A. Mike and Frog

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Mike has a frog and a flower. His frog is named Xaniar and his flower is named Abol. Initially(at time 0), height of Xaniar is h_1 and height of Abol is h_2. Each second, Mike waters Abol and Xaniar.

So, if height of Xaniar is h_1 and height of Abol is h_2, after one second height of Xaniar will become and height of Abol will become where x_1, y_1, x_2 and y_2 are some integer numbers and denotes the remainder of a modulo b.

Mike is a competitive programmer fan. He wants to know the minimum time it takes until height of Xania is a_1 and height of Abol is a_2.

Mike has asked you for your help. Calculate the minimum time or say it will never happen.

Input

The first line of input contains integer m ($2 \le m \le 10^6$).

The second line of input contains integers h_1 and a_1 ($0 \le h_1, a_1 < m$).

The third line of input contains integers x_1 and y_1 ($0 \le x_1, y_1 < m$).

The fourth line of input contains integers h_2 and a_2 ($0 \le h_2, a_2 < m$).

The fifth line of input contains integers x_2 and y_2 ($0 \le x_2, y_2 < m$).

It is guaranteed that $h_1 \neq a_1$ and $h_2 \neq a_2$.

Output

Print the minimum number of seconds until Xaniar reaches height a_1 and Abol reaches height a_2 or print -1 otherwise.

Examples

input
5 4 2 1 1 0 1 2 3
output
3

input
1023 1 2 1 0 1 2 1 1
output
-1

Note

In the first sample, heights sequences are following:

Xaniar:

Abol: