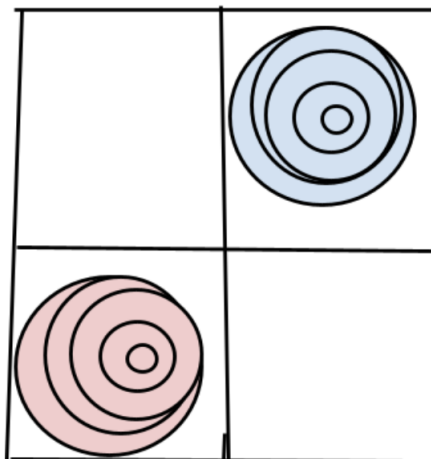


# Checkerboard Puzzle

Lewis Holland



Consider a 2 by 2 board, such as the one above, with a stack of disks in the bottom left square, and another in the top right. A larger disk can never be on top of a smaller disk, and disks of one color cannot go on top of disks of the other color. Your goal is to get the red stack to the top right square and the blue stack to the bottom left square by moving 1 disk per turn. A disk can be moved 1 unit to the left, right, up, down, or along a diagonal. If there are 5 disks in each stack, how should you move the disks to move the top right stack to the bottom left square and the bottom left stack to the top right square?

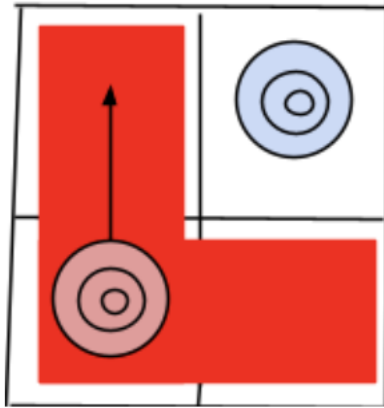
## Puzzle Explanation

This puzzle's goal is to switch the positions of the stacks of disks in the 2 by 2 grid. It is related to the Towers of Hanoi problem, except there are two sets of disks that cannot share a square with disks of the other color and there is a 2 by 2 grid instead of 3 towers.

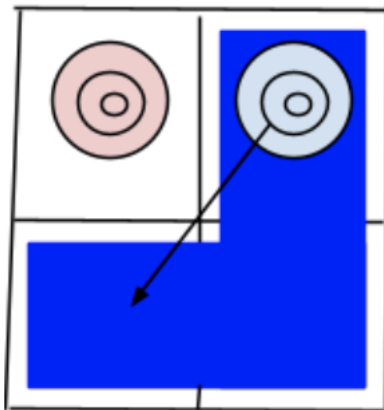
## Solution

Treat each stack as forming a Towers of Hanoi problem with the other 2 free squares:

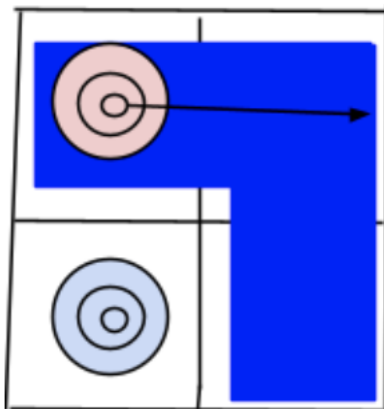
1. Move the bottom left stack to the top left, using the Towers of Hanoi method (illustrated below) and the free bottom right square.



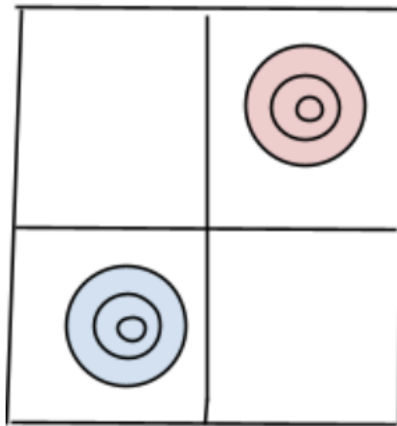
2. Move the top right stack to the bottom left square using the same method and the free bottom right square.



3. Move the top left stack to the top right square using the same method and the free bottom right square.



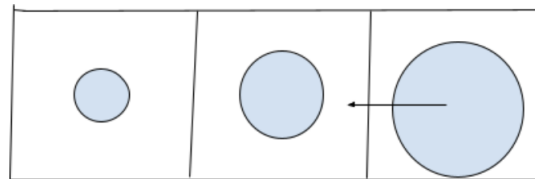
4. The stacks have now switched places.



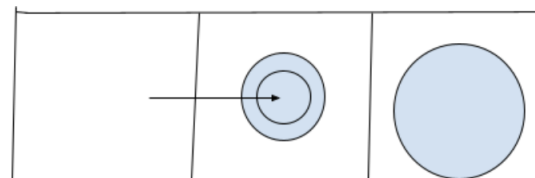
Towers of Hanoi Method (shown for 3 disks, but it can be scaled up to larger numbers of disks with greater complexity): 1.



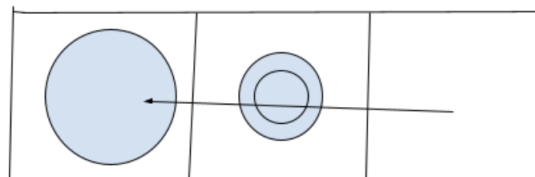
2.



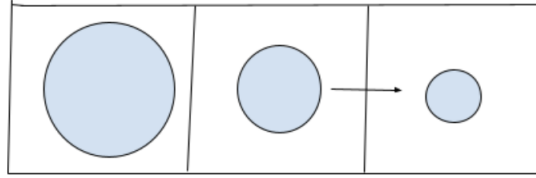
3.



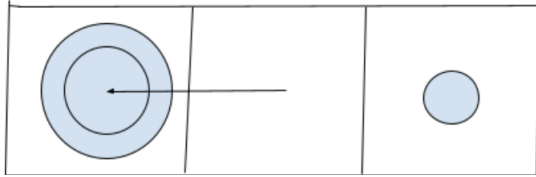
4.



5.



6.



7.

