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. $0 \le n \le 2147483647$ and $0 \le m < 20$. Note that $a \bmod b$ 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
```