PROBLEM 3

Shopping Spree

Input file: `shopin.txt`
Output file: `shopout.txt`

Time and memory limits: 1 second, 1 GB

After winning the lottery you have made the (perhaps unwise) decision to buy every item at the local Pair Mart store. Pair Mart has an unusual policy where customers are only allowed to buy items in pairs. When buying a pair, you get two items for the cost of the more expensive one.

In addition, you have collected K Pair Mart coupons. Each coupon allows you to buy a pair of items for the cost of the cheaper one, rather than the more expensive one.

The store has N items and the ith item costs C_i dollars. You know that N is even and so you can buy every item in the store.

What is the minimum cost to buy all N items?

Subtasks and constraints

Your program will be graded using many secret tests. Every test follows some rules:

- $2 \le N \le 200\,000$ and N is even.
- $0 \le K \le N/2$.
- $1 \le C_i \le 10\,000$ for all i.
- $C_i \le C_{i+1}$. That is, the costs are given in sorted order.

The secret tests are divided into subtasks. Your program must correctly solve **every test** within a subtask to earn the marks for that subtask:

- For Subtask 1 (35 marks), $K = 0$ and $N \le 1000$.
- For Subtask 2 (35 marks), $K = N/2$ and $N \le 1000$.
- For Subtask 3 (30 marks), no special rules apply.

Input

Your program must read input from the file `shopin.txt`. When testing on your own computer, this file must be placed in the same folder as your program. We strongly recommend using the solution templates (which you can find on the *Templates & Downloads* page of the competition website) to help you with input and output.

The file `shopin.txt` follows a specific format:

- The 1st line of input contains the integers N and K.
- The 2nd line of input contains N integers describing the costs of the items. The ith of these is C_i.

Output

Your program must write a single integer to the file `shopout.txt`: the minimum cost (in dollars) to buy all the items.

Sample input 1

```
4 1
3 4 6 10
```

Sample input 2

```
4 0
5 10 15 20
```

Sample input 3

```
6 3
2 2 4 4 5 6
```

Sample output 1

```
9
```

Sample output 2

```
30
```

Sample output 3

```
8
```

Explanation

- In the 1st sample case, you can buy the 1st and 4th item using the coupon for 3 dollars. You can then buy the 2nd and 3rd item for 6 dollars. This comes to a total cost of 9 dollars, which is the lowest possible.

- In the 2nd sample case, you can buy the 1st and 2nd item together and the 3rd and 4th item together. This comes to a total cost of 30 dollars, which is the lowest possible.

- In the 3rd sample case, one way to achieve the lowest possible cost is to buy the 1st and 5th items for 2 dollars using a coupon, then buy the 2nd and 6th items for 2 dollars using a coupon, and then finally buy the 3rd and 4th item for 4 dollars. The last pair will cost 4 dollars no matter whether or not you use the coupon. This comes to a total cost of 8 dollars.