

PROBLEM 3

# Shopping Spree

**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  $i$ th 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:

- $2 \leq N \leq 200\,000$  and  $N$  is even.
- $0 \leq K \leq N/2$ .
- $1 \leq C_i \leq 10\,000$  for all  $i$ .
- $C_i \leq C_{i+1}$ . 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  $N \leq 1000$ .
- For Subtask 2 (35 marks),  $K = N/2$  and  $N \leq 1000$ .
- For Subtask 3 (30 marks), no special rules apply.

## Input

We strongly recommend using the solution templates (which you can find at the *Attachments* section if you scroll down on ORAC) to help you with input and output.

Your program must read input in 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  $i$ th of these is  $C_i$ .

## Output

Your program must print a single integer: 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.