

# VOLO

*An abstract game for 2 players by Dieter Stein*

**This game is dedicated to the nature and beauty of birds. Their colors, their singing, and the art of flight.**

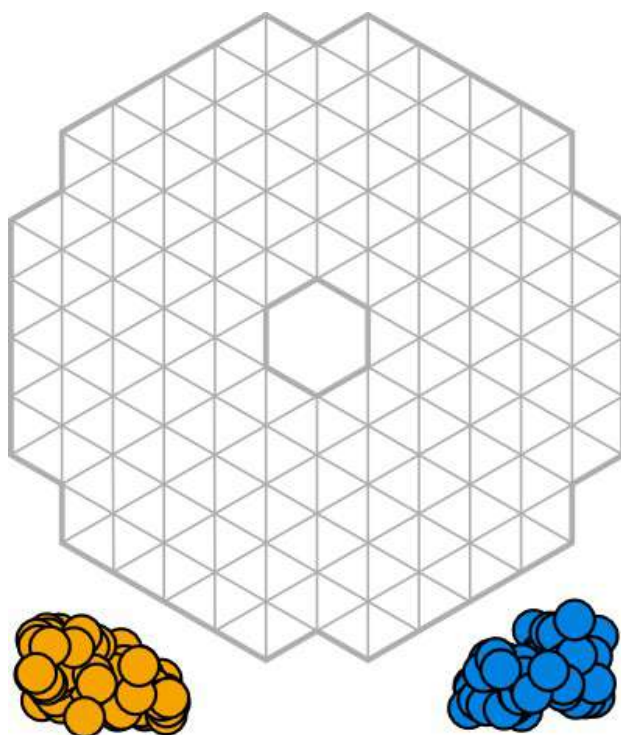
*The simplest mathematical models of animal aggregations generally instruct the individual animals to follow three rules:*

1. Move in the same direction as your neighbor
2. Remain close to your neighbors
3. Avoid collisions with your neighbors

*from Wikipedia, Collective animal behavior*

## Material

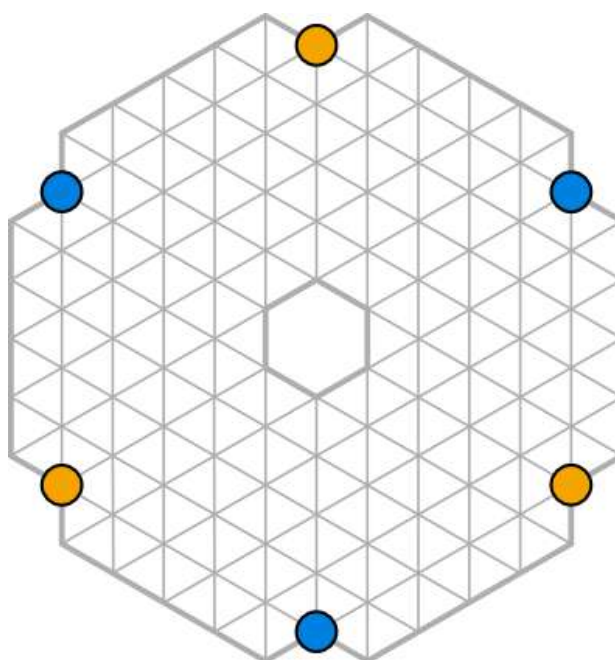
- Hexagonal board, edge size 7, the "sky" (without 6 corners and center space)
- 120 playing pieces (60 orange and 60 blue "birds")



**Figure 1** – The hexagonal board with 120 spaces (intersection of lines) and 2 × 60 pieces.

## Preparation

Each player gets 60 birds of one color and adds 3 of them to the board according to the following figure.



**Figure 2** – Initial setup.

## Objective

The aim of the game seems simple: **Bring all of your birds in the sky together into one contiguous flock.**

Yet the flight of the birds is not that simple. You must add new birds to the sky to let them fly together and this is where the competition unfolds.

## Play

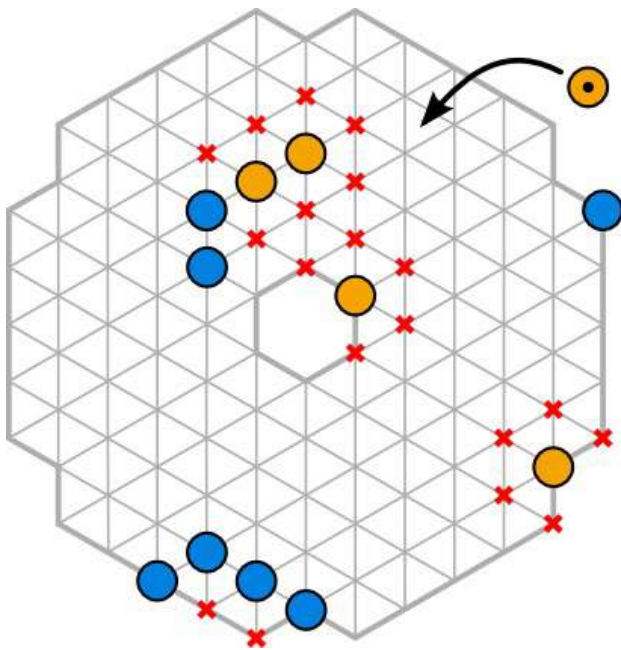
Players take turns, starting with Orange. In each turn you choose **one** of the following options:

- add a bird
- let the birds fly

If no actions are available, pass your turn.

### Add a Bird

Place a single bird anywhere, but **not adjacent** to any other **friendly** bird already on the board and **not into a region controlled by the opponent**. Such a region has no open path to any other friendly bird (see chapter "Regions" below).

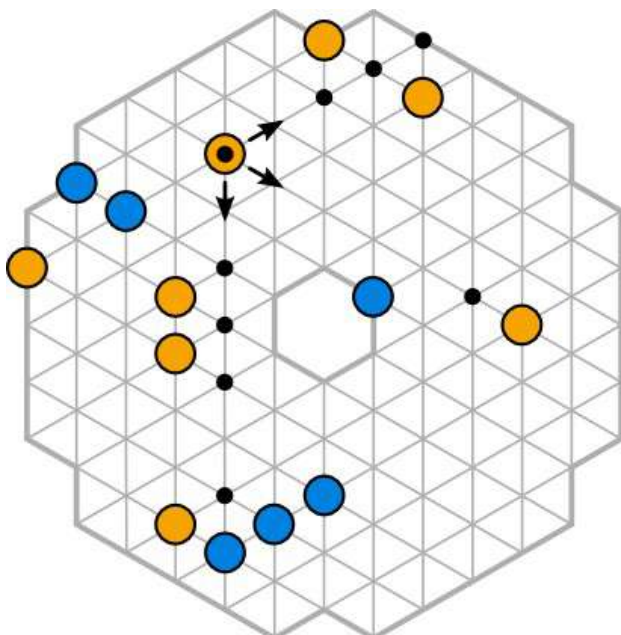


**Figure 3** – Orange may place a bird anywhere but not adjacent to a friendly bird or into a region controlled by the opponent.

### Let the Birds Fly

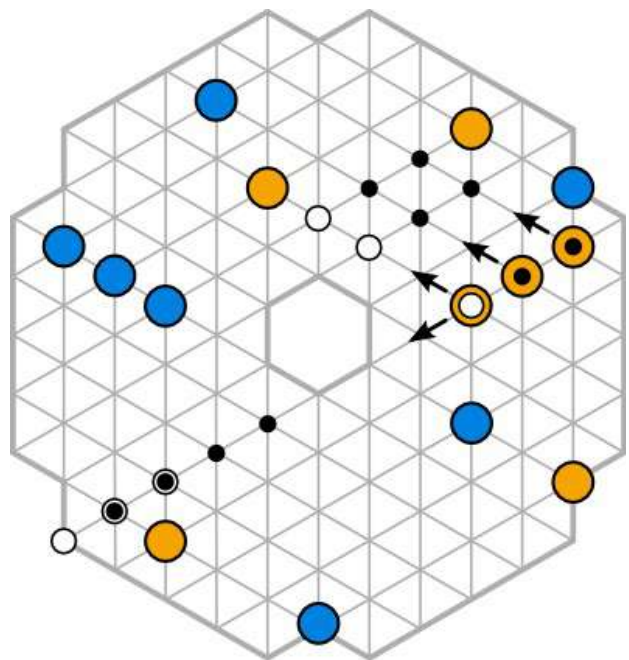
A single bird or a line of birds move in a straight line, over vacant spaces and must always stop **next to another friendly bird** and in this way **enlarge one or more other flocks**. (A single bird can also be referred to as a “flock”.)

You may **never split** an existing flock.



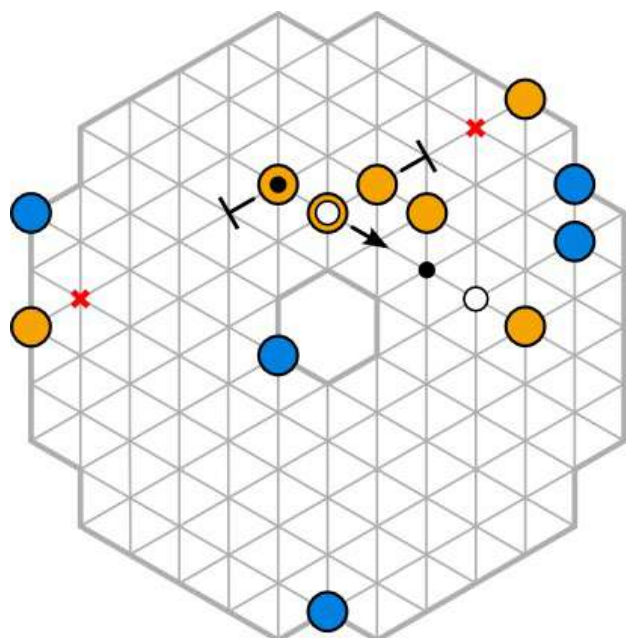
**Figure 4** – The marked orange bird has 8 moves. Note that the bird may pass friendly birds while flying as long as the final stop is adjacent to another flock.

A straight line of any number of birds of one color may fly **in file or side by side**.



**Figure 5** – The marked flock of 3 birds has 5 moves: either 2 or 3 steps to the upper left creating a flock of 4 or 5, or to the lower left flying in single file connecting to a single bird. Opponent birds block possible moves.

You may rearrange an existing flock if it is **not split** and also **enlarged** after the move.



**Figure 6** – The orange flock has **only one** move. It cannot be split. But it can be rearranged as long as it grew larger after the move.

### Regions

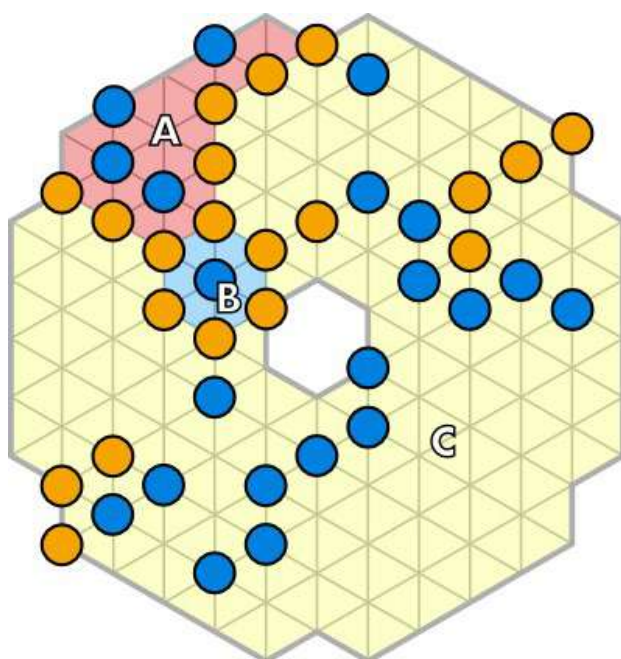
If a player’s birds are separated from each other in

different regions, i. e. there exists **no open path to any other friendly bird**, they are removed from the board – they fly away. “Open path” means vacant spaces or spaces occupied only by friendly birds.

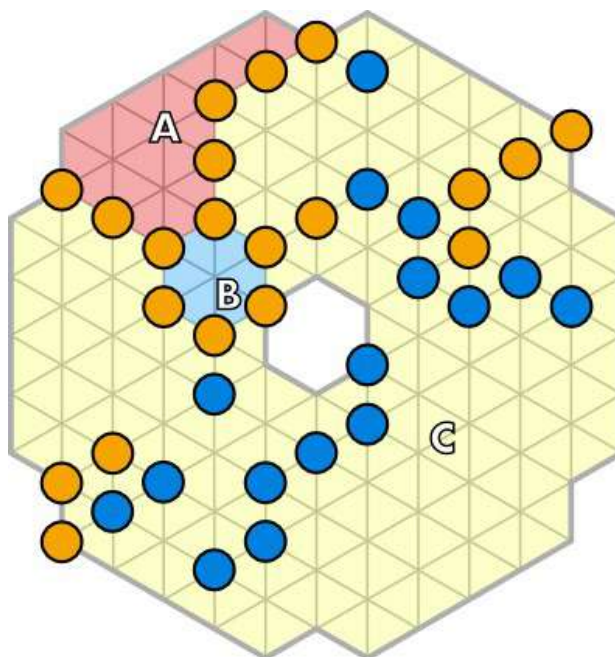
The player who made the move can choose which region must be cleared. It is possible that more than two regions are created. Clear any of these regions but leave **one** region untouched.

It is possible that the opponent is left with a single flock and the game is lost immediately.

*Note that usually creating regions and removing birds is beneficial only for your opponent.*



**Figure 7** – Orange created 3 regions A, B, and C and must now choose 2 of them, remove all birds there and give them back to the opponent player. In this example, if region B (with a single bird) would remain on the board, Blue would win the game immediately.

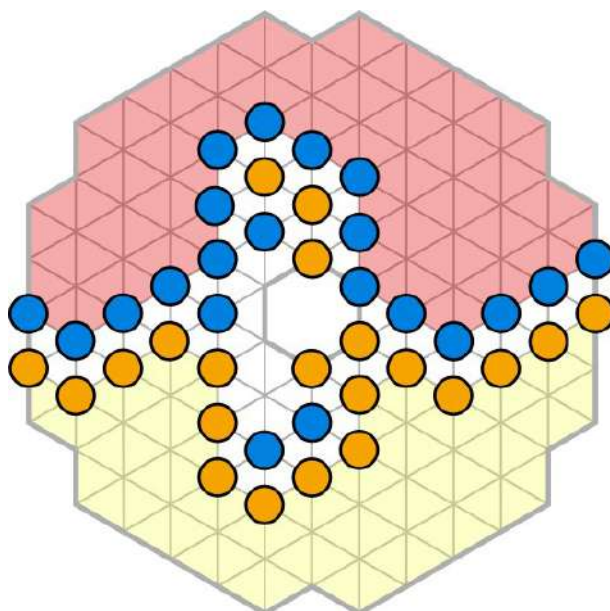


**Figure 8** – Orange removed all birds in the regions A and B.

### Pass

There may be a situation where you neither can (or want) to add a bird, nor let one of your flocks fly.

If no action is possible you **must** pass your turn. If however, birds could possibly be **added**, but only in regions of **your own** then you **may** pass your turn. If both players pass their turn, the game ends in a draw.



**Figure 9** – In this situation both players have no moves available. They could add birds, but only in their own regions (marked red and yellow). Here both players pass their turns and the game ends in a draw.



## End of the Game

You win by ending up with all your birds in **one contiguous flock of any size**.

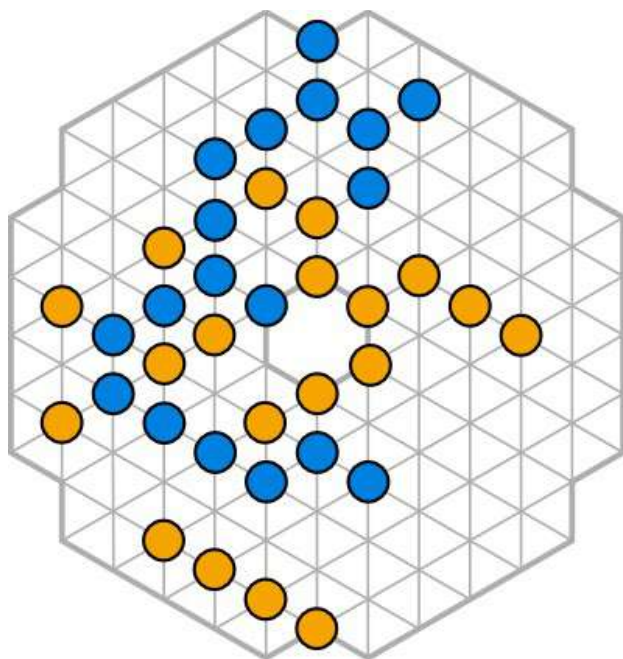


Figure 10 – Blue wins.

*Note that the effect of regions is always secondary. If you accomplish a winning formation and simultaneously divide your opponent's birds into two or more contiguous flocks, each in one region, **you** win. There is no need for you to clear any regions and thus create a winning position for your opponent as well.*

## Examples

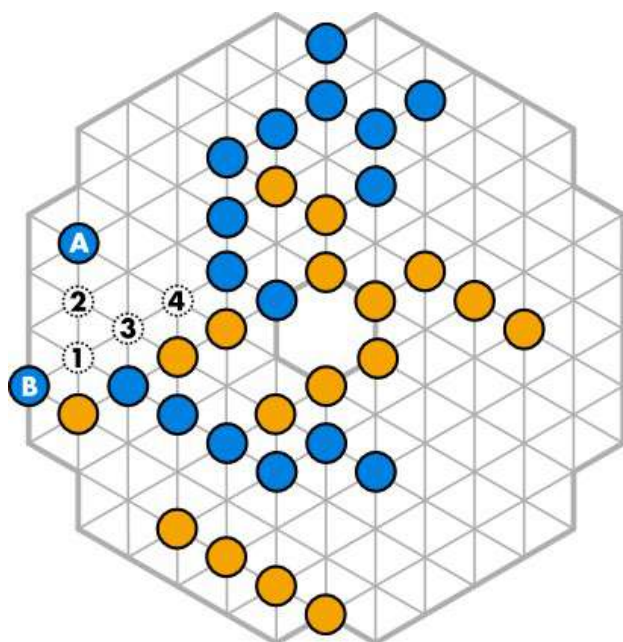


Figure 11 – Orange to move and must avoid the

decisive move for Blue A to space 1, thus an orange bird enters at space 2. After that, the blue bird B flies to space 3 and Orange cannot block the winning flight of Blue A to space 4 (see winning position above, figure 10).

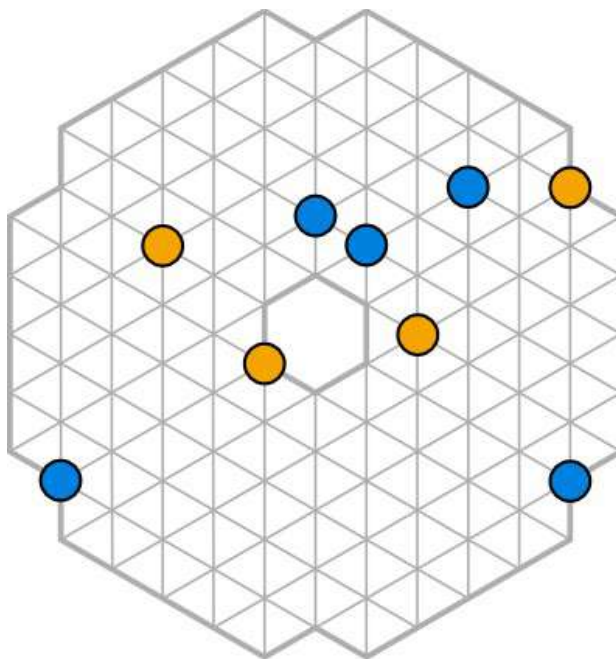


Figure 12 – Orange to move and win. Do you see how?

Find the solution here:

<http://spielstein.com/games/volo/puzzles/1>

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Dieter Stein, August 2010