Progression

Let be **S** a infinite secuence of integers:

S_0 = **a**;
S_1 = **b**;
$S_i = |S_{i-2} - S_{i-1}|$ for all i >= 2.

You have two integers **a** and **b.** You must answer some queries about the n-th element in the secuence

Input

The first line contains **a** y **b** (0 <= **a,b** <= 10^18).

The second line contains a integer **q** (1 <= q <= 100000).

The third contains **q** integers $\mathbf{q_i}$.

Output

For each $\mathbf{q_i}$ you must print a line with the q_i-th elementh of **S.**

Example

Input:

21 12

5

0 1 2 3 4

Output:

21

12

9

3

6

Note.- the values of q_i are in the range of 64 bits