

# Uniting Amoebas

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            1 second  
Memory limit:         512 megabytes

There are  $n$  amoebas placed on a circle. They are numbered with integers from 1 to  $n$ . For each  $i$ , amoebas  $i$  and  $i + 1$  are neighbors. Also, amoebas 1 and  $n$  are neighbors. The  $i$ -th amoeba has volume  $a_i$ .

Two neighboring amoebas can unite. As a result, both of them disappear and a new amoeba appears at their place. The volume of a new amoeba is equal to the sum of volumes of two amoebas. The cost of this operation is equal to the minimum volume of two amoebas. The amoebas will be uniting until one amoeba is left.

What is the minimum total cost of all operations until one amoeba is left?

## Input

The input consists of multiple test cases. The first line contains a single integer  $t$  ( $1 \leq t \leq 10^5$ ) — the number of test cases. The description of the test cases follows.

The first line of each test case contains a single integer  $n$  ( $2 \leq n \leq 2 \cdot 10^5$ ) — the number of amoebas.

The second line of each test case contains  $n$  integers  $a_1, a_2, \dots, a_n$  ( $0 \leq a_i \leq 10^9$ ) — volumes of amoebas.

It is guaranteed that the sum of  $n$  for all test cases does not exceed  $2 \cdot 10^5$ .

## Output

For each test case, print a single integer — the minimum total cost of all operations until one amoeba is left.

## Example

standard input	standard output
3	2
3	1
1 1 1	42
4	
0 1 0 2	
2	
100 42	