

## Problem D: Difficult Josephus problem

Time Limit: 3 Sec Memory Limit: 256 MB

Submit: 643 Solved: 179

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### Description

**Josephus problem** ([https://en.wikipedia.org/wiki/Josephus\\_problem](https://en.wikipedia.org/wiki/Josephus_problem)) is a theoretical problem related to a certain counting-out game ([https://en.wikipedia.org/wiki/Counting-out\\_game](https://en.wikipedia.org/wiki/Counting-out_game)). However, Narnal thought this problem is too easy for him, so he constructed a more complex Josephus problem as following.

There are  $n$  people standing in a circle indexing from 1 to  $n$ , and each person in the circle holds a note marked with a positive integer. At first, given a positive integer  $m$ , people count the number from one to the next starting from index 1 in clockwise (1, 2, ...,  $n$ , 1, 2, ...). When the counted number reaches  $m$ , the corresponding person will be eliminated from the circle and yell the number in his/her note, denoted by  $k_i$ , and then people restart counting from the next person targeting for number  $k_i$  until, eventually, only one person is left in the circle.

### Input

First line will be a positive integer  $T$ , which is the number of test cases.

In each test case, the first line would be two integers  $n$  and  $m$ , where  $n$  is the initial number of people, and  $m$  is the initial target counting number.

Then there will be a single line containing  $n$  integers, indicating the number on each person's note, from index 1 to index  $n$ .

$T \leq 100$ ,  $1 \leq n \leq 10^4$ .  $m$  and each number on the notes will be in the range of  $[1, 10^8]$ . We guarantee that there are no more than 20 cases with  $n > 5 \times 10^3$ .

### Output

For each case, output one line with one integer for the index of the remaining people.

### Sample Input

```
2
5 2
2 2 2 2 2
10 10
100000000 1 2 3 4 5 6 7 8 9
```

### Sample Output

3  
1

## HINT

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