Problem L
Onion
Time limit: 5 seconds

Onions are widely used in cuisines around the world. This problem is about an "onion peeling" process in geometry.

A set of points in a two-dimensional plane is *convex* if, for any pair of points p and q in the set, the line segment connecting p and q is entirely contained in the set. For a set of points S, its *convex hull* is the smallest convex set containing all points in S.

You are given four integers n, a, b, and k. You have a set S of n points, initialized as follows:

$$S = \{(x, (ax + b) \bmod n) \mid x = 0, 1, \ldots, n - 1\}.$$

You apply the following operation k times: let H be the convex hull of the set S, and then remove from S all points that lie on the boundary of the convex hull H.

Note that S can become empty. In that case, its convex hull is also empty, and its area is zero.

For each operation, determine the *doubled* area of the convex hull H. It can be shown that this value is always an integer.

Input

The input consists of a single line containing four integers n, a, b, and k ($1 \le n \le 10^9$; $0 \le a, b < n$; $1 \le k \le 300$).

Output

Output k lines. The i-th line should contain an integer representing the doubled area of the convex hull in the i-th operation.

Sample Input #1	Sample Output #1
4 1 2 1	8

Explanation for the sample input/output #1

Figure L.1 illustrates the points in S and the boundary of the convex hull in the first operation. The area of the convex hull is 4, and thus the doubled area is 8.

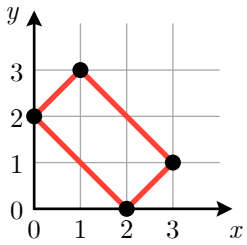


Figure L.1: Illustration of Sample Input #1.

Sample Input #2	Sample Output #2
37 14 7 5	2257 1406 592 74 0

Explanation for the sample input/output #2

Figure L.2 illustrates the boundaries in the first four operations. The set S becomes empty after the fourth operation. The area for the fifth operation is 0.

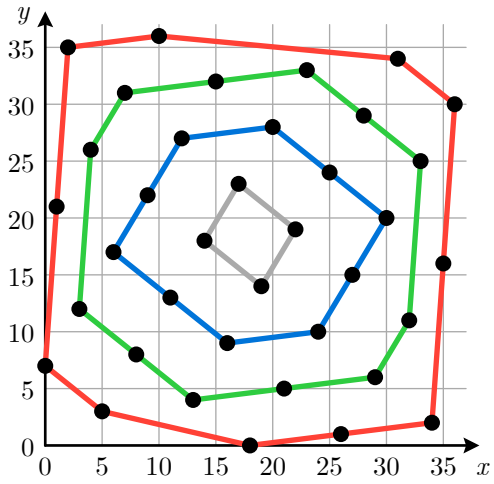


Figure L.2: Illustration of Sample Input #2.

Sample Input #3	Sample Output #3
280 40 12 4	131040 82880 39200 0