Servers Time

In distributed computing, one of the common subroutines for the servers is to pass what they computed to one special server called master that uses those results they computed to combine them together.

Your company has n servers that are numbered from 1 to n. The master server has number n. Each server i can pass direct messages to servers $i + sendTime[i]$ and $i - sendTime[i]$, proving that servers with those numbers exist. Passing a direct message lasts 1 second and message channels have an unlimited capacity which means that at any time many messages can be passing from one server to another. Now, all servers want to pass their messages to the master server. How long would each server take to pass its message to the master server?

The goal is to calculate, for each server, the minimum time needed to pass messages to the master. If there is a server which can't pass messages to the master, the answer for that server would be -1.

Example

Let's say that there are 5 servers and sendTime array is [1, 3, 1, 3, 4], then the following are the best ways to pass messages from each server to the master server.

The first server can pass messages to server 2. And then the message is passed to server 5 from server 2. So, it needed 2 seconds to reach the master server 5.

The second server can pass messages to server 5 directly. Which means it needed only 1 second to reach the master server.

The third server can pass messages to server 2. And then the message is passed to server 5 from server 2. So, the message needed 2 seconds to reach the master server.

The fourth server can pass messages to server 1. And then the message is passed to server 2. After that, the message is passed to the master server. So, it needed 3 seconds to reach the master.

The fifth server is the master, it doesn't need any time to pass a message to itself. So, the time taken is 0.

So, the answer is: [2, 1, 2, 3, 0].

Function description

Complete the *solve* function provided in the editor. This function takes the following 2 parameters and returns an integer array contains the minimum time needed to pass messages to the master.

- n: Represents an integer denoting the number of servers.
- $sendTime$: Represents an integer array of length n denoting the $sendTime$.

Input format

Note: This is the input format that you must use to provide custom input (available above the **Compile and Test** button).

- The first line contains an integer, n , denoting the number of elements in distance array.
- Each line i of the n subsequent lines $(where\ 0 \leq i < n)$ contains an integer indicates the distance that server i can pass messages to.

Output format

An integer array contains the minimum time needed to pass messages to the master.

Constraints

$2 \leq n \leq 10^5$
$1 \leq sendTime[i] \leq n$

Sample input

```
4
3
4
2
1
```

Sample output

```
1
-1
2
0
```

Explanation

Here we have 4 servers, the fourth server is the master. The following are the best ways to pass messages from each server to the master server.

The first server can directly pass messages to the master. So, it needs 1 second to deliver messages to the master server.

The second server is unable to pass messages to the master server in all ways.

The third server can pass messages to the first server. Then, the first server passes the messages to the master server. So, it needed 2 seconds to deliver messages to the master server.

The fourth server is the master. So, the time taken to pass messages to itself is 0.

So, the answer is: [1, -1, 2, 0].

Sample input 1

```
4
3
4
2
1
```

Sample output 1

```
1
-1
2
0
```

Sample input 2

```
3
1
1
1
```

Sample output 2

```
2
1
0
```

Note:

Your code must be able to print the sample output from the provided sample input. However, your code is run against multiple hidden test cases. Therefore, your code must pass these hidden test cases to solve the problem statement.

Limits

Time Limit: 2.0 sec(s) for each input file
Memory Limit: 256 MB
Source Limit: 1024 KB

Scoring

Score is assigned if any testcase passes