E. Singer House

time limit per test: 2 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

It is known that passages in Singer house are complex and intertwined. Let's define a Singer k-house as a graph built by the following process: take complete binary tree of height k and add edges from each vertex to all its successors, if they are not yet present.

Singer 4-house

Count the number of non-empty paths in Singer k-house which do not pass the same vertex twice. Two paths are distinct if the sets or the orders of visited vertices are different. Since the answer can be large, output it modulo $10^9 + 7$.

Input

The only line contains single integer k ($1 \le k \le 400$).

Output

Print single integer — the answer for the task modulo $10^9 + 7$.

Examples

input
2
output
9

input
3
output
245

input
20
output
550384565

Note

There are 9 paths in the first example (the vertices are numbered on the picture below): `1`, `2`, `3`, `1-2`, `2-1`, `1-3`, `3-1`, `2-1-3`, `3-1-2`.

Singer 2-house