

# The lightest language

Alphabet  $A_k$  consists of  $k$  initial letters of English alphabet. A positive integer called a weight is assigned to each letter of the alphabet. A weight of a word built from the letters of the alphabet  $A_k$  is the sum of weights of all letters in this word. A language over an alphabet  $A_k$  is any finite set of words built from the letters of this alphabet. A weight of a language is the sum of weights of all its words. We say that the language is prefixless if for each pair of different words  $w, v$  from this language  $w$  is not a prefix of  $v$ .

We want to find out what is the minimal possible weight of an  $n$ -element, prefixless language over an alphabet  $A_k$ .

## Example

Assume that  $k = 2$ , the weight of the letter a is  $W(a) = 2$  and the weight of the letter b is  $W(b) = 5$ . The weight of the word ab is  $W(ab) = 2 + 5 = 7$ .  $W(aba) = 2 + 5 + 2 = 9$ . The weight of the language  $J = \{ab, aba, b\}$  is  $W(J) = 21$ . The language  $J$  is not prefixless, since the word ab is a prefix of aba. The lightest three-element, prefixless language over the alphabet  $A_2$  (assuming that weights of the letters are as before) is  $\{b, aa, ab\}$ ; its weight is 16.

## Task

Write a program that for each test case:

- reads two integers  $n, k$  and the weights of  $k$  letters of an alphabet  $A_k$ ;
- computes the minimal weight of a prefixless,  $n$ -element language over the alphabet  $A_k$ ;
- outputs the result.

## Input

The number of test cases  $t$  is in the first line of input, then  $t$  test cases follow separated by an empty line.

In the first line of a test case there are two positive integers  $n$  and  $k$  separated by a single space, ( $2 \leq n \leq 10000, 2 \leq k \leq 26$ ). These are the number of words in a language and the number of letters in an alphabet respectively. The second line contains  $k$  positive integers separated by single spaces. Each of them is not greater than 10000. The  $i$ -th number is the weight of the  $i$ -th letter.

## Output

For each test case you should output one line with the weight of the lightest prefixless  $n$ -element language over the alphabet  $A_k$ .

## Example

Sample input:

1

3 2  
2 5

**Sample output:**  
16