Othello game algorithms

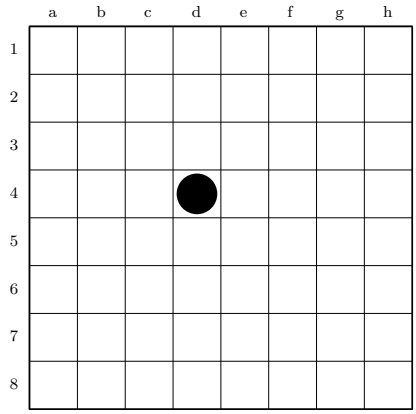
dandyvica@gmail.com

March 7, 2019

Abstract

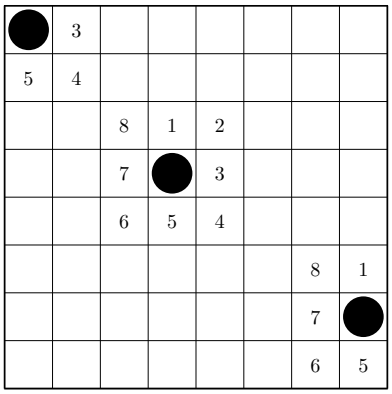
Algorithms to play Othello

1 Introduction to Othello



2 Bitboards

2.1 Piece neighbours



A piece on the board could have 3, 5 or 8 neighbours depending on its position on the board. Positions are shown clockwise

3 Notation

We introduce the following notation:

$bits_w$ = white pieces

$bits_b$ = black pieces

$bits_c$ = current player pieces

$bits_o$ = opponent player pieces

$full$ = union of black & white pieces = $bits_b \mid bits_w$

$empty$ = empty squares in the board = $\overline{full}$

$\overset{>>_d}{bits}$ = the neighbour of $bits$ in the direction d

3.1 Line cap moves algorithm

Algorithm 1 Line cap moves

$possible\_moves \leftarrow \varnothing$
for d *in* $1, 2, 3, 4, 5, 6, 7, 8$ **do**
  $candidates \leftarrow bits_o \cap \overset{>>_d}{bits_c}$ {opponent neightbours in d ?}
  while $candidates! = 0$ **do**
    $possible\_moves \mid = empty \,\&\, \overset{>>_d}{candidates}$
    $candidates \;= bits_o \,\&\, \overset{>>_d}{candidates}$
  end while
end for