A magic square is an $n \times n$ grid where the numbers 1, 2, 3, \ldots, $n^2$ are mapped to the grid squares in a one-to-one correspondence such that if you sum the numbers in each row, each column and the forward and backward diagonals, these sums are all equal. Here is an example of a $3 \times 3$ magic square.

\[
\begin{array}{ccc}
4 & 9 & 2 \\
3 & 5 & 7 \\
8 & 1 & 6
\end{array}
\]

Write a local search method that finds $n \times n$ magic squares. You can write in any language you like. If you want to write in an eccentric language, please run it by me first. Please turn in via email the following:

1. Your code (it should compile and run)

2. The largest magic square you were able to find

3. A short write up that describes what techniques you tried and how well they worked relative to each other.