

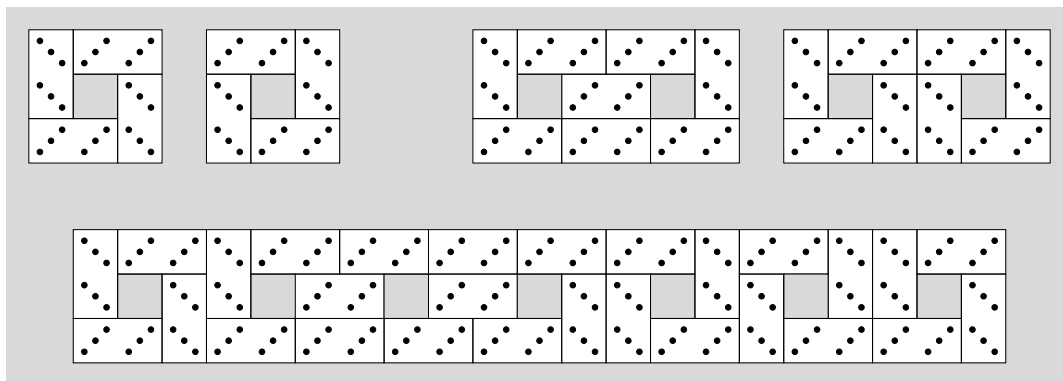
## Domino rectangles

P87164\_en

Cinquè Concurs de Programació de la UPC - Final (2007-10-03)

You have  $4n$  identical 3-3 domino pieces, and you must cover with them a  $3 \times 3n$  rectangle. As you can see in the picture below, the positions  $(2, 2), (2, 5), \dots, (2, 3n - 1)$  of the rectangle must be left empty. Depending on  $n$ , how many different rectangles are possible?

For instance, these are the two only possible rectangles for  $n = 1$ , two of the six possible rectangles for  $n = 2$ , and a possible rectangle for  $n = 7$ :



### Input

Input consists of several cases, each with two integer numbers  $n$  and  $m$ . You can assume  $0 \leq n \leq 10^{12}$  and  $2 \leq m \leq 10^6$ .

### Output

For every case, print the number of  $3 \times 3n$  rectangles modulo  $m$ .

#### Sample input

```
0 1000
1 1000
2 1000
2 4
7 127
1000000000000 998877
```

#### Sample output

```
1
2
6
2
61
751275
```

### Problem information

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