Spinning Game

Problem Description

N players (numbered from 0 to n-1) sit in a circle and play this game. Number the n positions in a clockwise direction, from 0 to n -1. Initially, player 0 is in position 0, player 1 is in position 1,..., and so on. The rules of the game are as follows: in each round, the player in position 0 moves clockwise to position m, the player in position 1 moves clockwise to position m+1,...and so on, the player in position n-m goes to position 0, the player in position n-m+1 goes to position 1,...and the player in position n-1 goes clockwise to position m-1.

Now, after a total of 10^k rounds, please answer which position player x finally went to.

Input

There is only one line, containing four integers n, m, k, and x, separated by a space between every two integers.

Output

An integer indicating the number of the position of the player x after 10^k rounds.

Sample Input

10 3 4 5

Sample Output

5

Hint

For 30% of the data, $0 < k < 7$;

For 80% of the data, $0 < k < 10^7$;

For 100% of the data, $1 < n < 10^6$, $0 < m < n$, $1 \leq x \leq n$, $0 < k < 10^9$.