Stollen Cut

Mouse Stofl loves Christmas Food so much that Stofl eats Stollen all year long. Stofl loves the delicious raisins and the mouth-watering marzipan.

Stofl invited K friends to share the Stollen that Stofl just bought at the bakery. For fairness reasons, Stofl wants to make sure that everyone's portion has roughly the same deliciousness. The Stollen consists of N parts, which can not be divided. Furthermore, each of the $K + 1$ mice must eat a contiguous part of the Stollen, and the whole Stollen has to be consumed. If a mouse is very unlucky, it will have to eat an empty portion. The deliciousness of a portion is defined as the sum of the deliciousness of its individual parts.

Stofl wants to keep the maximum difference in deliciousness between the portions as small as possible. If Stofl divides the Stollen in an optimal way, how large is the maximum difference in deliciousness between two portions?

Input

- The first line contains the number of parts N ($1 \leq N \leq 10^6$) of the Stollen, and K ($1 \leq K \leq 2$) the number of friends Stofl invited.
- The second line contains $d_0, d_1, \ldots, d_{N-1}$ where d_i is the deliciousness of part i of the Stollen. It holds that $0 \leq d_i \leq 1000$.

Output

Print the smallest maximum absolute difference of deliciousness between two portions over all possible Stollen assignments. Note that a Stollen is not cyclic and thus it is not possible to have a portion that contains both ends but does not contain the parts in the middle of the Stollen.

Limits

- The first test group is worth 10 points, with $K = 1$ and $N \leq 100$.
- The second test group is worth 10 points, with $K = 1$ and $N \leq 2000$.
- The third test group is worth 20 points, with $K = 1$ and $N \leq 10^6$.
- The fourth test group is worth 10 points, with $K = 2$ and $N \leq 100$.
- The fifth test group is worth 20 points, with $K = 2$ and $N \leq 2000$.
- The last test group is worth 30 points, with $K = 2$ and $N \leq 10^6$.

Samples

Input	Output
5 1 1 1 5 2 4	1

To minimize the difference of deliciousness between the two mice, the first mouse should get the first three parts ($1 + 1 + 5 = 7$)*, and the other mouse the remaining parts* ($2 + 4 = 6$)*. Thus the result is* $7 - 6 = 1$.

Input	Output
5 2 1 1 5 2 4	4

The first mouse should get the first two parts, the second mouse the next one (the middle part of the Stollen), and the last mouse the remaining two parts. Thus the deliciousness of the portions are 2, 5 *and* 6, *therefore the result is* 4.