Problem E. Tournament

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

A directed graph is called a tournament with n vertices if:

- The vertices are numbered 1 through n.
- For each $1 \leq u < v \leq n$ exactly one edge connects the vertices u and v, and the edge is directed either u to v or v to u.

Therefore, there are $2^{n(n-1)/2}$ tournament graphs with n vertices in total. Snuke drew all tournament graphs with n vertices, and for each of them he computed the number of strongly connected components. Compute the sum of all $2^{n(n-1)/2}$ values Snuke computed, modulo 1,000,000,007.

Input

Input contains one integer n.

Constraints:

- $1 \leq n \leq 10^5$

Output

Print the sum modulo $10^9 + 7$.

Examples

standard input	standard output
3	20
21	736073462

Note

For the first sample, there are 8 tournament graphs in total. Two of them have only one strongly connected component, and the others have three strongly connected components. The answer is $1 \times 2 + 3 \times 6 = 20$.