Problem G. Groceries

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

In the dwarfs' underground city there are N houses, numbered from 1 to N clockwise. The houses are connected by one circular, bidirectional road. Distances between each two consecutive houses are known, each such distance is a positive integer.

The dwarfs love to visit their neighbours: a dwarf living in house i visits dwarfs living in houses $i+1$ (or 1, when $i = N$) and $i-1$ (or N, when $i = 1$). However, they do not like to come empty-handed, so after leaving their house and before arriving at their neighbour's house, they need to visit a grocery store to buy appropriate products. The visited grocery can be further away or in the other direction than the neighbour's house and the dwarfs can turn back at any spot on their way.

Dwarf the Planner wants to modernize the city by demolishing all old grocery stores and building K new ones, so that the maximal distance travelled by a dwarf when visiting a neighbour is minimal possible. New grocery stores can be built at arbitrary places on the circular road, not necessarily at the same locations as the houses and not necessarily at integer distance from an existing house. Help the Planner in this task and write an algorithm which computes, for the optimal location of K grocery stores, the maximum distance travelled by a dwarf who visits his neighbour and a grocery store on the way.

Input

The first line of input contains two integers N and K, representing the number of houses and the number of grocery stores to be built, respectively.

The second line of input contains N positive integers $d_1, \ldots, d_N$, representing the distances along the road in clockwise direction between houses i and $i+1$ for $1 \le i < N$ and between houses N and 1 for $i = N$.

Limits $2 \le N \le 500\,000$, $1 \le K \le N$, $1 \le d_i \le 10^9$.

Output

Output a single integer, representing the minimum possible maximum distance travelled by a dwarf when going to a neighbour and visiting a grocery store on the way, for optimal location of K grocery stores. It can be proven that the result is always an integer.

Examples

standard input	standard output
3 1 2 4 5	6
5 3 2 6 4 1 5	6