

A. Wanmin Restaurant's Boiled Fish

2 s., 256 MB

The Wanmin Restaurant is open for business!

n people queue up everyday to purchase Wanmin Restaurant's Boiled Fish. The i -th person in line wants to buy a_i servings of the dish.

The chef prepares q batches of the dish - the j -th batch has k_j servings of Boiled Fish. Once a batch is ready, it is given one by one to the person standing at the front of the queue. The instant a person receives as many servings as they wanted, they immediately leave the queue (and so the next serving is given to the next person in line till they leave, and so on). After the n -th person has been served, **any remaining servings from that batch are thrown out** and the restaurant is cleaned.

However, the Wanmin Restaurant is quite popular - when the restaurant is being cleaned, the same n people line up once again - in the exact same order, and with exactly the same requirements as before. This process continues as long as the chef continues to make batches.

Your task is to tell the chef how many people remain in the queue after each batch of Boiled Fish is served. Note that once the n -th person has been served, all n people queue up again, so your output in this case should be n and not 0.

Input

The first line contains two integers n and q ($1 \leq n, q \leq 200\,000$) — the number of customers and the number of batches prepared by the chef.

The second line contains n integers $a_1, a_2, a_3, \dots, a_n$ ($1 \leq a_i \leq 10^9$) — the number of servings required by each customer.

The third line contains q integers $k_1, k_2, k_3, \dots, k_q$ ($1 \leq k_i \leq 10^{14}$) — k_i is the number of servings prepared in the i -th batch.

Output

Print q lines, the i -th of which is the number of customers remaining after the i -th batch has been served.

input
5 5 1 2 1 2 1 3 7 1 1 1
output
3 5 4 4 3

input
4 4 1 2 3 4 9 1 15 6
output
1 4 4 1

In the first sample test:

- The first batch serves the first two people completely, so they leave the queue
- The second batch serves all remaining people, so they leave the queue and then all 5 people queue up again. There are 3 extra servings in this batch, which are thrown out.
- The third batch serves only the first person, who leaves the queue
- The fourth batch goes to the second person, but they still want 1 more serving so nobody leaves the queue
- The fifth batch serves the second person, who then leaves the queue.

B. Convex Hull

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Given a set of n distinct points on the 2D plane, output their convex hull.

Input

The first line of input has an integer n ($1 \leq n \leq 200,000$): the number of points.

n lines follow, the i -th of which contains two integers x_i and y_i ($-10^9 \leq x_i, y_i \leq 10^9$): the coordinates of the i -th input point.

All points are distinct, and the input is such that the area of the convex hull is positive.

Output

First print an integer k : the number of points in the convex hull.

Then print k lines that describe the points. The points can be printed in any order.

input
6 2 1 2 5 3 3 4 3 4 4 6 3
output
4 2 1 6 3 4 4 2 5

input
4 0 0 1 0 2 0 1 1
output
4 0 0 1 0 2 0 1 1

Print every point which lies on the convex hull, i.e, if some points on the hull are collinear, print all of them (see second sample case for an example)