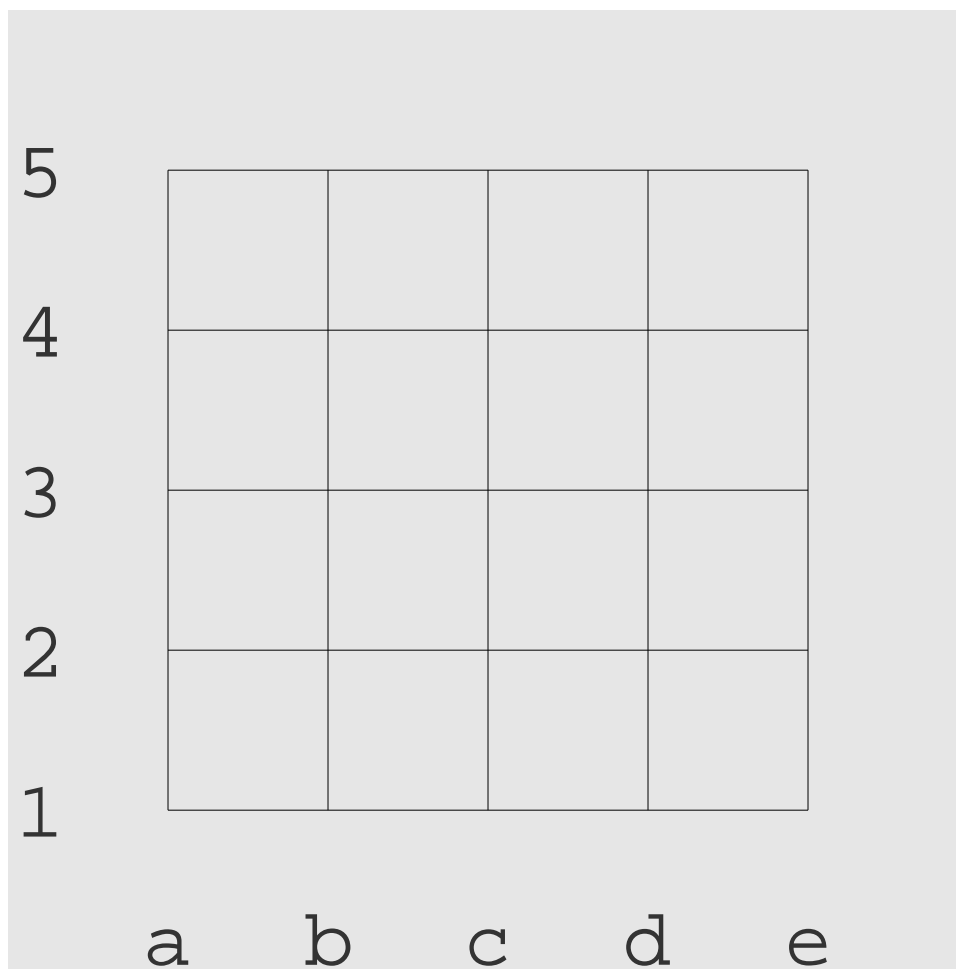
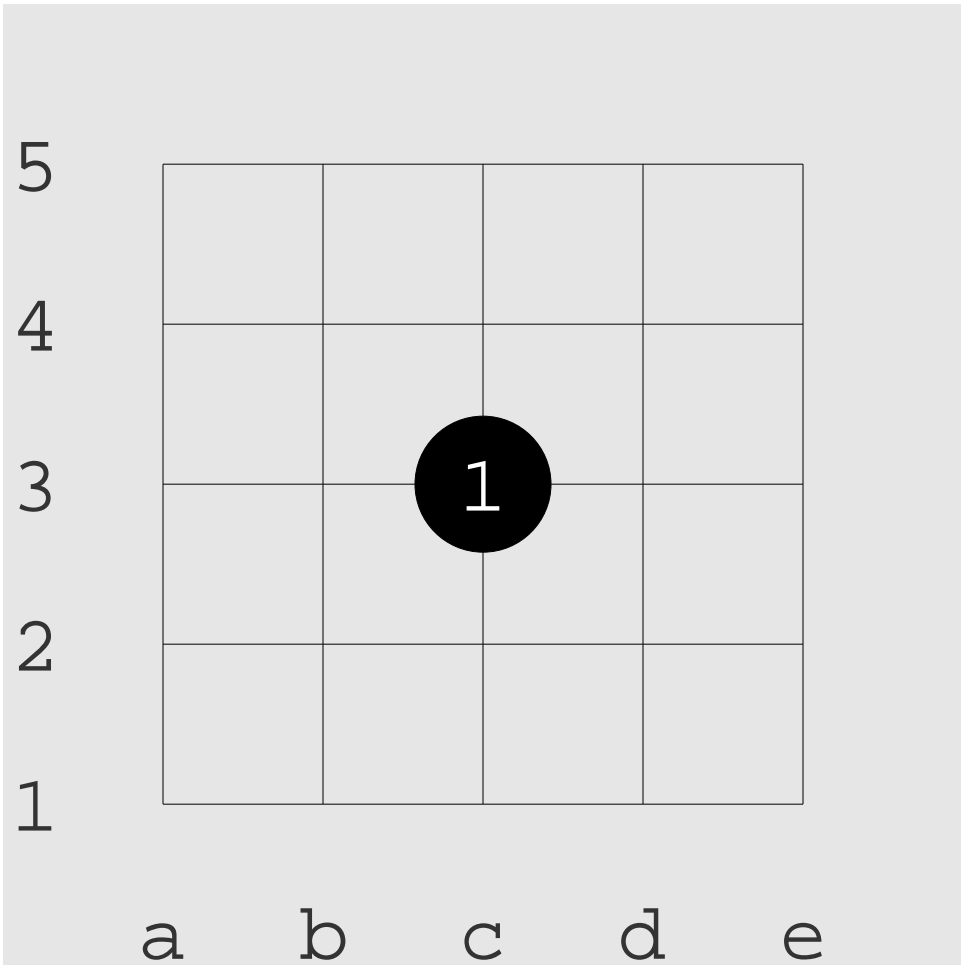
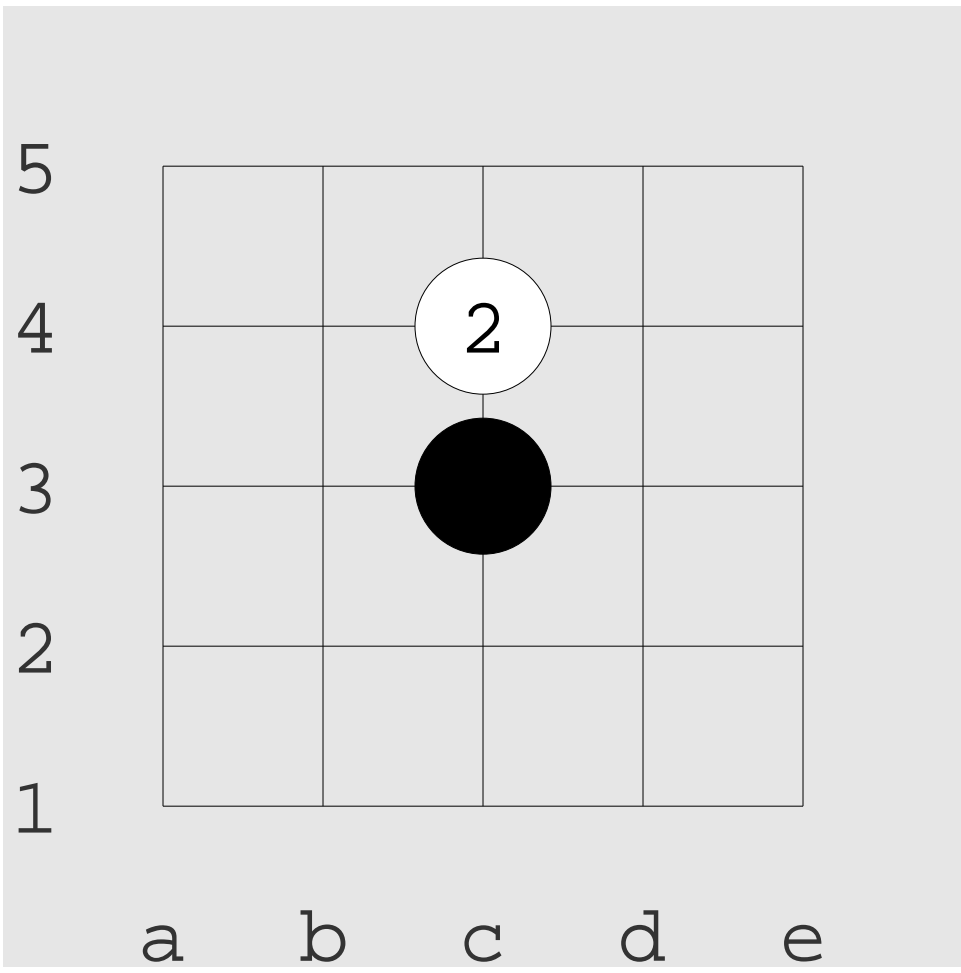


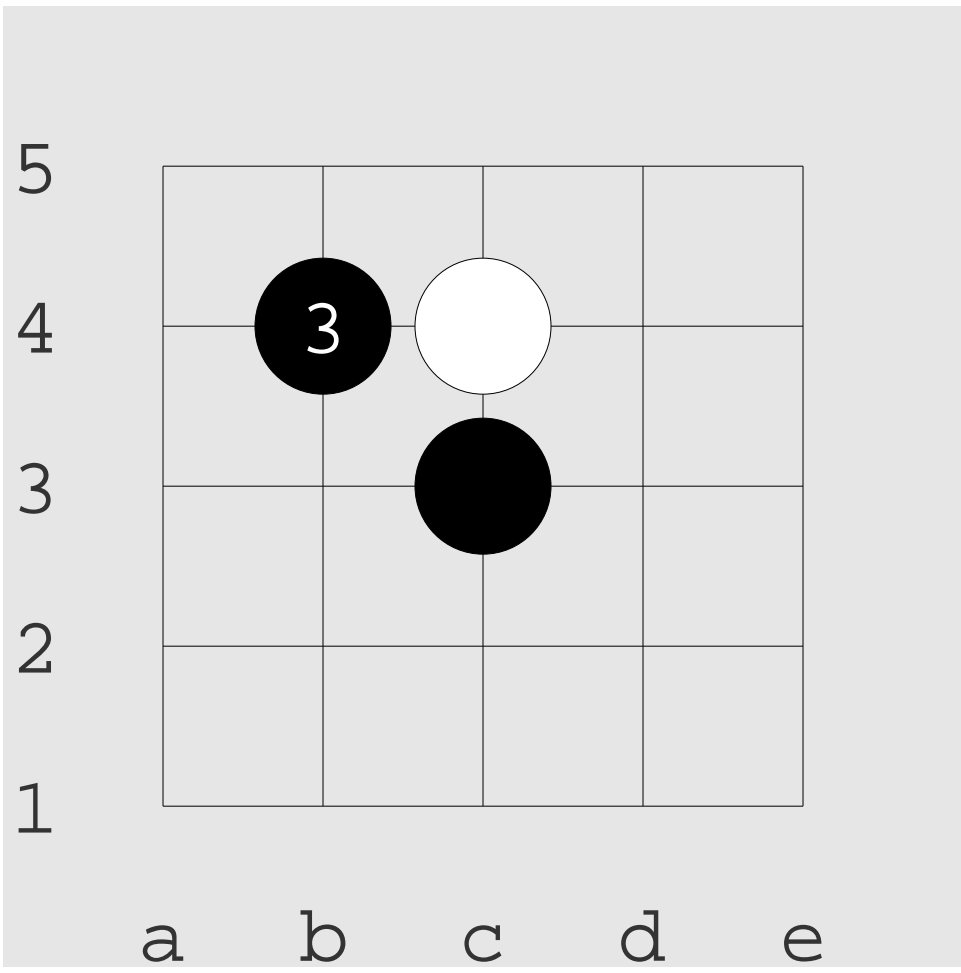
- <https://tromp.github.io/go.html>
- other versions <https://senseis.xmp.net/?RulesOfGo>
- board (grid), points, players
- positions (blocks, liberties, legal)
- points reached by a different-color point
- alternate-turn, black first
- capturing (clearing)
- pass, move
- end of game
- score
- winner

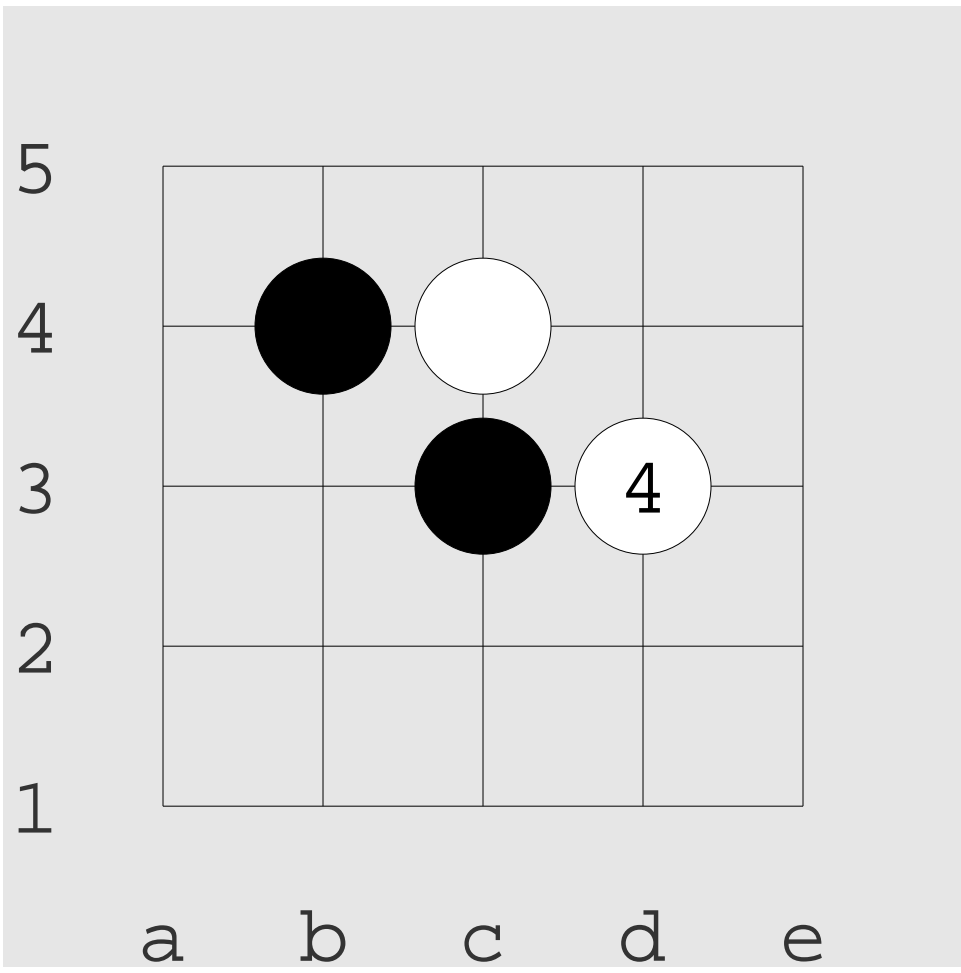


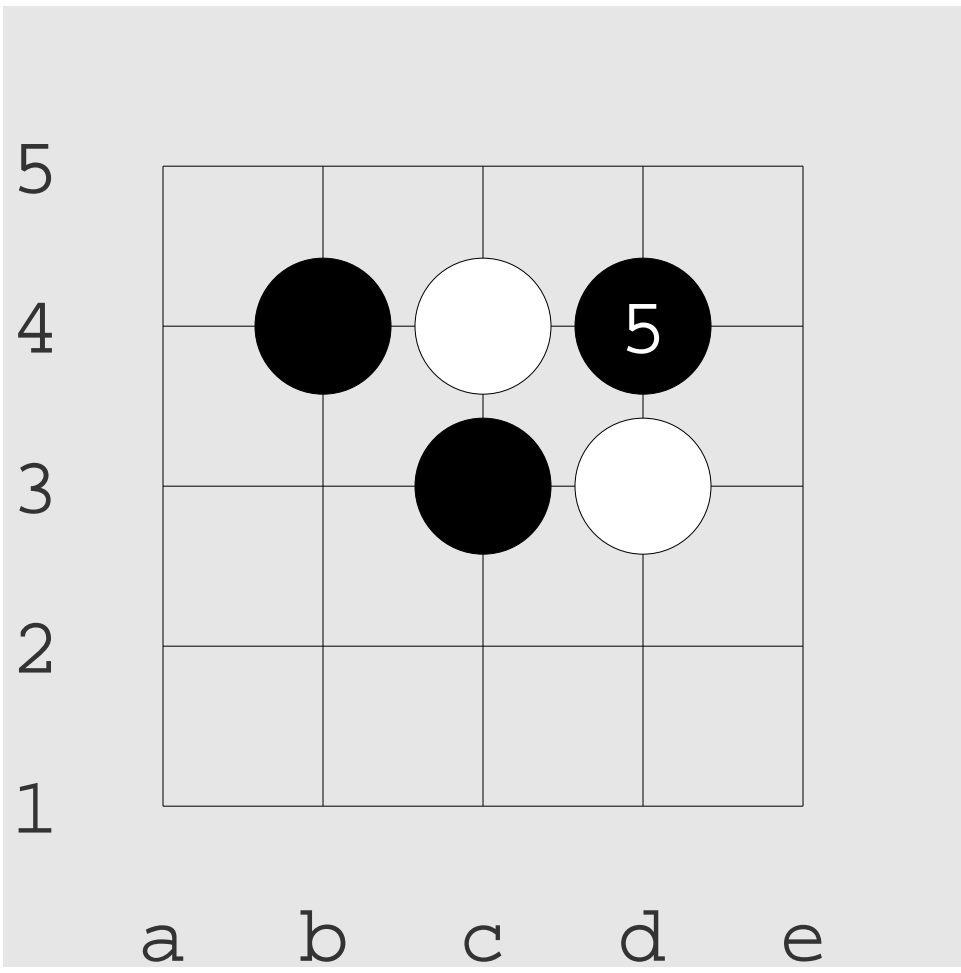
a 5×5 go game

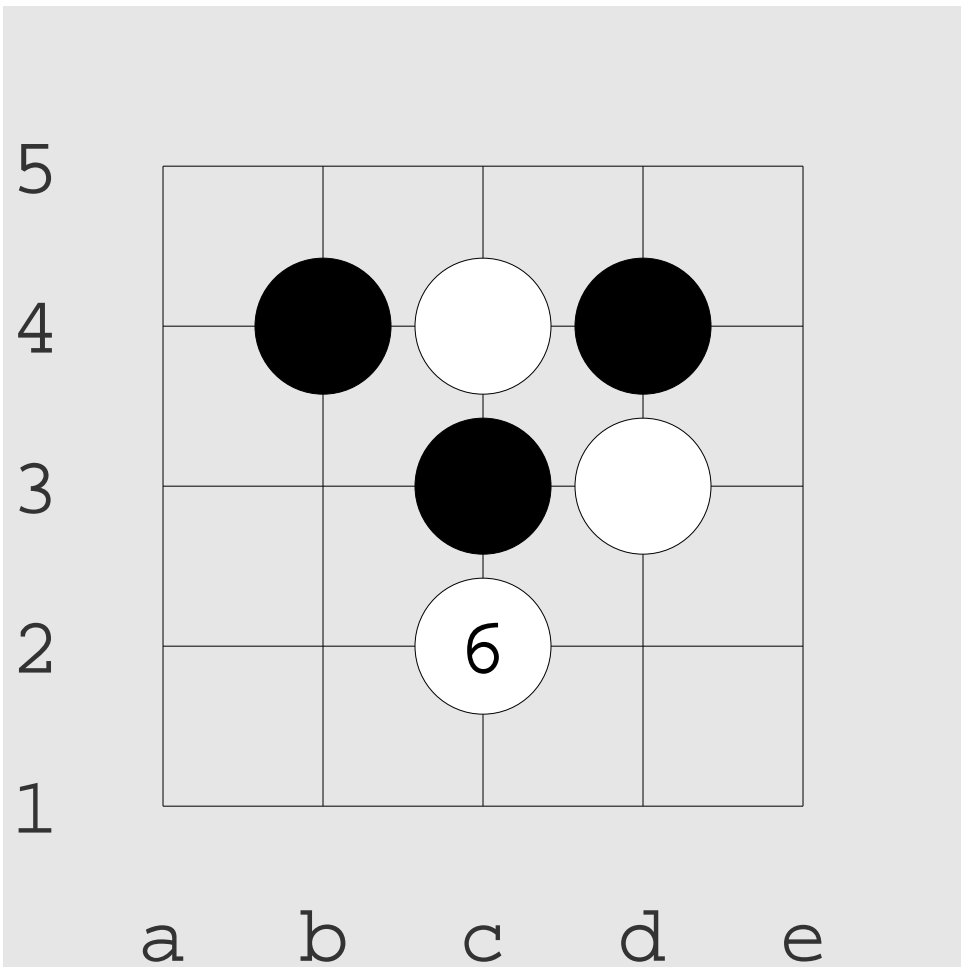


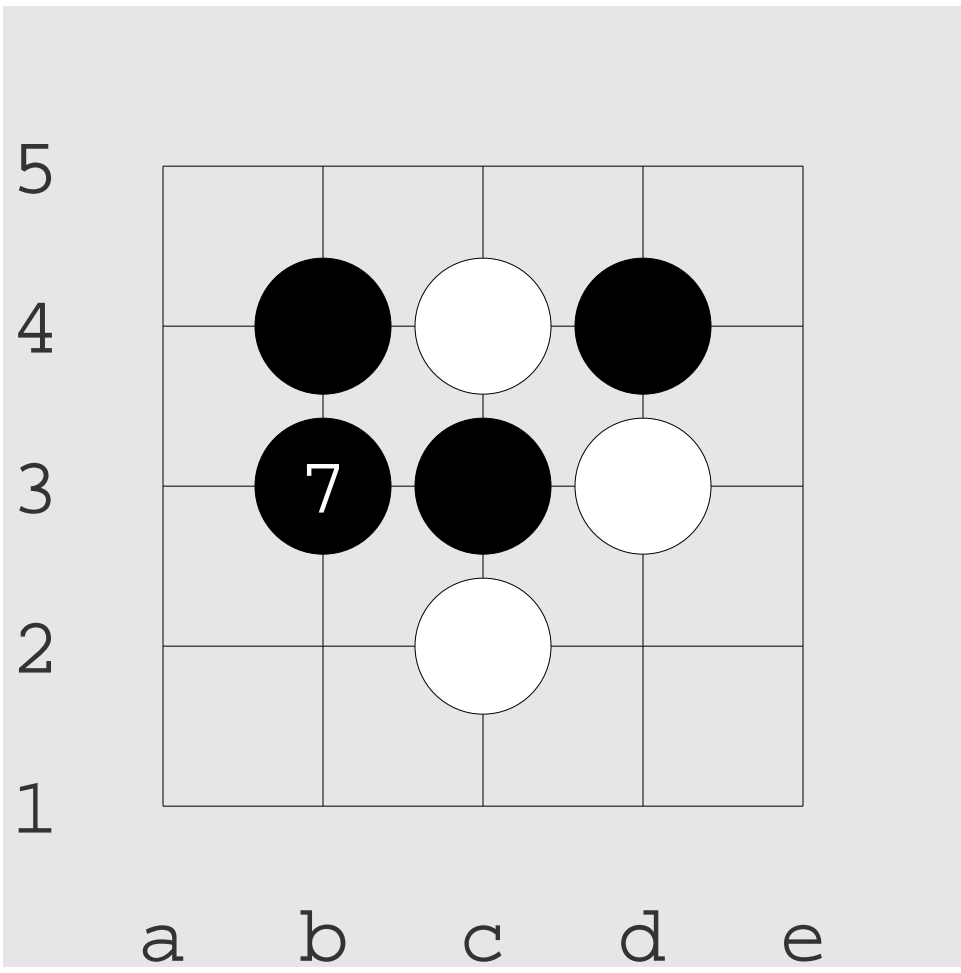


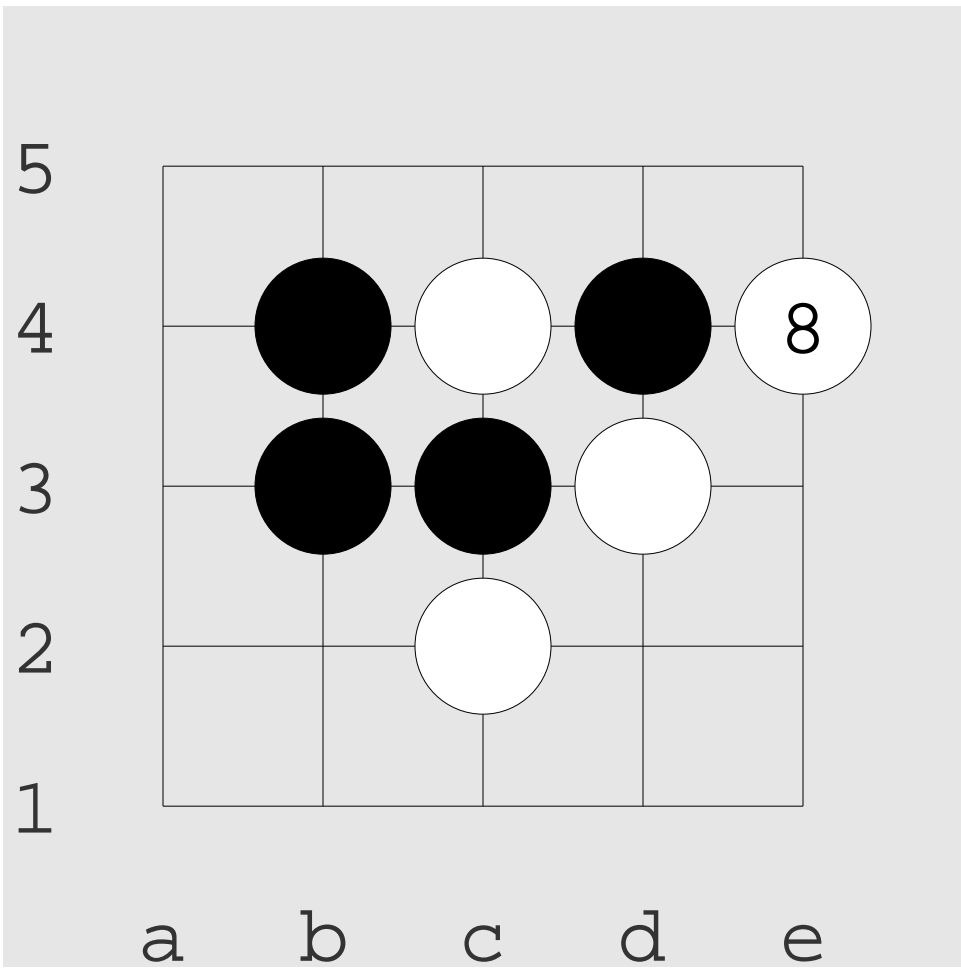


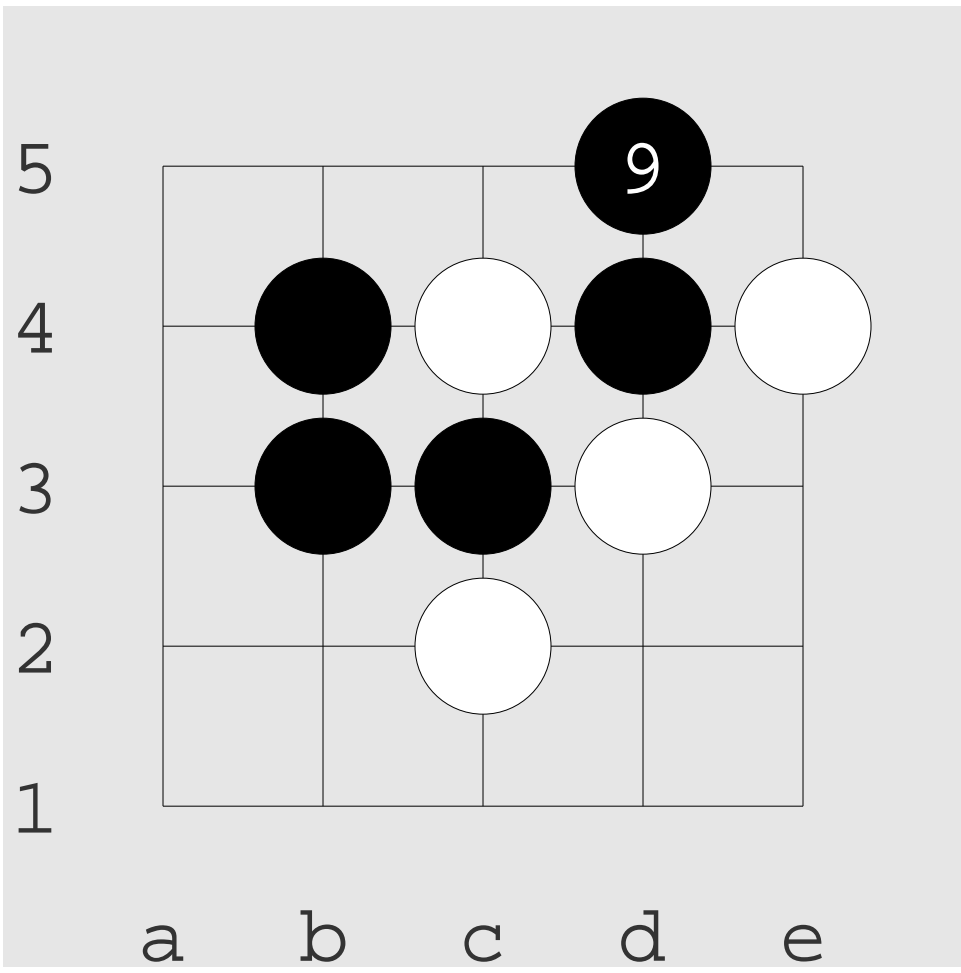


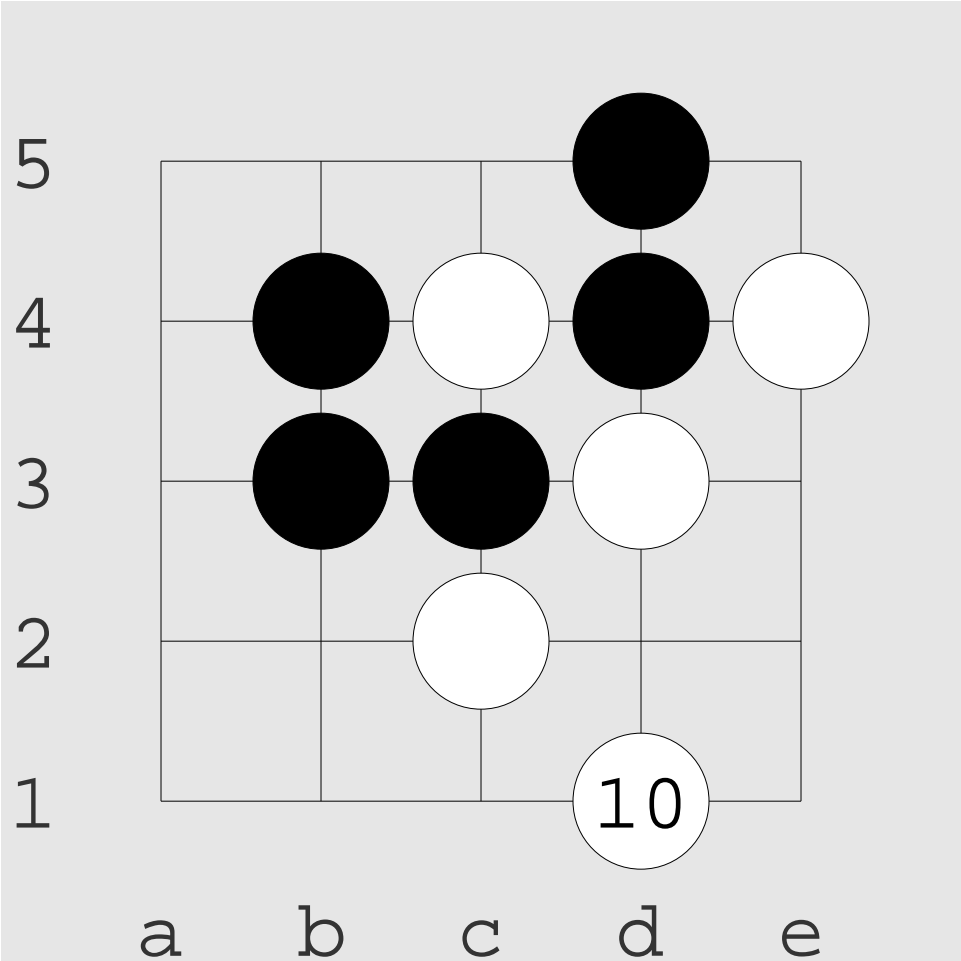


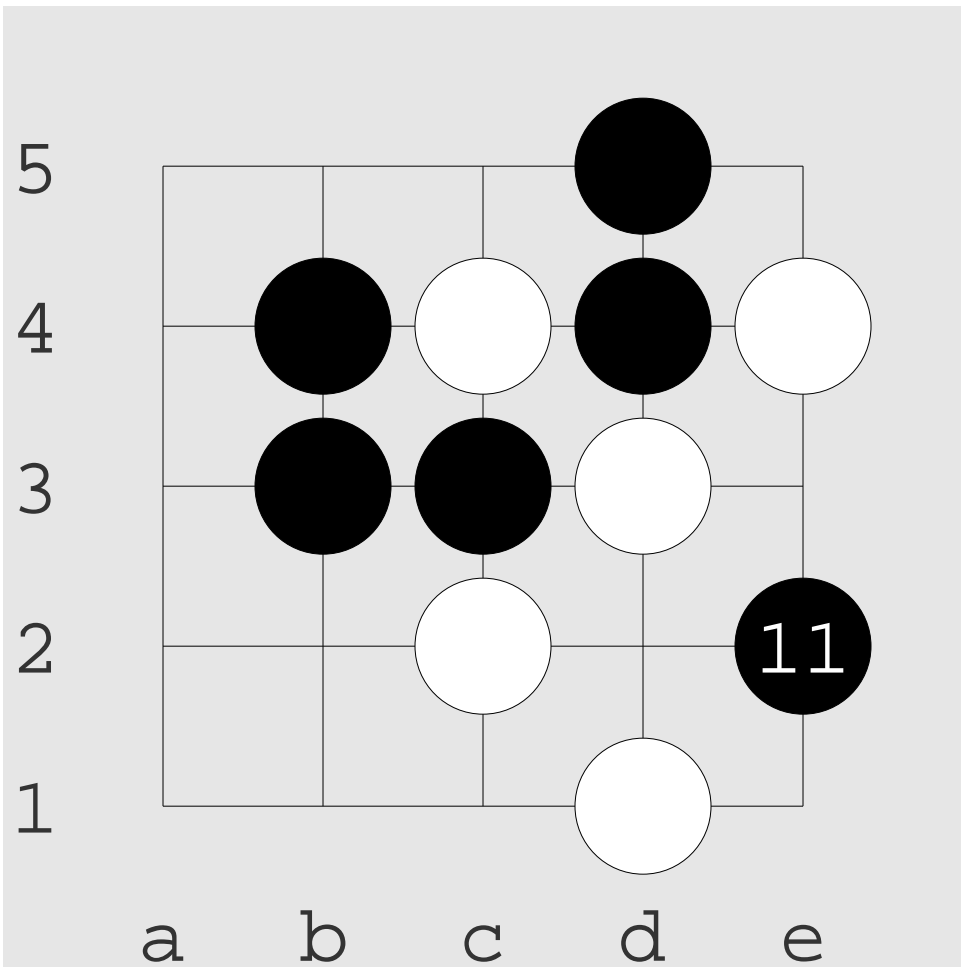


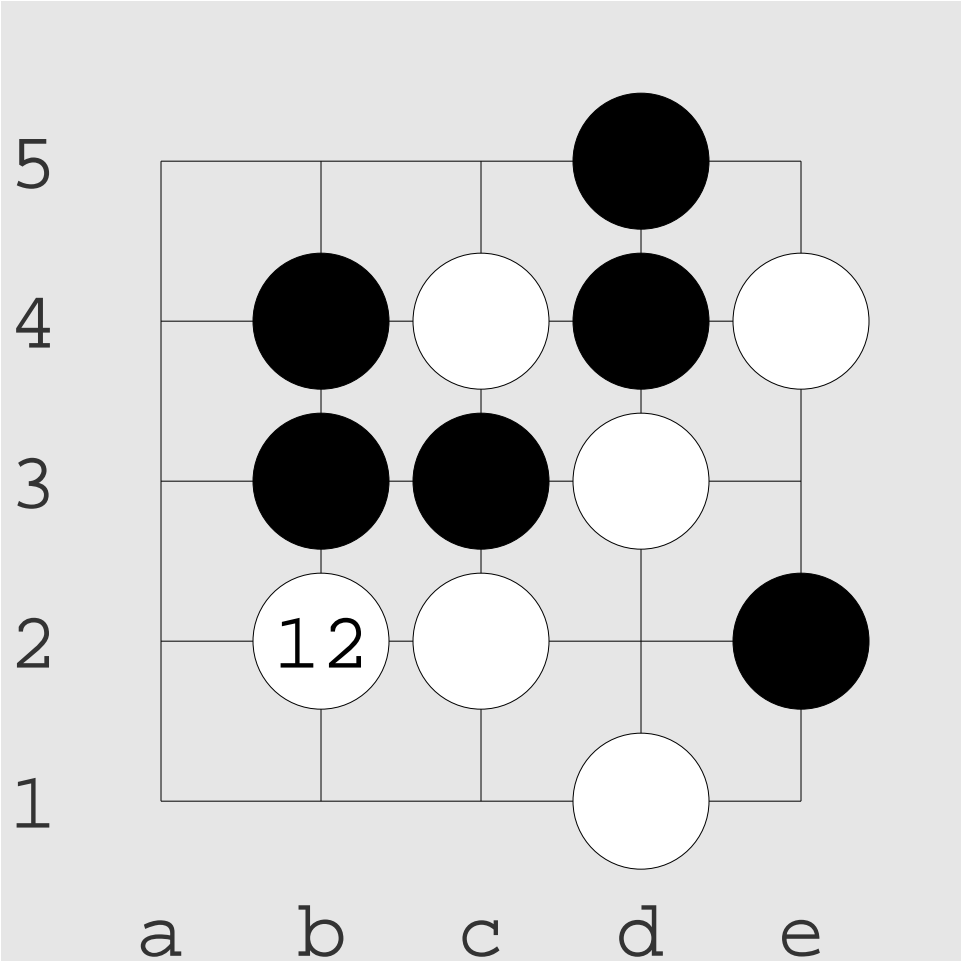


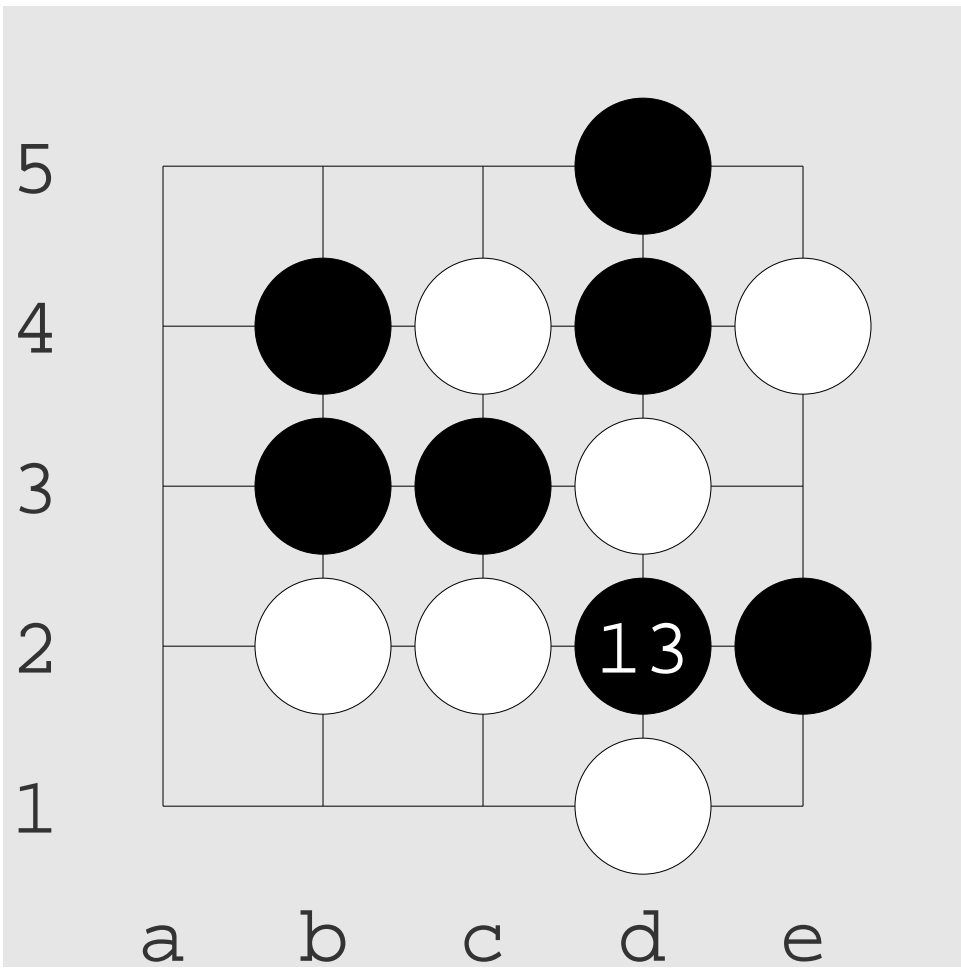


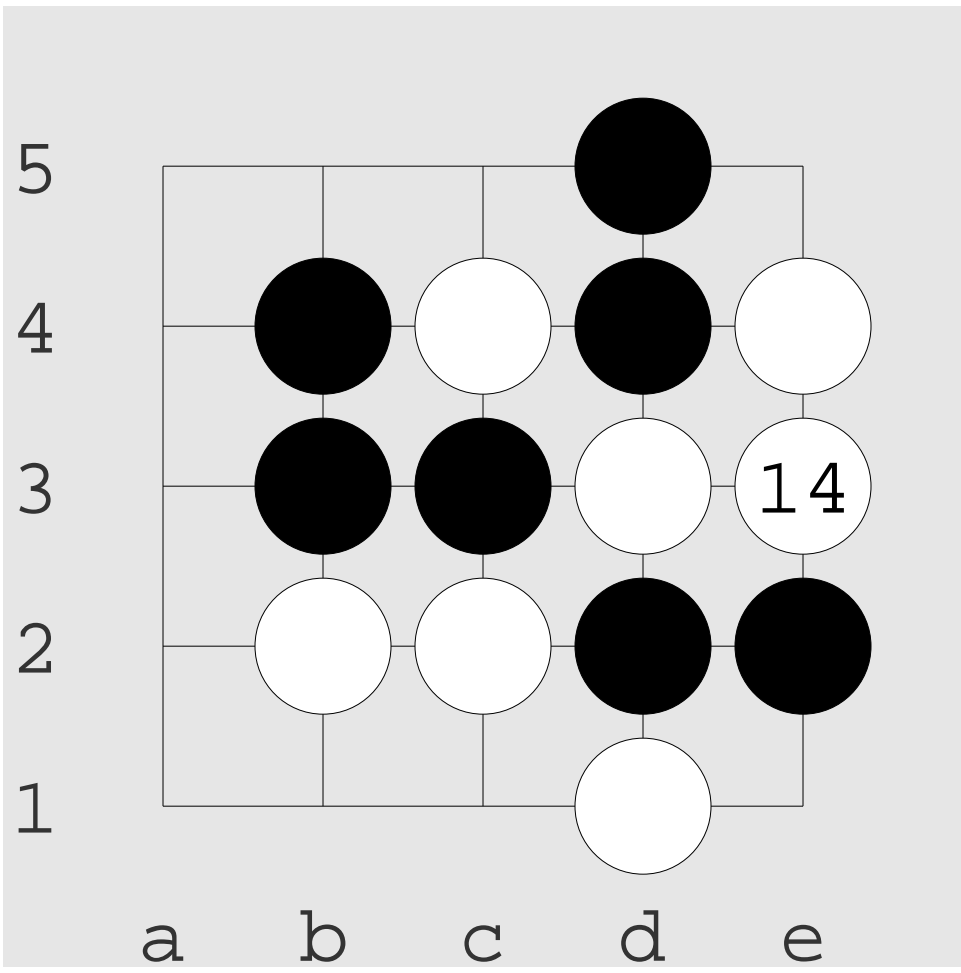


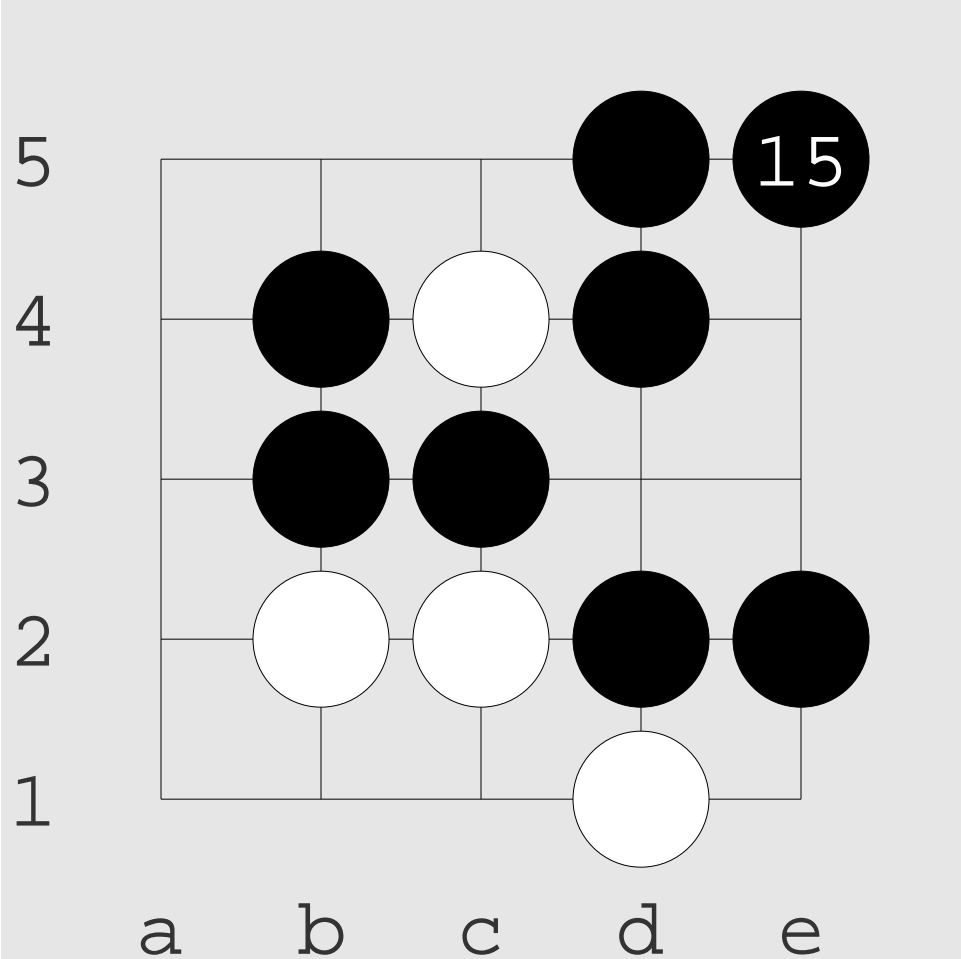


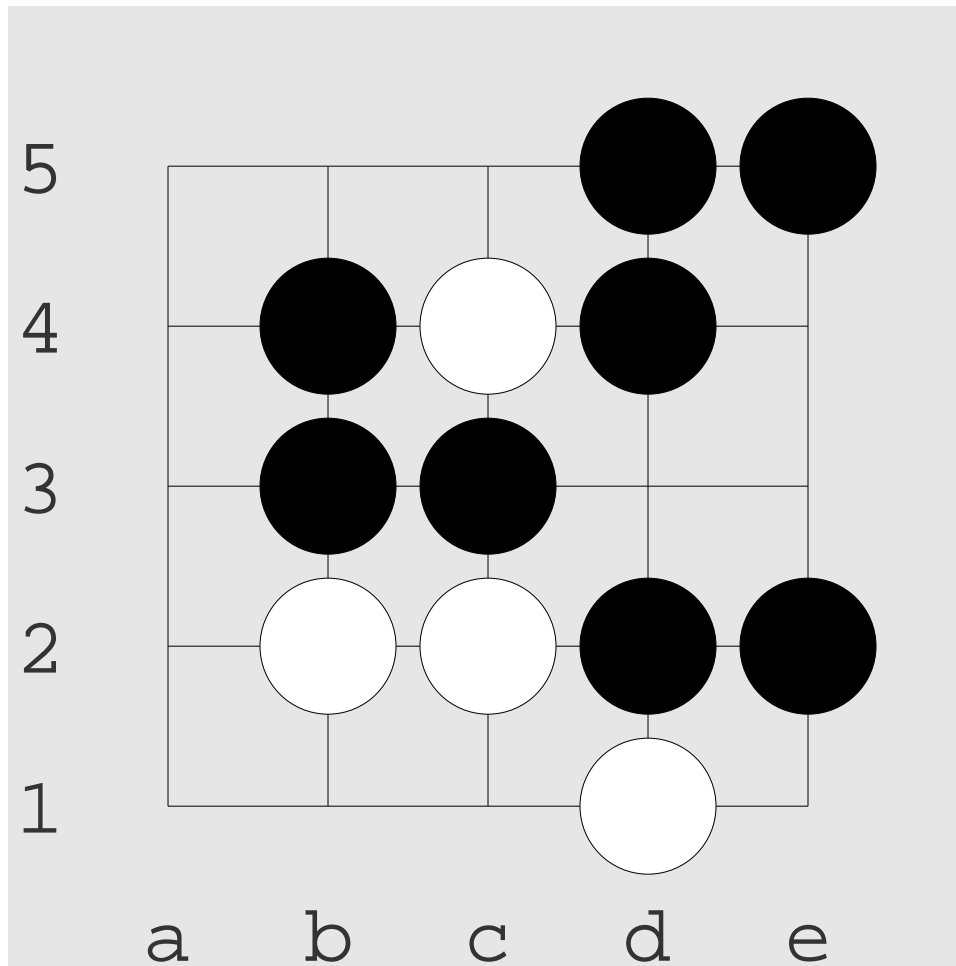




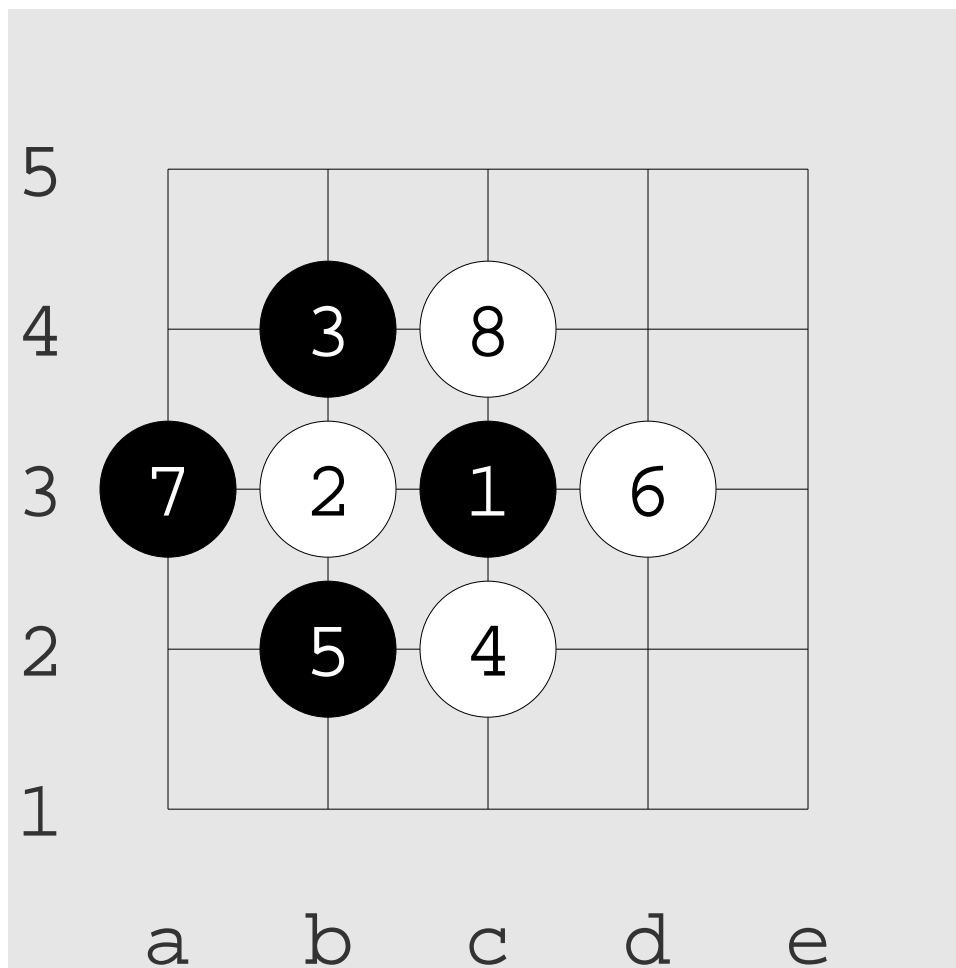




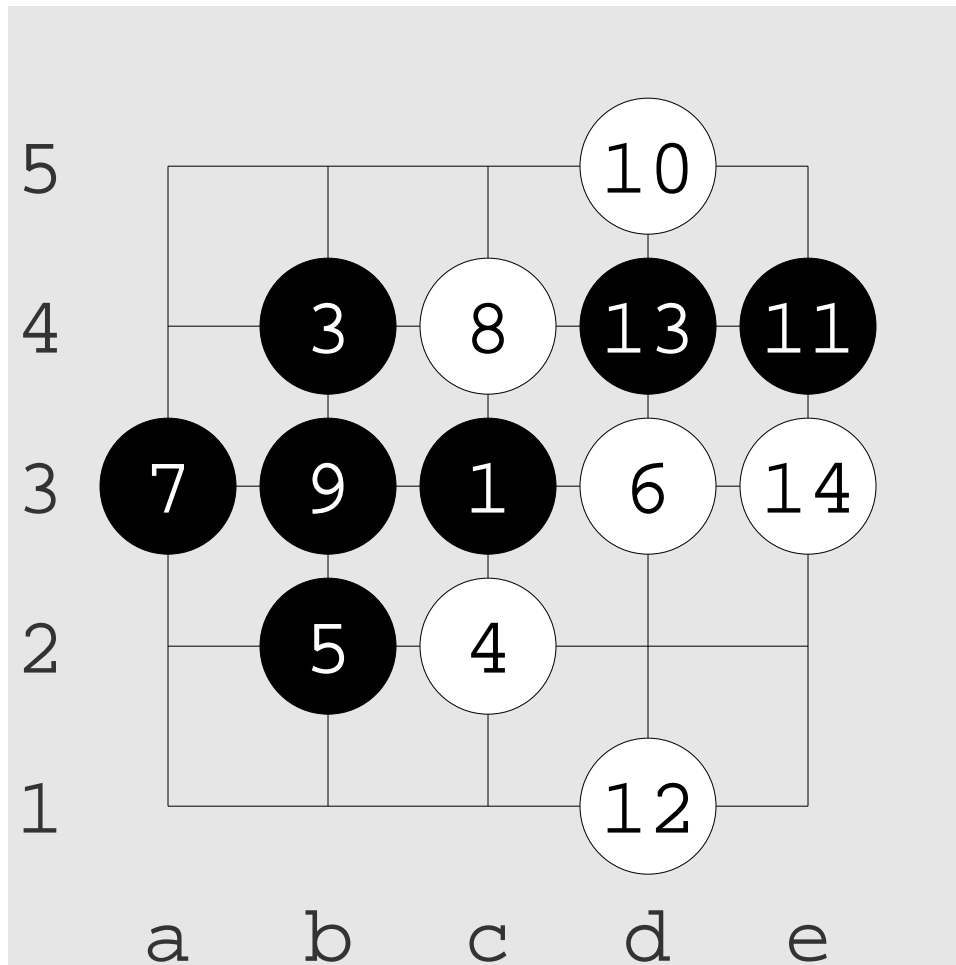




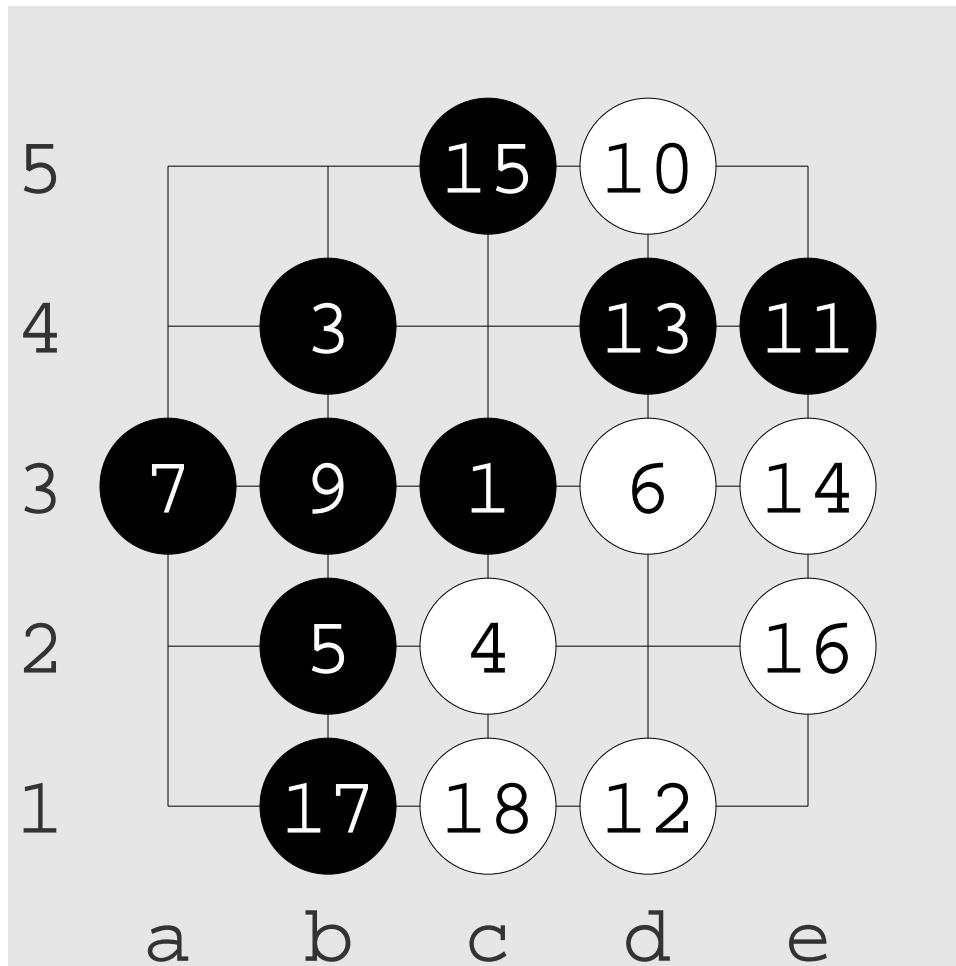
black wins 11 to 4



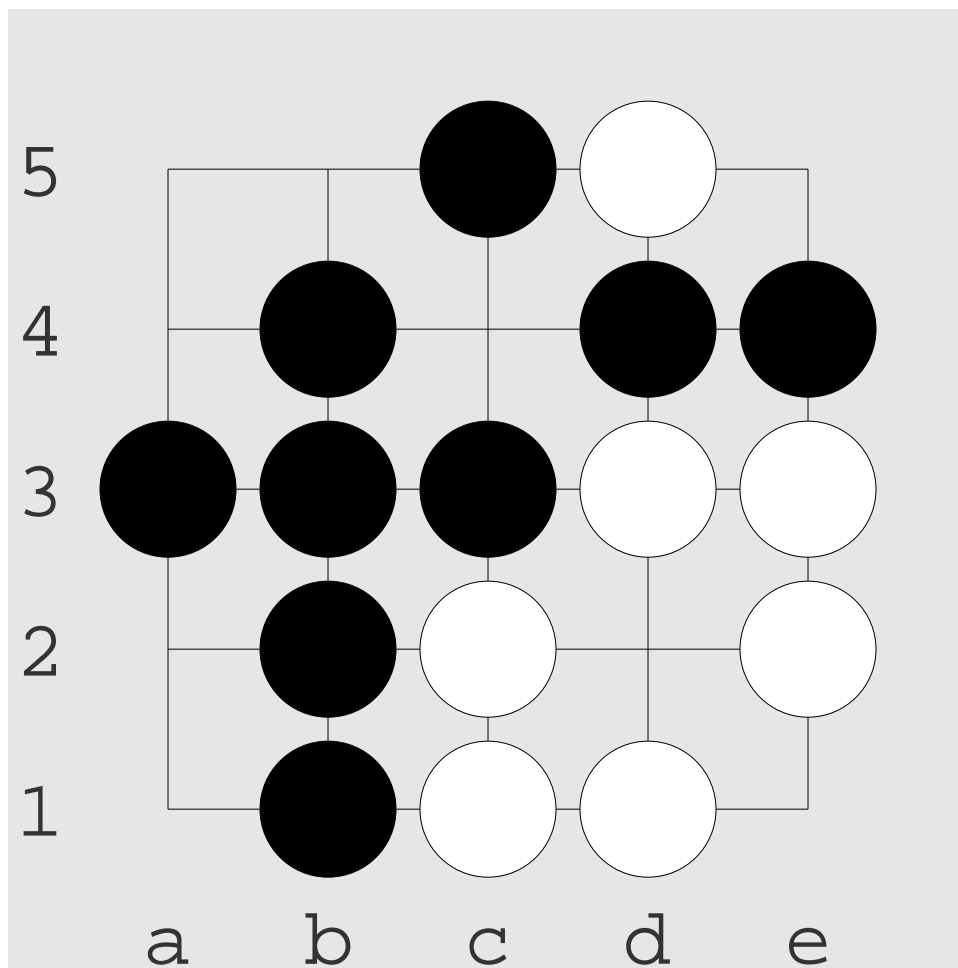
moves from another go game



moves from another go game

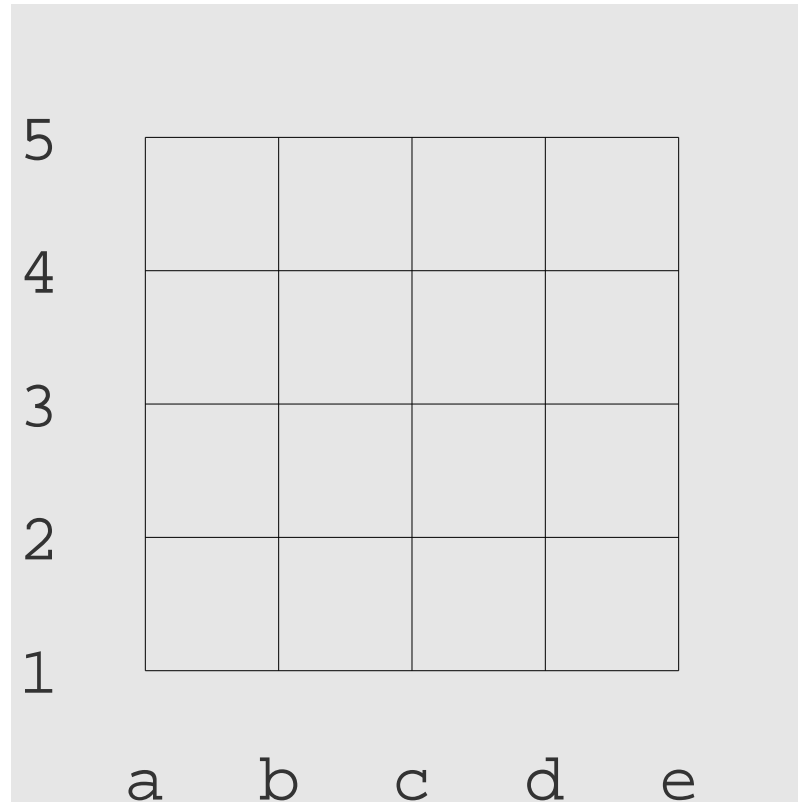


moves from another go game



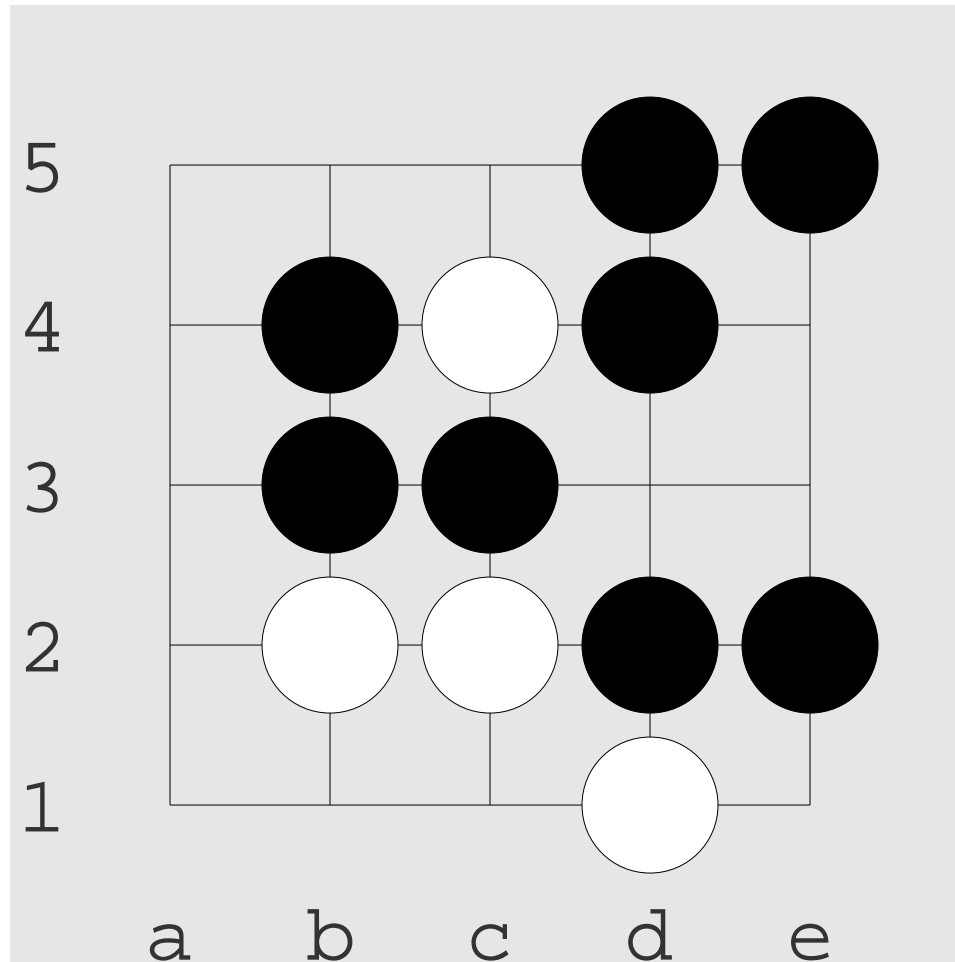
black wins 15 to 9

rule 1. *board* $m \times n$ rectangular grid of *points*,
 players black and white

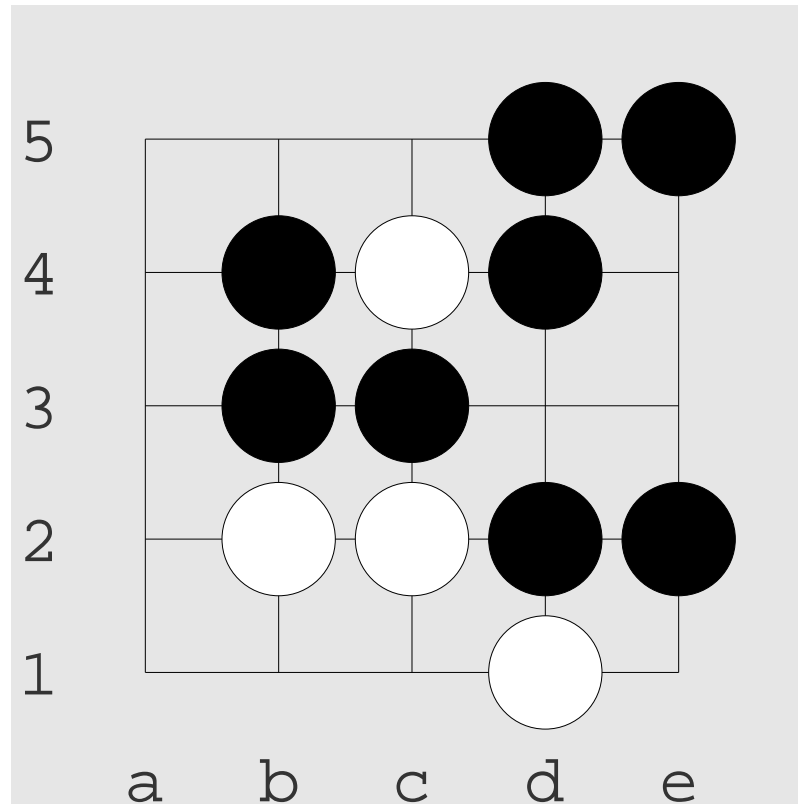


default board size **19×19**

rule 2. each point can be colored black/white/empty
(*position* grid with each point colored)



rule 3. point P reaches not- P -color C if exists
 P -color-path from P to a C -color point

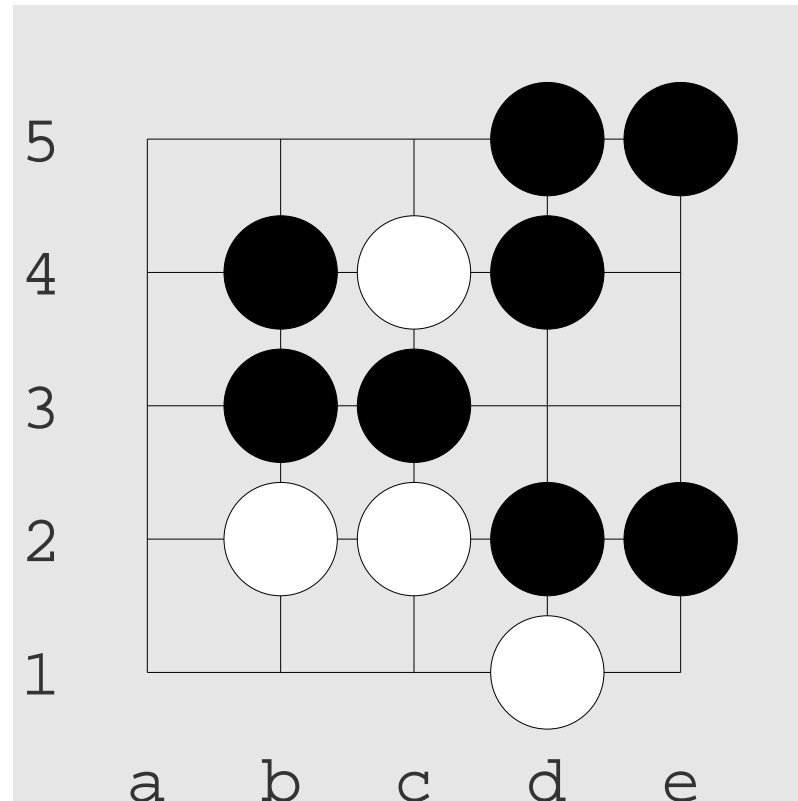


3d 3e 4e reach B-only
 all B-points reach W,E

other E-points reach B,W
 all W-points reach B,E

block connected component of same-colored points

block K liberties all E-points that touch any point of K



3 black blocks, 3 white blocks

block {d4 d5 e5} liberties: {c5 d3 e4}

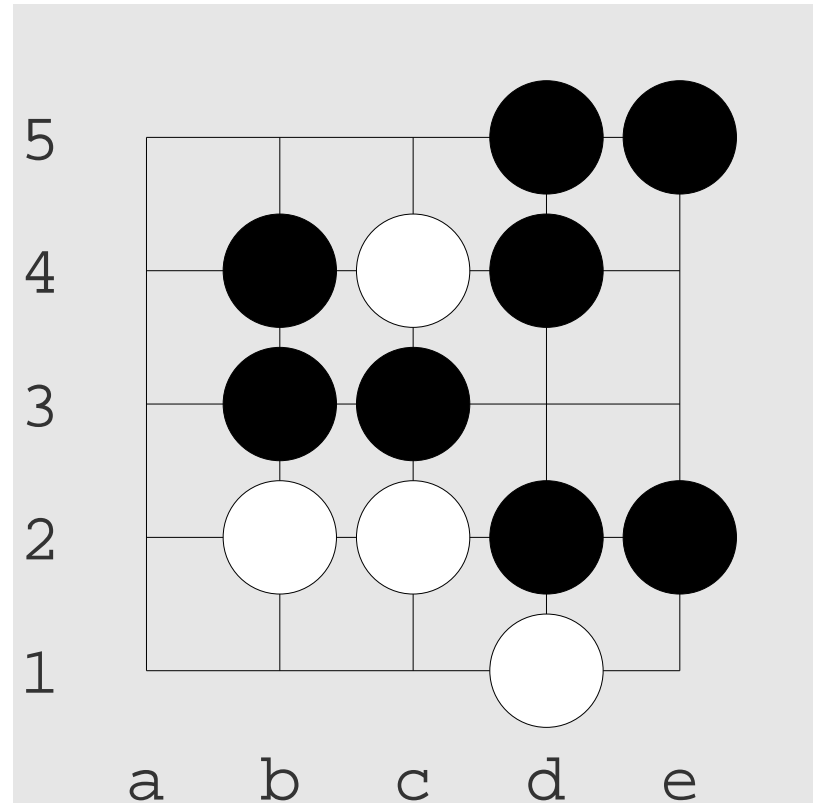
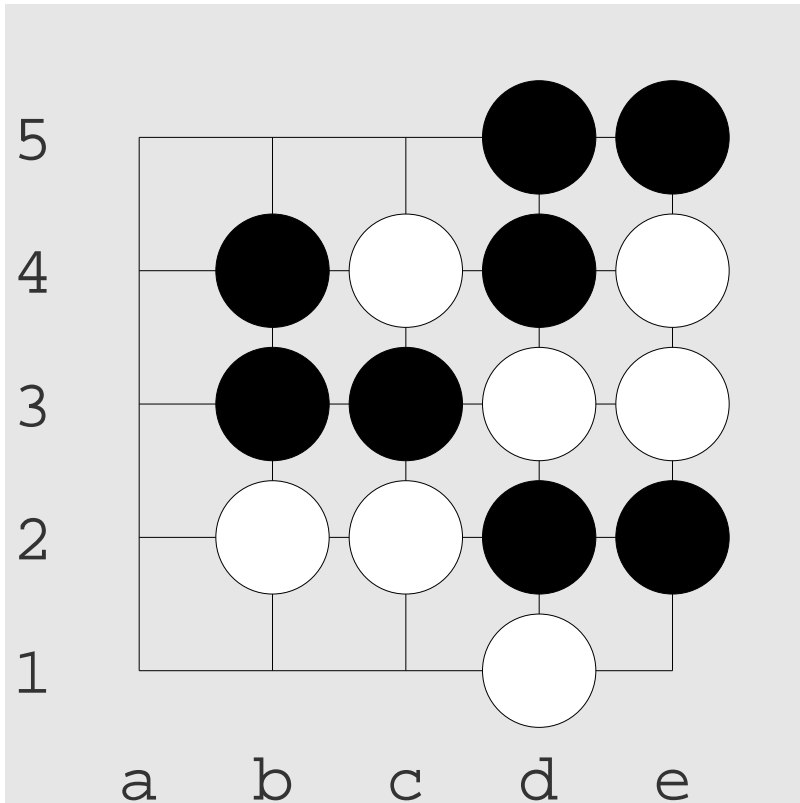
block {c4} liberty: {c5}

other 4 blocks?

rule 4.

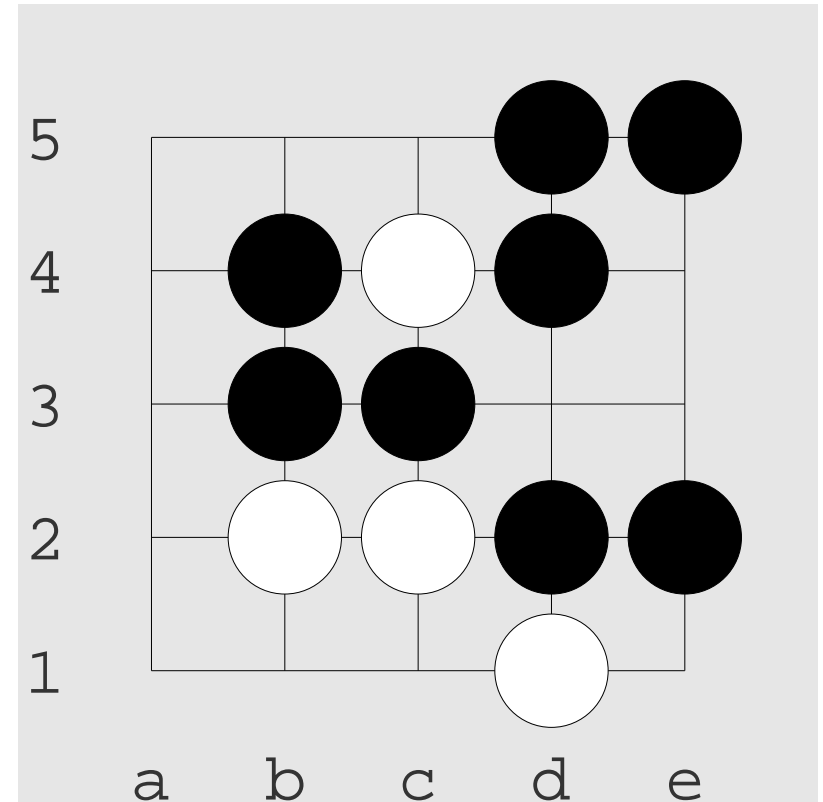
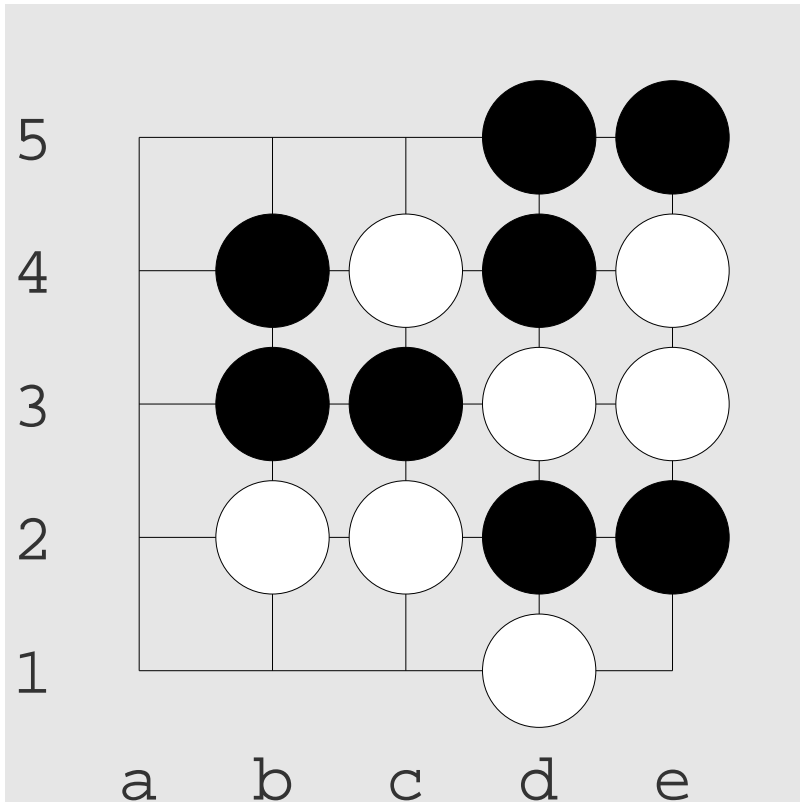
clear color C

empty all C-points that don't reach E



here, we cleared color W

a block is *captured* if it has no liberties
rule 4 (rephrased). remove all captured C-blocks



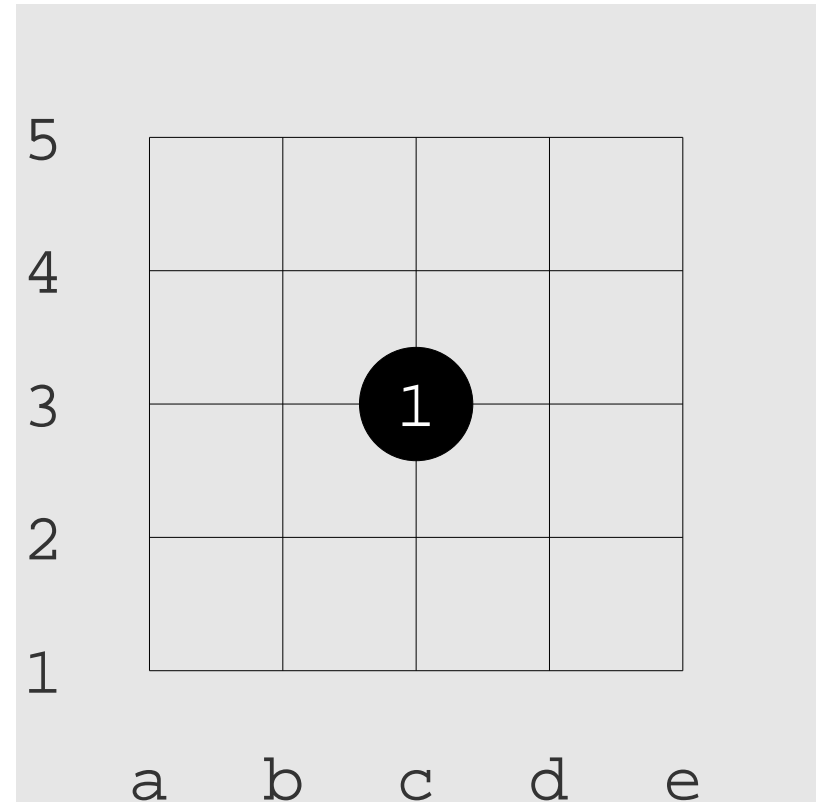
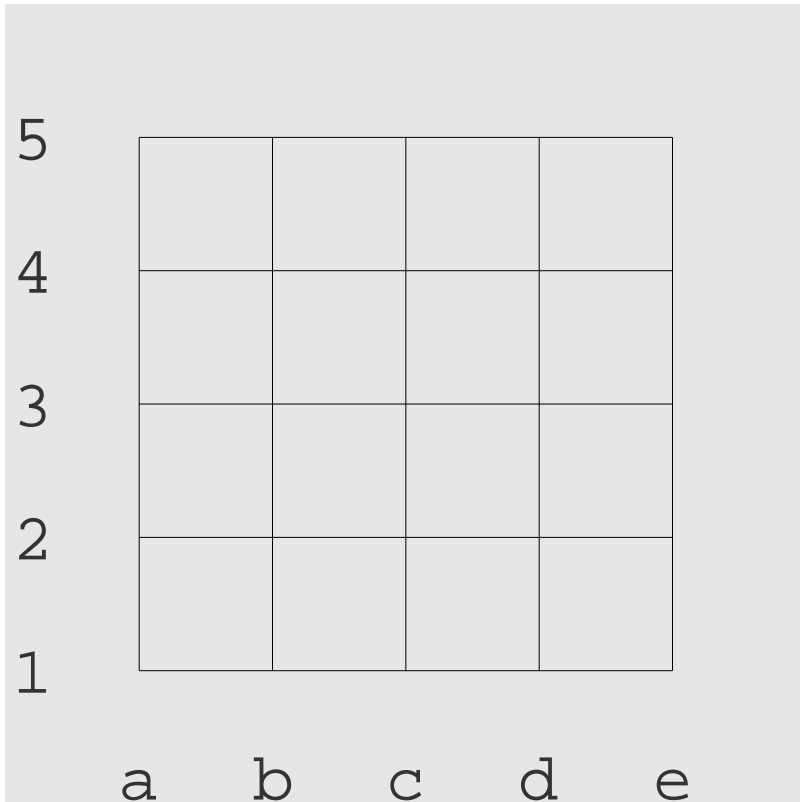
here, we removed all captured W-blocks

rule 5.

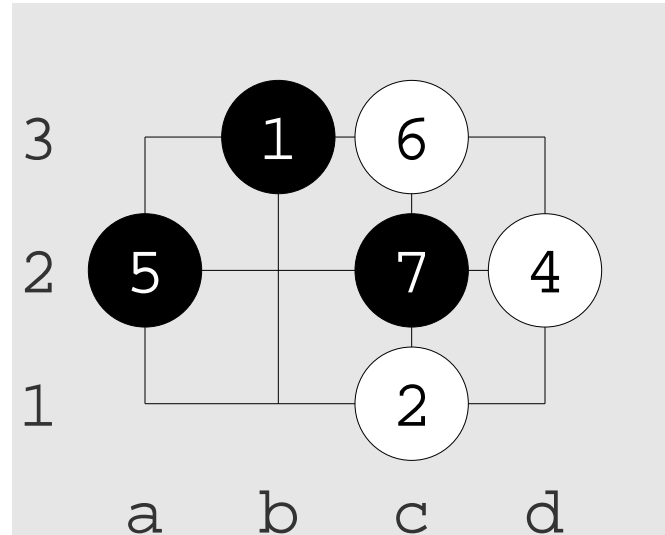
start from empty grid,

players alternate turns,

black moves first

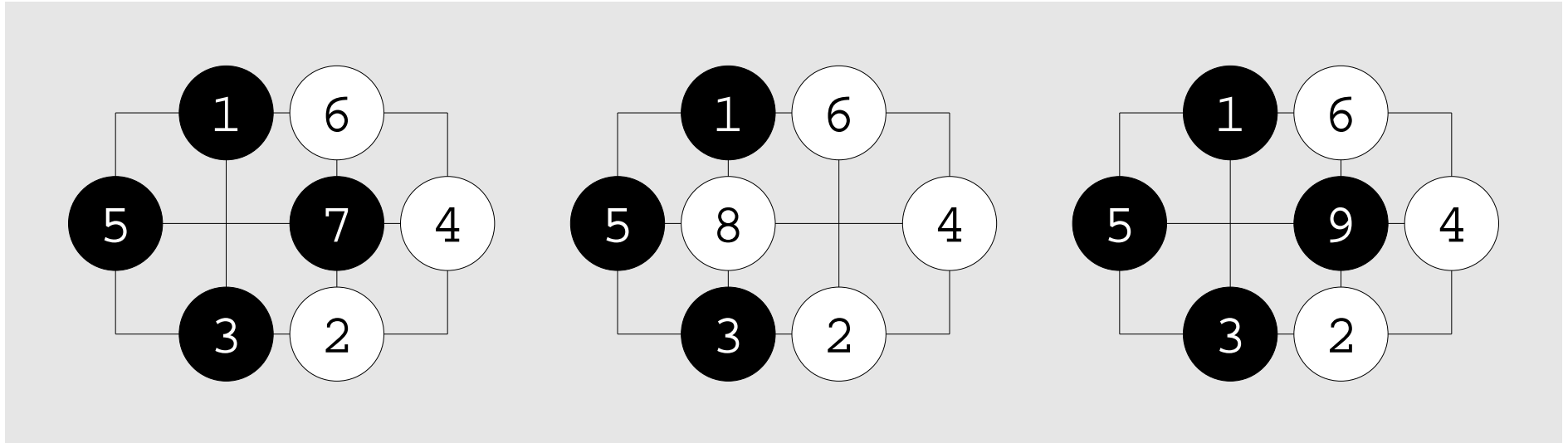


rule 6. a *turn* is either *pass* (do nothing) or
a move not making an earlier position (*superko*)



pass ? 1.B[b3] 2.W[c1] 3.B[pass] 4.W[d2] ...

rule 6. a *turn* is either *pass* (do nothing) or
a move not making an earlier position (*superko*)



superko ?

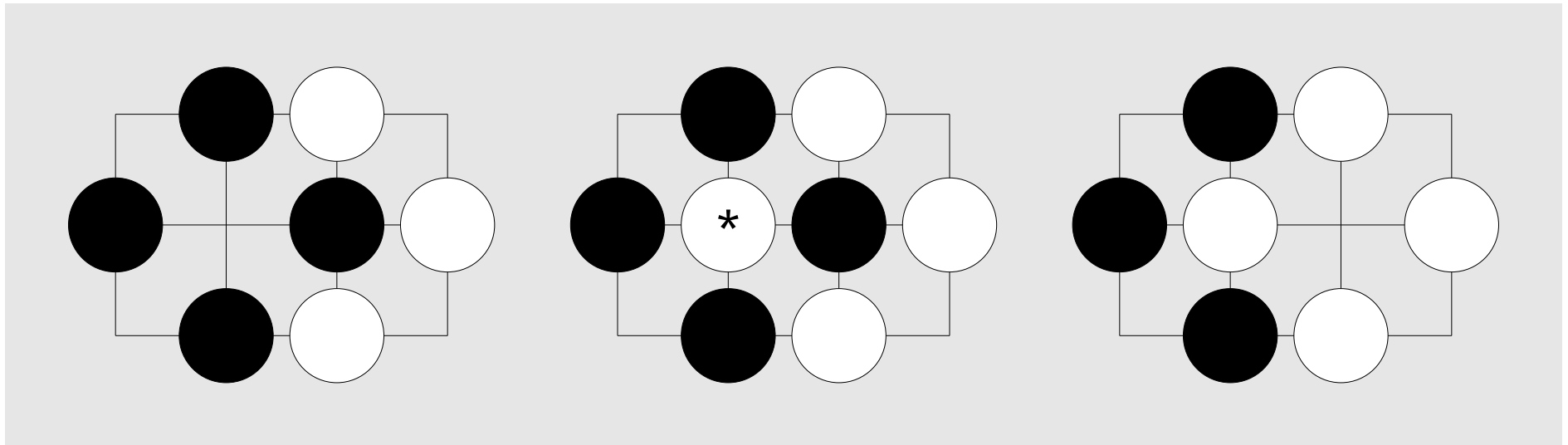
move 9 (illegal)

rule 7. a move by player P is

(1) P -color an E -point

(2) clear color Q (opponent of P)

(3) clear color P



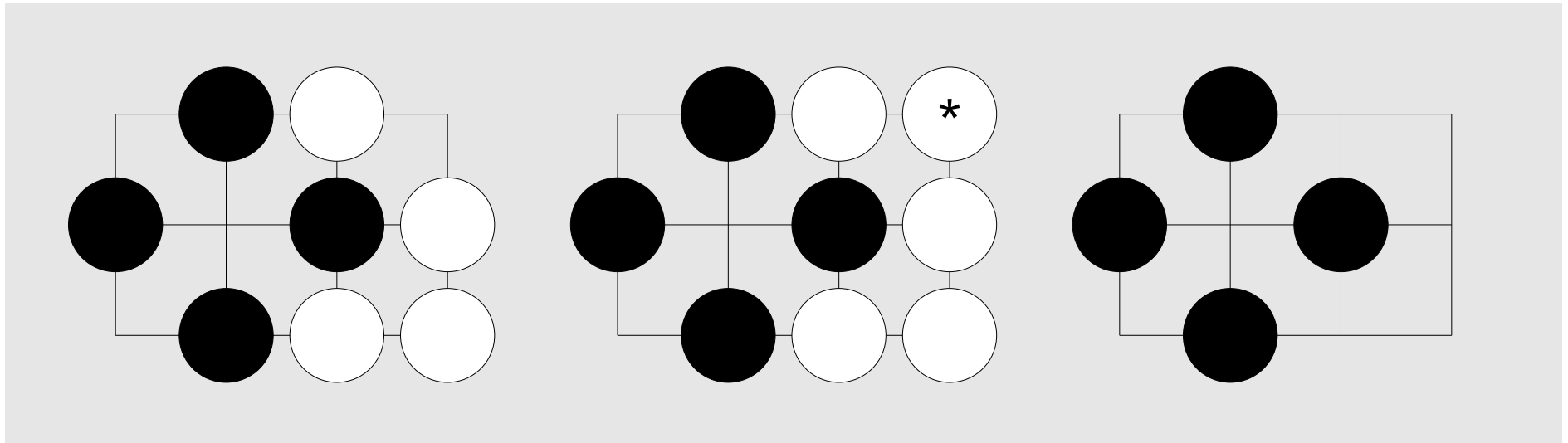
(2) is capture

rule 7. a move by player *P* is

(1) *P*-color an *E*-point

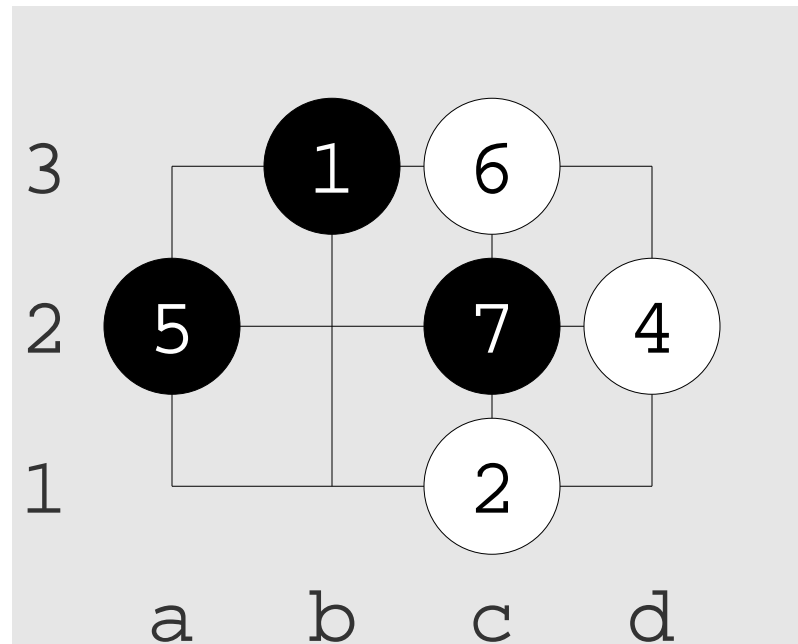
(2) clear color *Q* (opponent of *P*)

(3) clear color *P*



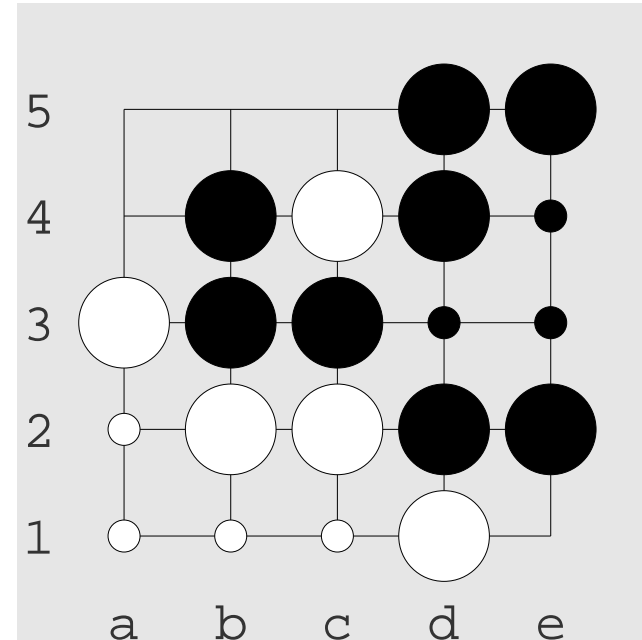
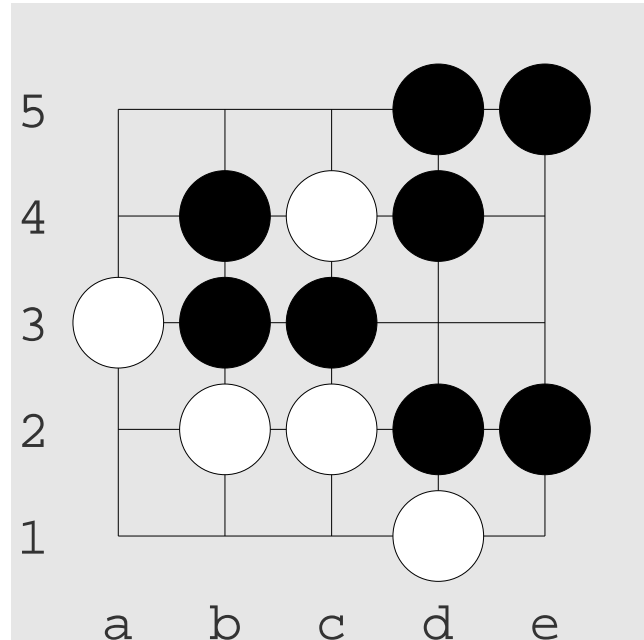
(3) is self-capture, allowed in logical rules of go,
but not in Chinese/Korean/Japanese/... rules

rule 8. game ends after 2 consecutive passes



1. B[b3]
2. W[c1]
3. B[pass]
4. W[d2]
5. B[a2]
6. W[c3]
7. B[c2]
8. W[pass]
9. B[pass]

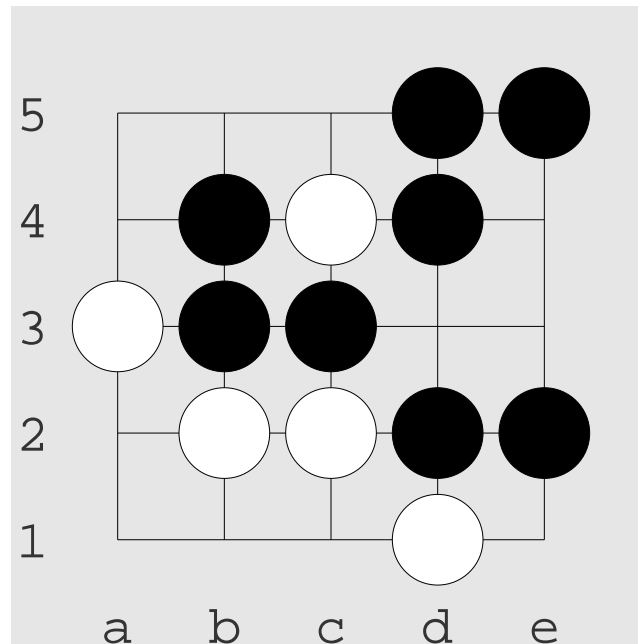
rule 9. *score* of player P with color C:
 number C-points + number E-points that reach only C



B-score $8 + 3 = 11$

W-score $5 + 4 = 9$

rule 10. *winner* player with higher score at game end
 (by prior agreement, a *komi* – fixed amount, e.g. 6.5 –
 can be added to W's final score)



here, komi 0 B wins by 2 (11 – 9)

here, komi 6.5 W wins by 4.5 (9 + 6.5 – 11)

the end (logical rules of go)