

ISR (Hard Version)

Time Limit: 1 Second
Memory Limit: 2048 MB

If you have seen the normal version of this problem in this class before, the only difference between the two versions is that you need to answer a series of queries in this version.

After his last visit to ISR Dining Center, LetianPie found the food was so good that he decided to go to ISR for dinner everyday. After several visits, LetianPie discovered that ISR actually provides even more types of food, but some of them are only available on certain weekdays. In specific, ISR provides n different kinds of food in total, with i -th kind of food served on the i -th table, and all tables are arranged in a line. On the i -th day, only tables in $[l_i, r_i]$ are open to customers.

In ISR, each person can choose to get in line at i -th table, and leave the line at j -th table ($i \leq j$), grabbing all kinds of food between i -th table and j -th table (inclusive). Each person can only get in line once during one visit.

LetianPie has already assigned each kind of food an integer value denoting how much he likes this kind of food. In specific, the i -th kind of food is assigned with value a_i ($-10^5 \leq a_i \leq 10^5$), where a positive value indicates that LetianPie likes this kind of food, and vice versa. Moreover, he has also known which tables will be open in the next m days from Illinois App. The happiness LetianPie gains from each dinner is the sum of values assigned to the foods he picks. Now LetianPie is wondering the maximum total happiness he can gain if he visits ISR in the next m days, and he chooses the starting and ending tables optimally. Since he is too hungry to think about it, he asks you to help him out.

Input

The first line contains two integer n and m ($1 \leq n, m \leq 10^5$) - the number of foods provided by ISR and the number of days LetianPie is going to ISR for dinner.

The second line contains n integer a_1, \dots, a_n ($-10^5 \leq a_i \leq 10^5$) - how much LetianPie likes each kind of food.

The next m lines describe the food offered by ISR in the next m days. Each line contains two integers l and r ($1 \leq l \leq r \leq n$), as described in the problem statement.

Output

Output a single integer denoting the maximum total happiness LetianPie can gain from the dinners.

Sample Inputs

```
5 3
3 -2 -1 4 0
2 3
1 5
1 3
```

Sample Outputs

7
