



Problem G. Automaton

Input file: `standard input`
Output file: `standard output`
Time limit: 2 seconds
Memory limit: 512 megabytes

Given n and k , calculate the expected number of vertices in the suffix automaton of a random string of length n over alphabet of size k . If r is the answer, output $r \cdot k^n$ modulo $10^9 + 7$.

Input

The first line contains the number of tests T . Each of the next T lines contains integers n and k ($1 \leq k \leq n \leq 40$). All tests in the input are different.

Output

Output T lines with answers for tests.

Example

standard input	standard output
3	12
2 2	447
4 3	14972
10 2	

Note

Let $S(s)$ be the set of all substrings of s . *Suffix automaton* of a string s is the smallest directed acyclic graph with a specified vertex v_0 and an assignment $l(e)$ of characters to all edges of G that satisfies the following property: $S(s) = \{l(e_1) \dots l(e_k) \mid (e_1, \dots, e_k) \text{ — a path starting at } v_0\}$.