Power sum

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a sequence is defined as follows:

- $L_0 = L_1 = 1$
- $L_{i+1} = L_i + L_{i-1} + 1$

Given two positive integers n and k, calculate: $L_0^k + L_1^k + \cdots + L_n^k$.

Input

First line contains the number of test cases t.

Each line in next t lines contains two positive integers n and k ($n \leq 2^{63} - 1, k \leq 13$).

Output

Print last 9 digits of answer of each test case on t lines.

Example

standard input	standard output
1 3 2	000000036