E. Modular Fibonacci

Time limit: 3s

The Fibonacci numbers (0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...) are defined by the recurrence:

$$\begin{aligned} F_0 &= 0 \\ F_1 &= 1 \\ F_i &= F_{i-1} + F_{i-2} \text{ for } i > 1 \end{aligned}$$

Write a program which calculates $M_n = F_n \bmod 2^m$ for given pair of n and m. $0 \leq n \leq 2147483647$ and $0 \leq m < 20$. Note that $a \ mod \ b$ gives the remainder when a is divided by b.

Input

Input consists of several lines specifying a pair of n and m.

Output

Output should be corresponding M_n, one per line.

Sample Input

```
11 7
11 6
```

Sample Output

```
89
25
```