C. Biscuits (biscuits)

Time limit: 3 seconds
Memory limit: 1024 MiB

Aurora and Bianca love amaretti biscuits, and today, their grandpa has baked a huge stack of them. To share the biscuits between them, they have invented the following game. As long as there are biscuits remaining in the stack, they repeat the following procedure:

1. Aurora picks an integer $X \geq 0$.
2. Next, Bianca picks an integer $Y \geq 0$ such that:
   - there are at least Y biscuits remaining, and
   - $Y \neq X$.
3. Aurora then eats the topmost Y biscuits (or none if $Y = 0$).
4. Finally, if there are still biscuits left, Bianca eats the topmost biscuit.

Of course, each girl wants to eat as much as possible. Each biscuit in the stack has a weight $1 \leq W_i \leq 50$. Once all biscuits are eaten, each girl's **happiness** is equal to the total weight of all the biscuits she has eaten during the game. Both girls know how to play the game optimally – each of them always makes moves that maximize her own happiness when the game ends.

Since the game is so much fun, they now want to play it every day! For the next Q days, their grandpa bakes a new stack with the same number of biscuits every day. To make the game more interesting, each day, he changes the weight of one single biscuit, while the weights of the others stay the same as the day before.

For the initial stack, and after each of these changes to the stack, you should determine **Bianca's happiness** at the end of the game each day.

Input

The first line of input contains two integers N and Q, the number of biscuits in the stack and the number of changes. The biscuits are numbered from 0 on the top to $N - 1$ on the bottom.

The second line contains N integers $W_0, W_1, ..., W_{N-1}$, the initial weights of the biscuits.

The ith of the next Q lines contains two integers P_i and Z_i, describing the ith change: their grandpa changes the weight of biscuit P_i to weight Z_i. In other words, the value of W_{P_i} changes to Z_i.

Output

Print $Q + 1$ integers, Bianca's happiness after each game.

Constraints

- $2 \leq N \leq 100\,000$.
- $0 \leq Q \leq 100\,000$.
- $1 \leq W_i \leq 50$ (yes, amaretti biscuits are quite light!).
- $0 \leq P_i \leq N - 1$ and $1 \leq Z_i \leq 50$.

Scoring

Your program will be tested on several test cases grouped into subtasks. To obtain the score for a subtask, you must correctly solve all the tests it contains.

- **Subtask 0 [0 points]**: Examples.
- **Subtask 1 [8 points]**: $Q = 0$ and $W_i = 1$.
- **Subtask 2 [9 points]**: $N \leq 3, Q \leq 5$.
- **Subtask 3 [11 points]**: at any point in time, the weights W_i are non-increasing; in other words, it holds that $W_0 \geq W_1 \geq ... \geq W_{N-1}$.
- **Subtask 4 [13 points]**: $N \leq 100, Q \leq 50$.
- **Subtask 5 [18 points]**: $N \leq 20\,000, Q \leq 50$.
- **Subtask 6 [12 points]**: $N \leq 20\,000, Q \leq 5000$.
- **Subtask 7 [29 points]**: no additional constraints.

Examples

stdin	stdout
2 1 10 15 1 1	10 1
5 2 1 1 1 1 2 2 20 3 30	3 4 24
4 2 1 2 4 8 3 2 2 3	7 4 4
3 0 1 1 1	1
3 4 50 8 1 1 1 1 8 2 7 2 1	8 1 8 8 8

Explanation

First Example. On the first day, the weights of the biscuits are 10 and 15.

- The optimal number for Aurora to choose is $X = 1$. Then, Bianca chooses $Y = 0$ and eats the topmost biscuit.
- In the second turn, Aurora chooses $X = 0$. Bianca's only option is to choose $Y = 1$. Then, Aurora eats the biscuit with weight 15 and the game ends.

On the second day, the weight of biscuit 1 is changed to 1, and the weights of the biscuits are now [10, 1].

- The optimal number for Aurora to choose is $X = 0$. Then, Bianca chooses $Y = 1$. Aurora eats the topmost biscuit, and Bianca eats the remaining one.

Bianca's happiness after the game is 1.

Second Example. The original weights of the biscuits are $[1, 1, 1, 1, 2]$ from top to bottom.

- It is optimal for Aurora to choose $X = 0$. Bianca then chooses $Y = 1$. Aurora eats the first biscuit, and Bianca the second.
- In the next turn, Aurora chooses $X = 0$. Bianca then chooses $Y = 2$. Aurora eats the next two biscuits and Bianca the last one. The game ends with Bianca's total happiness being 3.

After the first change, the weights are $[1, 1, 20, 1, 2]$.

- Now it is optimal for Aurora to choose $X = 2$. (If she chose any other value, Bianca would choose $Y = 2$, and then Aurora would not get to eat the big biscuit in the middle.) In response to Aurora's choice, Bianca chooses $Y = 0$ and eats the first biscuit. The remaining biscuit weights are $[1, 20, 1, 2]$.
- In the second turn, Aurora chooses $X = 1$, and Bianca chooses $Y = 0$. Again, Bianca eats the topmost biscuit. Afterwards, the weights of the remaining biscuits are $[20, 1, 2]$.
- In the third turn, Aurora picks $X = 0$. Bianca chooses $Y = 2$. After that, Aurora eats the biscuits with weights 20 and 1, and finally Bianca eats the last biscuit of weight 2. The total weight of biscuits Bianca eats is $1 + 1 + 2 = 4$.

After the second change, the weights are $[1, 1, 20, 30, 2]$. If both girls play optimally, Bianca eats all biscuits except for the one with weight 30.