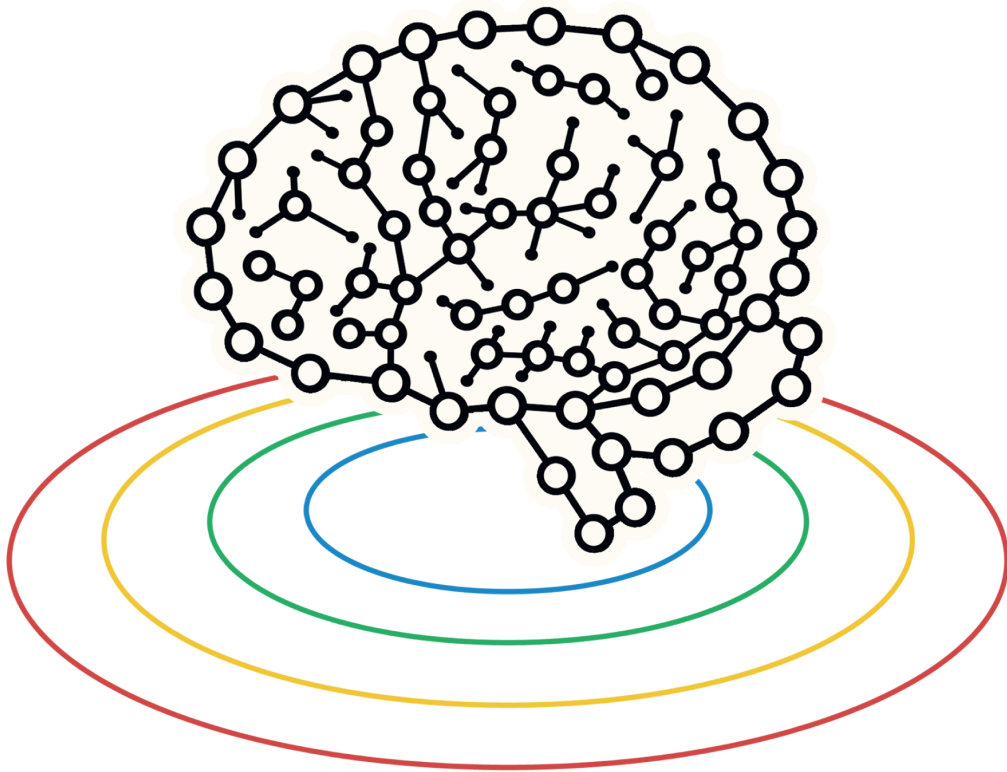




Association for Computing Machinery
University of the Philippines Diliman Student Chapter, Inc.



ALGOLYMPICS 2021

UP ACM PROGRAMMING COMPETITION

PRACTICE PROBLEMS

Sample Problem

Guardians of the Lunatics

Time Limit: 2 seconds

You are in charge of assigning guards to a prison where the craziest criminals are sent. The L cells form a single row and are numbered from 1 to L . Cell i houses exactly one lunatic whose *craziness level* is C_i .

Each lunatic should have one guard watching over him/her. Ideally, you should have one guard watching over each lunatic. However, due to budget constraints, you only have G guards to assign. You have to assign which lunatics each guard should watch over in order to minimize the total risk of having someone escape.

Of course, you should assign each guard to a set of adjacent cells. The *risk level* R_i that the lunatic in cell i can escape is given by the product of his/her craziness level C_i and the number of lunatics the guard assigned to him/her is watching over. Getting the sum of the R_i 's from $i = 1$ to $i = L$ will give us the total amount of risk, R , that a lunatic might escape.

Given L lunatics and G guards, what is the minimum possible value of R ?

Input Format

The first line of input contains two space-separated positive integers: L and G , the number of lunatics and the number of guards respectively.

The next L lines describe the craziness level of each of the lunatics. The i^{th} of these L lines describe the craziness level of the lunatic in cell block i .

Constraints

- $1 \leq L \leq 8000$
- $1 \leq G \leq 800$
- $1 \leq C_i \leq 10^9$

Output Format

Output a line containing the minimum possible value of R .

Sample Input	Sample Output
6 3 11 11 11 24 26 100	299

Explanation

The first guard should be assigned to watch over the first three lunatics, each having a craziness level of 11. The second guard should be assigned to watch over the next two lunatics, having craziness levels of 24 and 26. The third guard should be assigned to the craziest lunatic, the one having a craziness level of 100.

The first three lunatics each have a risk level of 33, the product of 11 (their craziness level) and 3 (the number of lunatics their guard is watching over). The next three lunatics have risk level of 48, 52 and 100. Adding these up, the total risk level is 299.

This problem was adapted from NOI.PH (<https://noi.ph/past-problems/>)