

Pancakes

| Time Limit | Memory Limit |
|------------|--------------|
| 2 seconds | 256 MB |

Statement

You have qualified for your village's annual junior pancake-eating competition, and you are training hard to win the grand prize: a month's supply of free pancakes! Just the thought of that many pancakes makes you drool.

As any pancake enthusiast would know, there are exactly N types of pancakes¹, numbered from 1 to N . Channeling your pancake-eating powers, you are able to stuff exactly K pancakes into your mouth at the same time. Your ability, however, comes with its disadvantages. You are not able to eat pancakes one-by-one, and the K pancakes must be **of different types**. Under these constraints, you can perform your ability as many times as you want.

For round 1 of competition, you will get p_1 pancakes of type 1, p_2 pancakes of type 2, p_3 pancakes of type 3, and so on.

You want to know the maximum number of total pancakes you can eat on the first round. Answering this question will earn you **most of the points** for this problem (this part of the problem corresponds to subtasks 1 through 5, where $Q = 0$).

For the remaining points, you realise that there are a total of $Q + 1$ rounds of competition. For subsequent rounds $j + 1$, the pancakes given will be the same as round j , except that you will get a_j pancakes of type b_j instead. Determine for **all rounds**, what is the maximum number of pancakes you can eat?

Next year, you will be too old to qualify for the competition. You only have one shot at the grand prize. Determined to make it count, you whip out your trusty laptop and begin coding.

Input

The first line of input contains three integers: N , K and Q .

The second line input contains N space-separated integers, the i th of which is p_i .

The next Q lines of input contain two space-separated integers, the j th such line containing a_j and then b_j .

¹Your favourite pancakes are the ones with ground hazelnuts in the batter. They taste *amazing*!

Output

Output $Q + 1$ integers. The integers should be the maximum number of pancakes you can eat in each round, in order from round 1 to round $Q + 1$.

As the answer can become quite large, C++ users are advised to use 64-bit integers (`long long` instead of `int`).

Sample Input 1

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

Sample Output 1

```
8
```

Sample Input 2

```
4 3 0
5 2 9 4
```

Sample Output 2

```
15
```

Sample Input 3

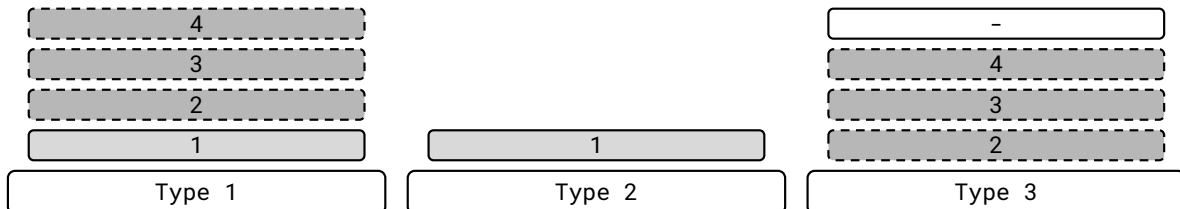
```
4 3 2
5 2 9 4
4 2
0 4
```

Sample Output 3

```
15
18
12
```

Explanation

Below is a diagram illustrating sample input 1.

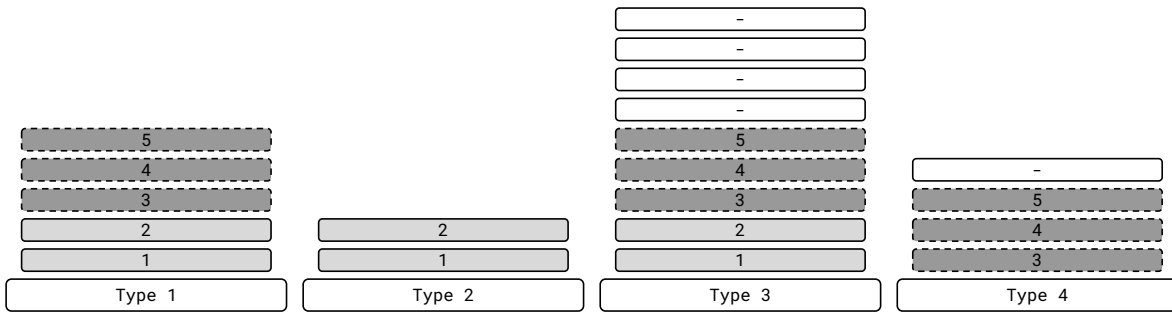


To achieve the maximum of 8 pancakes when you can eat 2 pancakes at once:

- Eat a type 1 pancake with a type 2 pancake.
- Devour the remaining type 1 pancakes by pairing each of them up with a type 3 pancake.

In total, you channel your abilities 4 times, eating 8 pancakes. Note that this is not the only way to eat 8 pancakes.

Below is a diagram illustrating sample input 2.

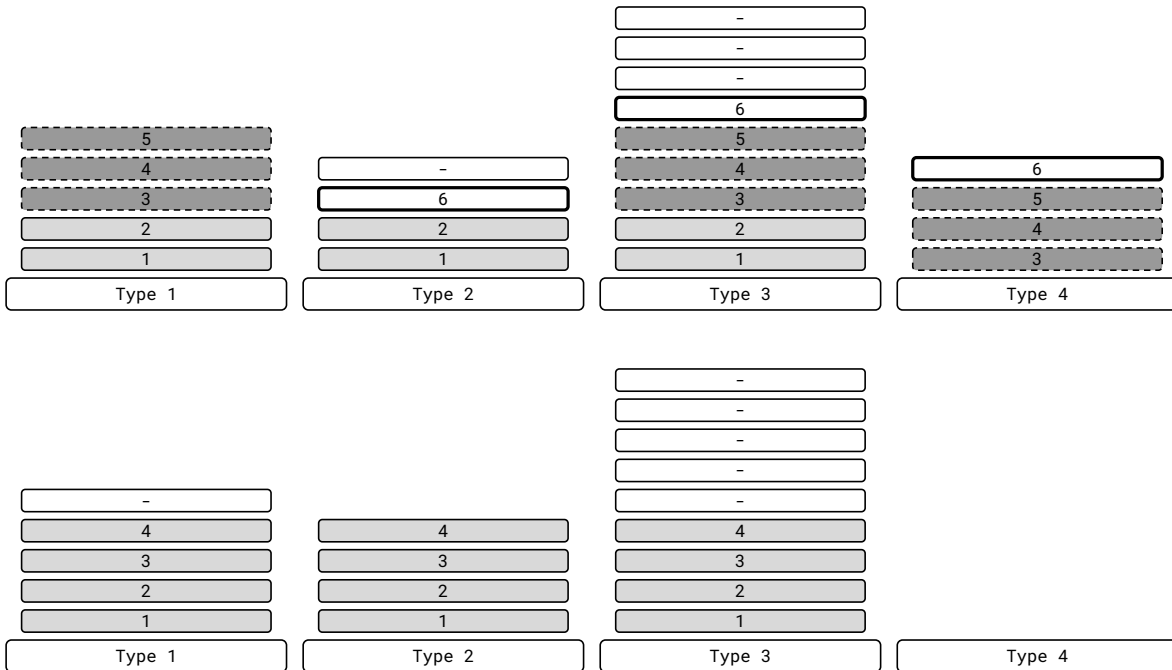


To achieve the maximum of 15 pancakes when you can eat 3 pancakes at once:

- Eat types 1, 2 and 3 pancakes until you have no more type 2 pancakes.
- Eat types 1, 3 and 4 pancakes until you have no more type 1 pancakes.

In total, you channel your abilities 5 times, eating 15 pancakes. Note that this is not the only way to eat 15 pancakes.

Below are diagrams illustrating rounds 2 and 3 of sample input 3. Round 1 of sample input 3 is the same as sample input 2.



Following the diagrams, you can achieve a maximum of 18 and 12 pancakes in rounds 2 and 3 respectively.

Constraints

- $2 \leq K \leq N \leq 10^5$
- $0 \leq Q \leq 10^5$
- $0 \leq p_i \leq 10^9$ for all i
- $0 \leq a_j \leq 10^9$ for all j
- $1 \leq b_j \leq N$

(Yes, that is a lot of pancakes. It's okay to drool.)

Subtasks

| Number | Points | Max Q | Other constraints |
|--------|--------|--------|---|
| 1 | 12 | 0 | $N = 3$ and $K = 2$ |
| 2 | 8 | 0 | $K = 2$ |
| 3 | 20 | 0 | $N \leq 1000$ and $p_i \leq 1000$ for all i |
| 4 | 13 | 0 | $p_i \leq 10^5$ for all i |
| 5 | 17 | 0 | None |
| 6 | 19 | 10^5 | $p_i, a_j \leq 10^5$ for all i, j |
| 7 | 11 | 10^5 | None |