

## Problem A

### So Easy!

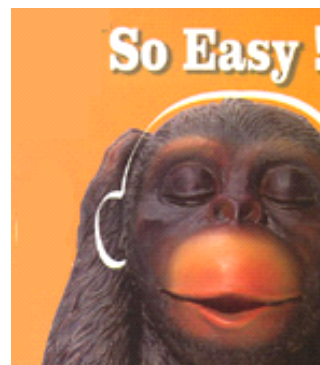
#### Description

A sequence  $S_n$  is defined as:

$$S_n = \left\lceil \left( a + \sqrt{b} \right)^n \right\rceil \% m$$

Where  $a, b, n, m$  are positive integers.  $\lceil x \rceil$  is the ceil of  $x$ . For example,  $\lceil 3.14 \rceil = 4$ . You are to calculate  $S_n$ .

You, a top coder, say: So easy!



#### Input

There are several test cases, each test case in one line contains four positive integers:  $a, b, n, m$ . Where  $0 < a, m < 2^{15}$ ,  $(a-1)^2 < b < a^2$ ,  $0 < b, n < 2^{31}$ .

The input will finish with the end of file.

#### Output

For each the case, output an integer  $S_n$ .

#### Sample Input

```
2 3 1 2013
2 3 2 2013
2 2 1 2013
```

#### Sample Output

```
4
14
4
```