

## 10229 Modular Fibonacci

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

$$F_0 = 0$$

$$F_1 = 1$$

$$F_i = F_{i-1} + F_{i-2} \text{ for } i > 1$$

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  $a \bmod b$  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
```