

F. Mice and Holes

time limit per test: 1.5 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

One day Masha came home and noticed n mice in the corridor of her flat. Of course, she shouted loudly, so scared mice started to run to the holes in the corridor.

The corridor can be represented as a numeric axis with n mice and m holes on it. i th mouse is at the coordinate x_i , and j th hole — at coordinate p_j . j th hole has enough room for c_j mice, so not more than c_j mice can enter this hole.

What is the minimum sum of distances that mice have to go through so that they all can hide in the holes? If i th mouse goes to the hole j , then its distance is $|x_i - p_j|$.

Print the minimum sum of distances.

Input

The first line contains two integer numbers n, m ($1 \leq n, m \leq 5000$) — the number of mice and the number of holes, respectively.

The second line contains n integers x_1, x_2, \dots, x_n ($-10^9 \leq x_i \leq 10^9$), where x_i is the coordinate of i th mouse.

Next m lines contain pairs of integer numbers p_j, c_j ($-10^9 \leq p_j \leq 10^9, 1 \leq c_j \leq 5000$), where p_j is the coordinate of j th hole, and c_j is the maximum number of mice that can hide in the hole j .

Output

Print one integer number — the minimum sum of distances. If there is no solution, print -1 instead.

Examples

input
4 5 6 2 8 9 3 6 2 1 3 6 4 7 4 7
output
11

input
7 2 10 20 30 40 50 45 35 -1000000000 10 1000000000 1
output
7000000130