C. Sequence of points

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given the following points with integer coordinates on the plane: $M_0, A_0, A_1, ..., A_{n-1}$, where n is odd number. Now we define the following infinite sequence of points M_i: M_i is symmetric to M_{i-1} according (for every natural number i). Here point B is symmetric to A according M, if M is the center of the line segment AB. Given index j find the point M_j.

Input

On the first line you will be given an integer n ($1 \le n \le 10^5$), which will be odd, and j ($1 \le j \le 10^{18}$), where j is the index of the desired point. The next line contains two space separated integers, the coordinates of M_0. After that n lines follow, where the i-th line contain the space separated integer coordinates of the point A_{i-1}. The absolute values of all input coordinates will not be greater then 1000.

Output

On a single line output the coordinates of M_j, space separated.

Examples

input
3 4 0 0 1 1 2 3 -5 3

output
14 0

input
3 1 5 5 1000 1000 -1000 1000 3 100

output
1995 1995