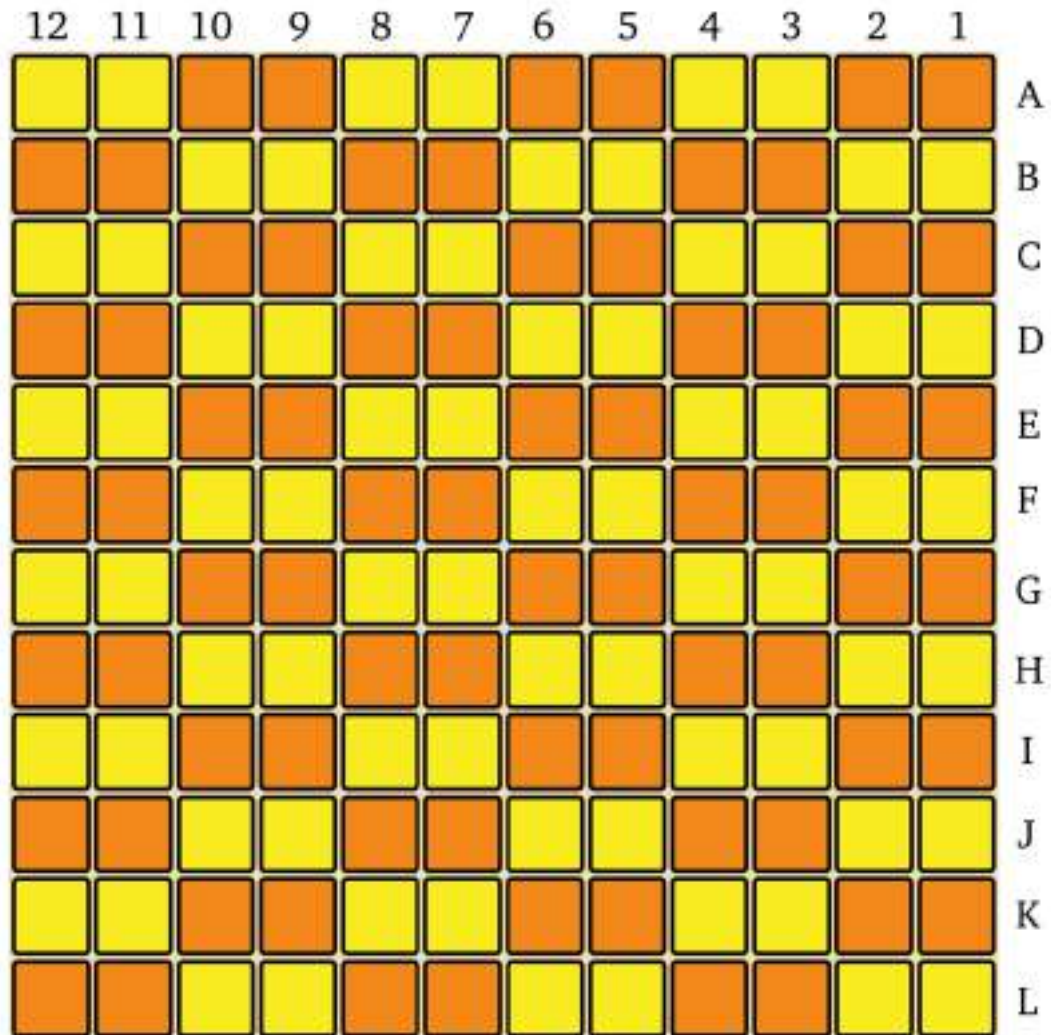


Each twist disrupts a number of pieces and their connections, so maintaining a group's integrity is tough in this game. As a result most groups tend to be long and spindly, stretching delicately across the board and reinforced with strategically-placed bandaged pieces to keep them together. In this case, Orange won the above game with their largest group of 29 pieces, compared to Yellow's 21:

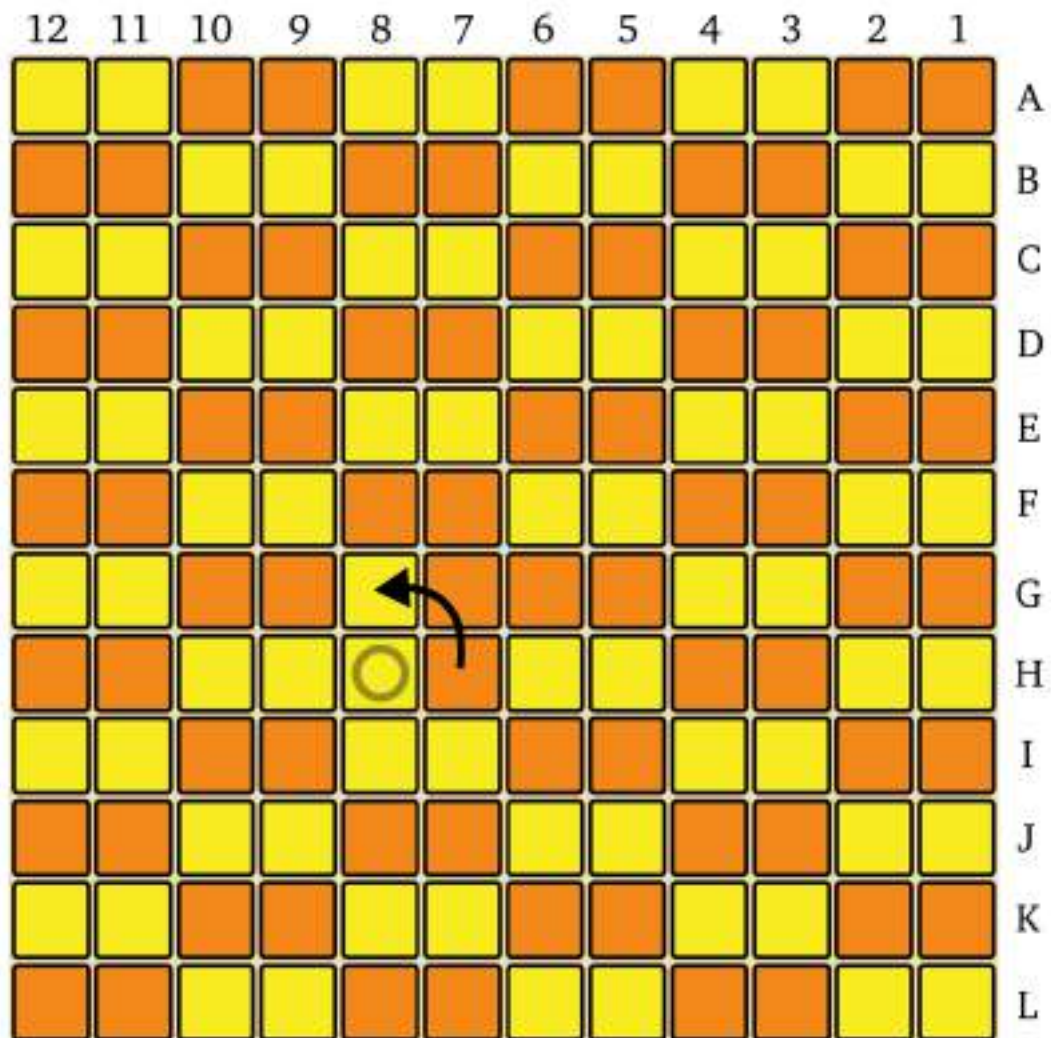




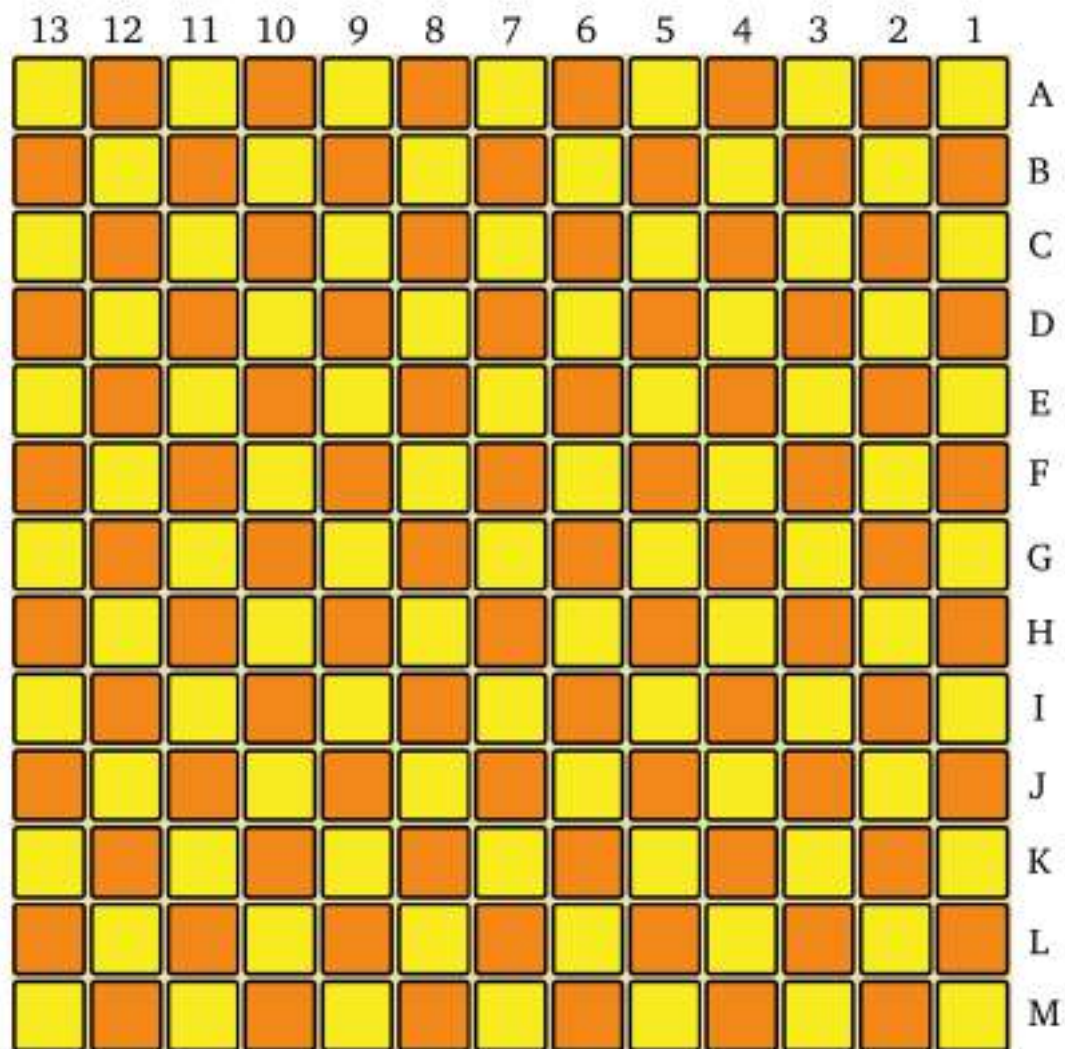
This is the secondary starting position:



The main advantages here are that this position is easier on the eyes, and early moves create a more visually clear impact on the board, which makes the game a bit easier to understand for new players:



Permute can also be played on odd-length boards, although in this case only the primary chequerboard pattern works:



In this setup, Yellow has two more pieces than Orange, which may even out any advantage gained by Orange due to moving first. However, I should note that there is no indication right now that this kind of balance adjustment is necessary; in 88,891 AI test games, winning chances were 49.99% for Orange and 50.01% for Yellow, so the balance seems pretty good in the default setup.



## Playing Permute

For the moment, a physical version of Permute is still in development. We are aiming to produce a physical game set that is specialised for Permute's twisty gameplay, and will allow players to make these unusual moves in a straightforward and convenient way. As soon as some news is forthcoming on this, I will share it in the game's BGG forum.

In the meantime, there are two ways to play Permute online or against AI:

1. MindSports – Christian Freeling's essential web destination for abstract games has added Permute to its arsenal of games that can be played against AI opponents or against human players via its Players Section. The AI opponent isn't too strong, but it's more than adequate for learning the game and getting a feel for how to win. Only 12x12 boards are supported. Find it here:  
<https://mindsports.nl/index.php/the-pit/1074-permute>
2. Ai Ai -- this fantastic Java-based platform for playing abstract strategy games added Permute in the 'Combinatorial 2020' category in its game list. This software is free, offers strong and customisable AI opponents and online play, and is absolutely essential for any abstract games fan. I've written a blog post on Ai Ai and how to play Permute with it, which you can find here:  
<https://drericsilverman.wordpress.com/2020/10/13/permute-update-now-available-in-ai-ai/>

For physical play, despite the lack of a specialised set Permute is completely playable using straightforward game components. If you have a plain square grid board of sufficient size, a supply of two colours of flat pieces, and some tokens, you can set up a game. Just make sure that the playing pieces are smaller than the grid squares, to allow you to easily rotate them without causing too much disturbance to surrounding pieces.