IOI Training Camp 2011 – Final 1, 21 June, 2011

Problem 3 Segment flip

You are given N numbers a_1, a_2, ..., a_N. In a *segment flip*, you pick a contiguous segment $a_i, a_{i+1}, \ldots, a_j$ of these numbers, where $i \leq j$, and negate all the numbers in this segment.

You are permitted at most K segment flips overall. Also, no two segments that you flip can overlap. That is, if you flip $a_i, \ldots, a_j$ and $a_k, \ldots, a_\ell$ then either $j < k$ or $\ell < i$.

Your aim is to maximize the sum of all the numbers in the sequence by applying appropriate segment flips meeting these constraints.

For instance, suppose the sequence is -5, 2, -3 and you are allowed a single segment flip. The best sum you can achieve is 6, by flipping all three numbers as a single segment to 5, -2, 3.

Input format

The first line contains two integers N and K. The next line contains N integers, the initial values of a_1, a_2, ..., a_N.

Output format

A single integer denoting the maximum possible sum of the final array.

Test Data

In all subtasks, $0 \leq K \leq N$ and for each $i \in \{1, 2, \ldots, N\}$, $-10^4 \leq a_i \leq 10^4$.

- *Subtask 1 (20 marks):* $1 \leq N \leq 300$.
- *Subtask 2 (40 marks):* $1 \leq N \leq 3000$.
- *Subtask 3 (40 marks):* $1 \leq N \leq 10^5$.

Sample input

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3 1
-5 2 -3
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Sample output

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6
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Time and memory limits

The time limit for this task is 1 second. The memory limit is 128 MB.