Problem D. Least Prefix Sum

Time Limit   2000 ms

Mem Limit   262144 kB

Baltic, a famous chess player who is also a mathematician, has an array $a_1, a_2, \ldots, a_n$, and he can perform the following operation several (possibly 0) times:

- Choose some index i ($1 \leq i \leq n$);
- multiply a_i with -1, that is, set $a_i := -a_i$.

Baltic's favorite number is m, and he wants $a_1 + a_2 + \cdots + a_m$ to be the smallest of all non-empty prefix sums. More formally, for each $k = 1, 2, \ldots, n$ it should hold that

$$a_1 + a_2 + \cdots + a_k \geq a_1 + a_2 + \cdots + a_m.$$

Please note that multiple smallest prefix sums may exist and that it is only required that $a_1 + a_2 + \cdots + a_m$ is one of them.

Help Baltic find the minimum number of operations required to make $a_1 + a_2 + \cdots + a_m$ the least of all prefix sums. It can be shown that a valid sequence of operations always exists.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10\,000$). The description of the test cases follows.

The first line of each test case contains two integers n and m ($1 \leq m \leq n \leq 2 \cdot 10^5$) — the size of Baltic's array and his favorite number.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($-10^9 \leq a_i \leq 10^9$) — the array.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, print a single integer — the minimum number of required operations.

Examples

Input	Output
6 4 3 -1 -2 -3 -4 4 3 1 2 3 4 1 1 1 5 5 -2 3 -5 1 -20 5 2 -2 3 -5 -5 -20 10 4 345875723 -48 384678321 -375635768 -35867853 -35863586 -358683842 -81725678 38576 -357865873	1 1 0 0 3 4

Note

In the first example, we perform the operation $a_4 := -a_4$. The array becomes $[-1, -2, -3, 4]$ and the prefix sums, $[a_1,\ a_1 + a_2,\ a_1 + a_2 + a_3,\ a_1 + a_2 + a_3 + a_4]$, are equal to $[-1, -3, -6, -2]$. Thus $a_1 + a_2 + a_3 = -6$ is the smallest of all prefix sums.

In the second example, we perform the operation $a_3 := -a_3$. The array becomes $[1, 2, -3, 4]$ with prefix sums equal to $[1, 3, 0, 4]$.

In the third and fourth examples, $a_1 + a_2 + \cdots + a_m$ is already the smallest of the prefix sums — no operation needs to be performed.

In the fifth example, a valid sequence of operations is:

- $a_3 := -a_3$,
- $a_2 := -a_2$,
- $a_5 := -a_5$.

The array becomes $[-2, -3, 5, -5, 20]$ and its prefix sums are $[-2, -5, 0, -5, 15]$. Note that $a_1 + a_2 = -5$ and $a_1 + a_2 + a_3 + a_4 = -5$ are both the smallest of the prefix sums (and this is a valid solution).