

IOI Training Camp 2011 – Test 2, 12 June, 2011

Problem 1 Weighted sum

You are given a sequence of N numbers $C[1], C[2], \dots, C[N]$ and a fixed value $M \leq N$. For each subsequence of positions $1 \leq i_1 < i_2 < \dots < i_M \leq N$, we compute the weighted sum

$$\sum_{j=1}^M j \cdot C[i_j] = 1 \cdot C[i_1] + 2 \cdot C[i_2] + \dots + M \cdot C[i_M].$$

The aim is to find the maximum such weighted sum that can be attained.

For instance, if the given sequence is $-50, 100, -20, 40, 30$ and M is 2, the best weighted sum arises when we choose positions 2 and 4 so that we get a value $1 \cdot 100 + 2 \cdot 40 = 180$.

On the other hand, if the given sequence is $10, 50, 20$ and M is again 2, the best option is to choose positions 1 and 2 that we get a value $1 \cdot 10 + 2 \cdot 50 = 110$.

Input format

The first line of input contains two space separated integers, N and M . The second line contains N space separated integers, the values $C[1], C[2], \dots, C[N]$, in that order.

Output format

A single line containing the maximum value that you can achieve.

Test Data

- *Subtask 1 (60 marks):* $1 \leq N \leq 5000$, and $1 \leq M \leq 500$
- *Subtask 2 (40 marks):* $1 \leq N \leq 20000$, and $1 \leq M \leq 2000$

In both subtasks, $M \leq N$ and $-500 \leq C[i] \leq 500$ for all $i \in \{1, 2, \dots, N\}$.

Sample input 1

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5 2
-50 100 -20 40 30
```

Sample input 2

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3 2
10 50 20
```

Sample output 1

180

Sample output 2

110

Time and memory limits

The time limit for this task is 2 seconds. The memory limit is 32 MB