

Othello

Pieces and Board: Othello is played on a rectangular board of n (≥ 3) rows and m ($26 \geq m \geq 3$) columns. The default game has 4 rows by 4 columns as shown in Position 0. For an arbitrary n and m , you must center that starting 2x2 cluster for the initial position.

To Move: Each player takes turns adding a piece of their color to the board, such that you ‘flip’ at least one of the opponents pieces every turn. A piece is flipped if a move results in the piece being sandwiched between an opposing player's pieces. Pieces are flipped in both the orthogonal (left right up down) and diagonal directions (see Figure 2 for an example). If a player cannot flip any pieces, they must pass on their turn.

To Win: The game ends when both players are forced to pass. The player with the most pieces of their own color wins. If the number of pieces is equal, it is a tie.

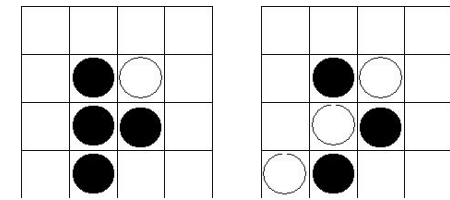
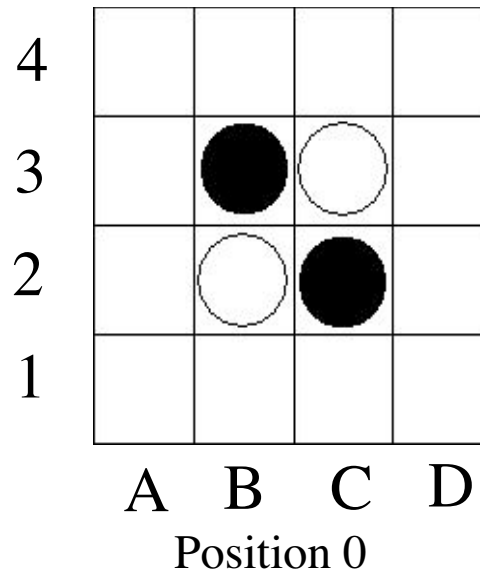
Compulsory Rule Changes:

- **Misère Rules:** You win when you have *fewer* points than the opponent when the game ends.
- **Place Anywhere:** You no longer have to flip a piece every turn, allowing you to place a piece at any location. There are no passes in this mode.

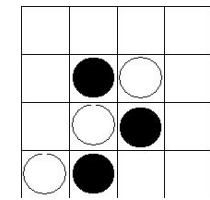
Position Representation:

• (T row row row ...)
 T stores whose turn it is (b or w). Each row is in the form $ppp\dots$ where p is “b” or “w”, representing the corresponding piece on the board, or “-” if blank. E.g., here’s position 1: (w -b-- -bb- -bw- ----)

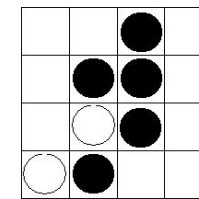
Example game starting with default board (black starts)



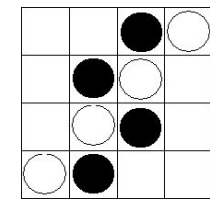
Black at B1,
flipping White
at B2 1



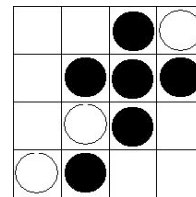
White at A1,
flipping Black
at B2. 2



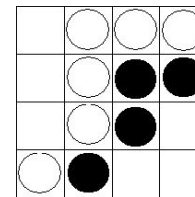
Black at C4,
flipping White
at C3. 3



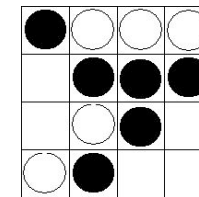
White at D4,
flipping Black
at C3. 4



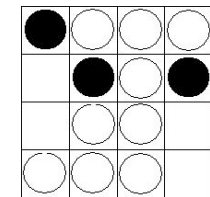
Black at D3,
flipping White
at C3. 5



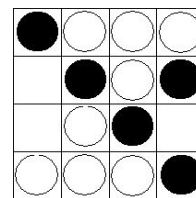
White at B4,
flipping Black
at B3, C4. 6



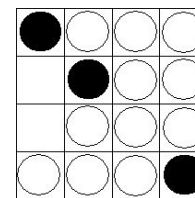
Black at A4,
flipping White
at B3. 7



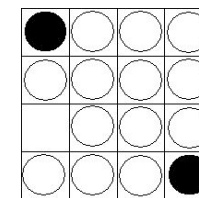
White at C1,
flipping Black
at B1, C2, C3. 8



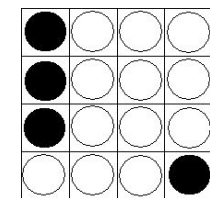
Black at D1,
flipping White
at C2. 9



White at D2,
flipping Black
at C2, D3. 10



Black
passes. 11



White at A3,
flipping black
at B3. 12

Black at A2,
flipping
White at A3. 13

White
wins,
12 to 4.