Absolutely Flat

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	1024 mebibytes

You are given an array a consisting of n positive integers. However, some elements of a are missing, and they are replaced by zeroes.

Define the *oscillation* of a on a segment $[\ell, r]$ to be $\max(a_\ell, \ldots, a_r) - \min(a_\ell, \ldots, a_r)$.

You are given q segments in the form $[\ell_i, r_i]$. Replace each zero in a with a positive integer to minimize the sum of oscillations of a on all q segments.

Input

The first line contains two integers n and q ($1 \le n, q \le 2 \cdot 10^5$).

The second line contains n integers $a_1, \ldots, a_n$ ($0 \le a_i \le 10^9$): the elements of the array. Here, $a_i = 0$ means that the i-th element is missing.

The next q lines describe the segments. Each of them contains two integers ℓ_i and r_i ($1 \le \ell_i \le r_i \le n$).

Output

Print a single integer: the minimum sum of oscillations of a on all the given segments.

Examples

standard input	*standard output*
5 2 2 1 0 3 2 1 3 3 5	2
5 3 1 0 3 0 1 1 2 2 4 5 5	2
7 4 4 4 0 1 0 3 4 1 3 1 3 3 5 4 7	6

Note

In the first example, the only optimal array is $a = [2, 1, 2, 3, 2]$.

In the second example, there are several optimal arrays. For example, $a = [1, 2, 3, 2, 1]$ is optimal.

In the third example, there are several optimal arrays. For example, $a = [4, 4, 4, 1, 2, 3, 4]$ is optimal.