Problem A. Traffic Light 2

TimeLimit: 1 second
MemoryLimit: 256 megabytes

"Oh My God! It is almost contest now!" Mr. Guan just woke up and found that it was already very late! He needs to participate in the I2CP final contest today.

Guan is going from his home to school. His home is located at position 0 on a number line, and the school is at position c ($c > 0$). Guan walks 1 unit per second in the positive direction. Along the way, there are n traffic lights.

The i-th traffic light is located at position p_i ($0 < p_i < c$). Starting from the moment Guan leaves home (time $t = 0$), this traffic light alternates green for g_i seconds, then red for r_i seconds, repeating this pattern forever. In other words, the light's cycle length is $T_i = g_i + r_i$, and it is green during time intervals $[k \times T_i, k \times T_i + g_i)$ for every nonnegative integer k. It is red during the remaining time intervals.

Guan starts at position 0 at time $t = 0$ and moves forward at a speed of one unit per second. When he arrives at a traffic light at position p_i, he checks the light's color at the same time. If it is green, he continues moving immediately. If it is red, he must wait at that position until it turns green again before continuing his journey.

After the midterm contest, he tried to wait for the traffic light, so he learned a magic to change the time of the traffic light, and he can change at most k of traffic lights (change either the time of the green light or red light), for each change, he can set the time of the light any positive integer he wants.

But Mr. Guan is too lazy to calculate which of them he should change, so he can spend the least time going to school. Your task is to determine the earliest possible time (in seconds) when Guan can reach his school at position c with at most k of the traffic light changes.

Input

The first line contains three integers n, k, and c — the number of traffic lights, the maximum number of operations, and the position of the school.

The second line contains n integers p_i — the position of the i-th traffic light.

The third line contains n integers g_i — the seconds of the green light for the i-th traffic light.

The fourth line contains n integers r_i — the seconds of the red light for the i-th traffic light.

- $1 \le n \le 1000$
- $0 \le k \le n$
- $1 \le p_1 < p_2 < \cdots < p_n < c \le 10^9$, i.e., $p_i < p_{i+1}$ for all $1 \le i < n$.
- $1 \le g_i, r_i \le 10^9$ for all $1 \le i \le n$

Output

Print an integer — the earliest possible time when Mr. Guan can reach his school at position c with at most k of the traffic light changes.

Examples

standard input	standard output
3 0 10 3 5 8 5 2 4 3 7 4	18
3 1 10 3 5 8 5 2 4 3 7 4	10

Note

In the second example, if Mr. Guan changes the red light duration of the second traffic light to 2 seconds, he can arrive at the school without waiting at any traffic light.