

MAGIC SQUARES

1. State: assignment of $1, 2, 3, \dots, n^2$ to the n^2 boxes

$n=4$

16	6	15	14
1	7	13	3
5	8	2	12
9	4	10	11

How many states? $n^2!$

$$n^2(n^2-1)(n^2-2)\dots(3)(2)(1) = (n^2)!$$

2. Moves: Swap two entries at random

3. Function to minimize: function on the states that is minimized when the state is a magic square

- Compute difference of row/column/diag sums with the target value $\frac{1}{2}n(n^2+1)$. Add up the absolute value of the differences.
- Count the number of row/cd/diag sums that don't match the target value
- Compute the row/cd/diag sums and multiply them.
Product is maximized when the sums are all the same.