

Problem

Given N boxes on a straight line. The i -th box has $A(i)$ stones.

For $1 < i < N$, the i -th box has 2 neighbours: the $(i-1)$ th box and the $(i+1)$ th box. The 1st box only has 1 neighbour (the 2nd box). The N th box only has 1 neighbour (the $(N-1)$ th box).

You need to move the stones between boxes, so that the number of stones in each box are equal.

In each move, you can do the following: - For each box i , you can either do one of the following: - Do nothing with this box - Take one stone from this box and put that stone in one of its neighbouring boxes. - If this box has 2 neighbours, you can take 2 stones from this box, put one in each of the neighbouring boxes (you cannot put 2 stones in the same neighbouring box). - The actions in one move must be applied at the same time, i.e. You cannot move a stone from box 1 to box 2, and then move that same stone from box 2 to box 3.

Find the minimum number of moves.

Constraints:

- $1 \leq N \leq 10,000$.
- $1 \leq A_i \leq 1,000,000,000$.

Input

There are multiple test cases in the input file. For each test: - 1st line: N - number of boxes - 2nd line: N integers - $A(i)$.

There is a blank line between two consecutive test cases.

The last line of the input file contains the only integer -1.

Output

For each test: - If there is no solution, print -1 - Otherwise, print the minimum number of moves.

Example

Input

```
3
0 99 3

2
49 50

3
3 0 3

-1
```

Output

```
34
-1
1
```

Explanation:

- In the first test, there are 102 stones in total. So after all moves, there must be 34 stones ($102 / 3 = 34$) in each box.

```
+---+---+---+
| 0 | 99| 3 |
+---+---+---+
```

- In the first 31 moves, takes 2 stones from the middle box, and put them in the 2 neighbours:

```
+---+---+---+
| 31| 37| 34|
+---+---+---+
```

- In the next 3 moves, takes 1 stone from the middle box and put it into the left box:

```
+---+---+---+
| 34| 34| 34|
+---+---+---+
```

- So we need 34 moves in total.
- In the second test, since there are in total 101 stones, we cannot make the 2 boxes having same

amount of stone.

- In the third test, initially, we have:

```
+---+---+---+  
| 3 | 0 | 3 |  
+---+---+---+
```

- In 1 move, we can move the stone from left box to middle box, and from right box to middle box. After that, we have 2 stone in each box:

```
+---+---+---+  
| 2 | 2 | 2 |  
+---+---+---+
```