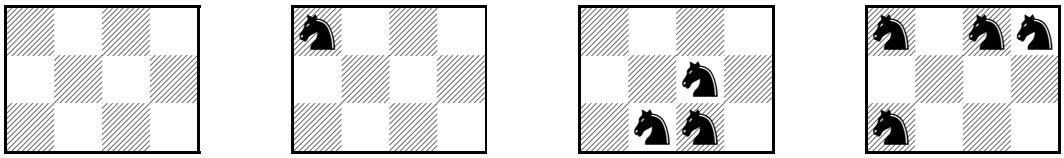
Knights

P19852_en

Quinzè Concurs de Programació de la UPC - Final (2017-09-13)

Given an $n \times m$ chess board, you can place on it as many black knights as you wish, as long as no two knights threaten each other. How many possibilities do you have?

For instance, these are just four of the 278 possibilities for $n = 3$ and $m = 4$:



Input

Input consists of several cases, each with n and m. Assume $1 \leq n \leq 4$ and $1 \leq m \leq 10^{15}$.

Output

For every case, print the number of possibilities modulo $10^8 + 7$.

Sample input

```
1 1
1 10
2 1
3 4
4 2
4 10
4 1000000000000000
```

Sample output

```
2
1024
4
278
81
18702843
51397909
```

Problem information

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