

Assignment #1.1

Goal : To construct an $N \times N$ magic square (for odd N)

Guide :

An example for a 3×3 magic square :

6	1	8
7	5	3
2	9	4

An example for a 5×5 magic square :

15	8	1	24	17
16	14	7	5	23
22	20	13	6	4
3	21	19	12	10
9	2	25	18	11

A square matrix is called a magic square, if the summations of each row, column, and diagonal are the same. To construct $N \times N$ magic square for odd N , there is a simple way as follows :

- (1) Place 1 in the middle of the first row.
- (2) If the number k is placed in the i th row and the j th column, written as position (i, j) , then the number $k+1$ should be placed in position $(i-1, j-1)$. Note that this matrix is circular.
- (3) Repeat step (2) until all N^2 numbers are placed in the matrix.
- (4) If there is a previously placed number in position $(i-1, j-1)$, then place $k+1$ in position $(i+1, j)$ instead.

Note : The constructed magic square is symmetric from top to down, and from left to right. You can also rotate the entire matrix by 90 degrees, 180 degrees, or 270 degrees, whereas the property of summation still holds.

Output : Please output 1×1 , 3×3 , 5×5 , 7×7 , and 9×9 magic squares.