



## 4104 - MODEX

Asia - Singapore - 2007/2008

Many well-known cryptographic operations require modular exponentiation. That is, given integers  $x$ ,  $y$  and  $n$ , compute  $x^y \bmod n$ . In this question, you are tasked to program an efficient way to execute this calculation.

### Input

The input consists of a line containing the number  $c$  of datasets, followed by  $c$  datasets, followed by a line containing the number ``0'`.

Each dataset consists of a single line containing three positive integers,  $x$ ,  $y$ , and  $n$ , separated by blanks. You can assume that  $1 < x$ ,  $n < 2^{15} = 32768$ , and  $0 < y < 2^{31} = 2147483648$ .

### Output

The output consists of one line for each dataset. The  $i$ -th line contains a single positive integer  $z$  such that

$$z = x^y \bmod n$$

for the numbers  $x$ ,  $y$ ,  $z$  given in the  $i$ -th input dataset.

### Sample Input

```
2
2 3 5
2 2147483647 13
0
```

### Sample Output

```
3
11
```

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Singapore 2007-2008