Hero of Sushi

Input file:	*standard input*
Output file:	*standard output*
Time limit:	4 seconds
Memory limit:	1024 mebibytes

Dok is playing a game "Hero of Sushi". The rules of the game are not very important to us; it is enough to know that it consists of rounds numbered from 1 to n.

Dok controls the hero; the hero has a money balance in the game, which initially contains 0 tugriks. After completing the i-th round, a_i tugriks are credited to his balance.

Additionally, after completing each round, the hero gains access to the in-game sushi shop. The contents and the meaning of this shop are not very important to us; it is enough to know that it can be rerolled.

For each visit to the sushi shop, the first reroll costs c_1 tugriks, the second c_2 tugriks, and so on. Moreover, $1 \le c_1 \le c_2 \le \ldots \le c_m$. During any visit to the shop, the hero can make any number of rerolls from 0 to m, but he cannot have less than 0 tugriks in his balance at any moment in time.

It is also possible to skip rounds in the game. If you skip the i-th round, you do not receive a_i tugriks for it and do not gain access to the shop.

Dok is very interested in the maximum number of rerolls his hero can make in total across all shops if he skips the first t rounds, for each t from 0 to $n-1$. Unfortunately, he is not a programmer, so he turned to you for help.

Input

In the first line of input data, there are two integers n, m ($1 \le n, m \le 3 \cdot 10^5$) — the number of rounds in the game and the maximum number of rerolls that can be made in one shop.

In the second line, there are n integers $a_1, \ldots, a_n$ ($1 \le a_i \le 10^{12}$) — the amount of money received for completing each round.

In the third line, there are m integers $c_1, \ldots, c_m$ ($1 \le c_i \le 10^{12}$, $c_1 \le c_2 \le \ldots \le c_m$) — where c_i is the price of the i-th reroll in the shop during each visit.

Output

Output n integers — the maximum number of rerolls across all shops that can be made if the first t rounds are skipped, for each t from 0 to $n-1$.

Example

standard input	*standard output*
5 4 6 2 12 6 3 1 3 3 5	13 10 9 4 1

Note

In the first example, if Dok does not skip any rounds, he will be able to make a total of 13 rerolls across all shops, following this scheme:

- After the first round, make 2 rerolls, spending $1+3=4$ tugriks and leaving 2 tugriks in his balance.
- After the second round, make another 2 rerolls, spending $1+3=4$ tugriks and leaving 0 tugriks in his balance.
- After the third round, make another 3 rerolls, spending $1+3+3=7$ tugriks and leaving 5 tugriks in his balance.
- After the fourth round, make another 3 rerolls, spending $1+3+3=7$ tugriks and leaving 4 tugriks in his balance.
- After the fifth round, make another 3 rerolls, spending $1+3+3=7$ tugriks and leaving 0 tugriks in his balance.