

# winning $6 \times 6$ Hex openings by R Hayward

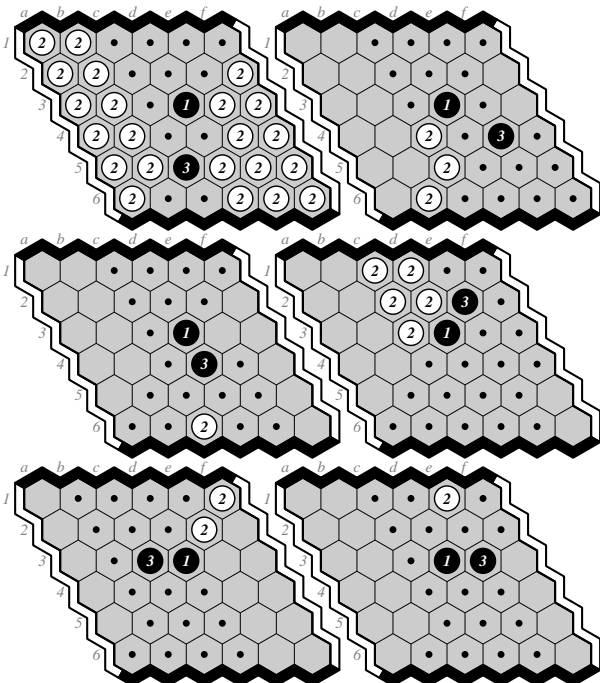
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Here we outline how to find all winning opening moves for  $6 \times 6$  Hex.

## 1.1 A $6 \times 6$ center-win strategy

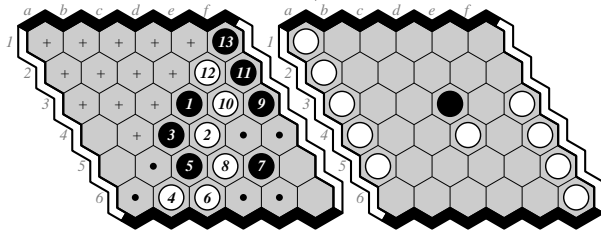
To start, we show that opening in the center is a winning move. We give an explicit strategy for this opening.

Assume Black plays first with 1 .d3. If White plays 2 .x, where x is not e6, then Black plays as in the appropriate diagram below and connects d3 to both the top and bottom.



If White plays 2 .e6, then Black plays as below left. Using “+” cells, Black connects d3 to the top. Using the other marked cells, Black follows the variation and either connects bottom to top or (if White deviates from the variation) bottom to d3). This kind of connection, where a player either connects

two cells or wins the game, was explored by Nishi. (This winning strategy for 1 .d3 2 .d4 is not the one with the smallest carrier. For example, Black can win from the position below right. The proof is left as a puzzle for the reader.)



## 1.2 All winning $6 \times 6$ opening moves

None of the top 6 strategies nor the above right strategy use a1–a5. Thus these 5 moves all *lose* as opening moves for White. By symmetry, f2–6 also lose as White openings. The only other losing White openings are b1 and e6.

It is not hard to show 1 .e6 loses for White. (The main line is e6 d3 d4! c4 b6 a6 b5 a5 b4 a4 b2 b3 c2 e3! c3 d5!. In each case “!” is the only winning move.)

So White openings a1–a5, b1 all lose. By symmetry (switch colors and flip the board along the main diagonal), Black openings a1–e1, a2 all lose, as do their mirror images f6–b6, f5. All other Black openings win.

Exercise: play against a neighbour. open at b5 and see if you can win.

[Hic66]

## Notes

<sup>1</sup>As quoted by Jim Hicks in Life Magazine 1966 [Hic66].

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## Bibliography

[Hic66] Jim Hicks, *Close-up: Piet hein, denmark's scientist-poet*, Life Magazine **October 14** (1966), 55–66.