Minimal Cyclic Shift

We consider two sequences of integers, $a_0, a_1, \ldots, a_{n-1}$ and $b_0, b_1, \ldots, b_{n-1}$, to be *similar* if there exists a polynomial, $P(x)$, with integer coefficients of a degree $\leq k$ such that $P(i) = (a_i - b_i) \bmod m$ (where $m = 998244353$) for $0 \leq i < n$.

Given sequences a and b, find and print the minimal integer x (where $0 \leq x < n$) such that a cyclic shift of b on x elements (sequence $b_{x \bmod n}, b_{(x+1) \bmod n}, \ldots b_{(x+n-1) \bmod n}$) is *similar* to a; if no such x exists, print -1 instead.

Input Format

The first line contains two space-separated integers describing the respective values of n (the length of the sequences) and k (the maximum degree of polynomial).
The second line contains n space-separated integers describing the respective values of $a_0, a_1, \ldots, a_{n-1}$.
The second line contains n space-separated integers describing the respective values of $b_0, b_1, \ldots, b_{n-1}$.

Constraints

- $1 \leq n \leq 10^5$
- $0 \leq k \leq 10^9$
- $0 \leq a_i, b_i < m$

Output Format

Print an integer, x, denoting the minimal appropriate cyclic shift. If no such value exists, print -1 instead.

Sample Input 0

```
6 0
1 2 1 2 1 2
4 3 4 3 4 3
```

Sample Output 0

```
1
```

Explanation 0

After a cyclic shift of $x = 1$, sequence b is $[3, 4, 3, 4, 3, 4]$ and $P(x) = -2$. Thus, we print 1.

Sample Input 1

```
4 2
1 10 100 1000
0 0 0 0
```

Sample Output 1

```
-1
```

Explanation 1

Sequence b does not change after any cyclic shift and there are no integers p, q, and r such that $P(x) = p \cdot x^2 + q \cdot x + r$ and $P(0) = 1$, $P(1) = 10$, $P(2) = 100$ and $P(3) = 1000 \bmod m$. Thus, we print -1.