



Candies

There are N candies in a row on the table. Each candy has a value called **deliciousness**. The deliciousness of the candy which is located i -th from the left is A_i ($1 \leq i \leq N$).

JOI-chan decided to eat some of these N candies. JOI-chan wants to maximize the sum of deliciousness of candies which she is going to eat.

However, JOI-chan thinks that just choosing candies greedily is not interesting, so she makes a rule that she cannot choose two consecutive candies simultaneously.

JOI-chan has not decided how many candies she eats, so JOI-chan wants to know, for each j ($1 \leq j \leq \lceil \frac{N}{2} \rceil$), the maximum sum of deliciousness of candies when she eats j candies. Here $\lceil x \rceil$ is the smallest integer larger than or equal to x .

Task

Given the number of candies and the deliciousness of candies, write a program which calculates, for each j ($1 \leq j \leq \lceil \frac{N}{2} \rceil$), the maximum sum of deliciousness of candies when she eats j candies.

Input

Read the following data from the standard input.

- The first line of input contains an integer N . This means there are N candies on the table.
- The i -th line ($1 \leq i \leq N$) of the following N lines contains an integer A_i . This means the deliciousness of the candy which is located i -th from the left is A_i .

Output

Write $\lceil \frac{N}{2} \rceil$ lines to the standard output. The j -th line ($1 \leq j \leq \lceil \frac{N}{2} \rceil$) of output contains the maximum sum of deliciousness of candies when she eats j candies.

Constraints

All input data satisfy the following conditions.

- $1 \leq N \leq 200\,000$.
- $1 \leq A_i \leq 1\,000\,000\,000$ ($1 \leq i \leq N$).



Subtask

There are 2 subtasks. The score and additional constraints of each subtask are as follows:

Subtask 1 [8 points]

- $N \leq 2000$.

Subtask 2 [92 points]

There are no additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5	7
3	12
5	10
1	
7	
6	

In Sample Input 1, there are 5 candies and their deliciousness are 3, 5, 1, 7, 6 from the left.

JOI-chan should eat candies as follows:

- When she eats 1 candies, she eats fourth candy from the left (deliciousness 7).
- When she eats 2 candies, she eats second and fourth candies from the left (deliciousness 5, 7).
- When she eats 3 candies, she eats first and third and fifth candies from the left (deliciousness 3, 1, 6).

Again, she cannot choose two consecutive candies simultaneously. For example, keep in mind that when she eats 2 candies, she cannot eat both fourth and fifth candies from the left (deliciousness 7, 6).



Sample Input 2	Sample Output 2
20	936349374
623239331	1855340557
125587558	2763350783
908010226	3622744640
866053126	4439368364
389255266	5243250666
859393857	5982662302
596640443	6605901633
60521559	7183000177
11284043	7309502029
930138174	
936349374	
810093502	
521142682	
918991183	
743833745	
739411636	
276010057	
577098544	
551216812	
816623724	