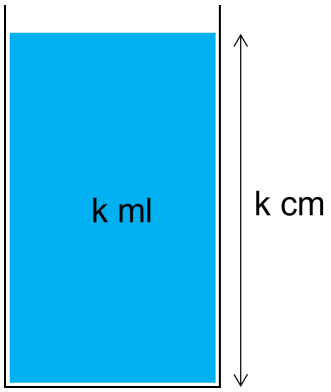
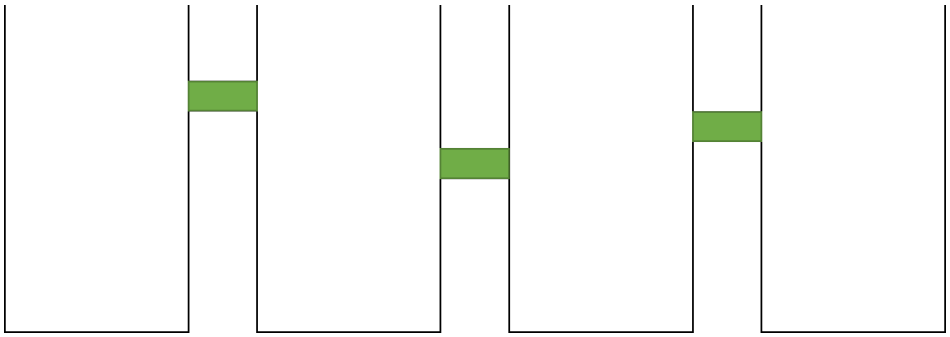
Vasos comunicantes

Alexandra has been learning about volumes in physics this week and wants to run an experiment home. She has n identical plastic cups, which have been designed so that the difference in centimeters between the edge where the water ends in the cup and the bottom of the cup is equal to the number of milliliters of water it contains.



Alexandra has put the glasses in a row and connected the i-th glass with the $i+1$-th glass for all i, through a horizontal straw. To make the experiment more interesting, she has placed the straws at heights above the bottom of the glass which might not necessarily be equal:



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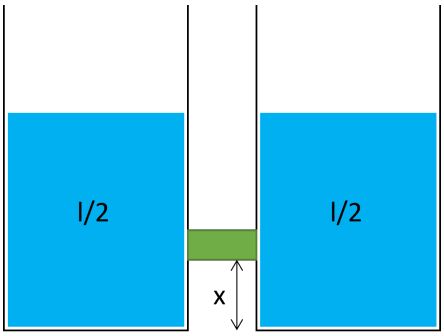
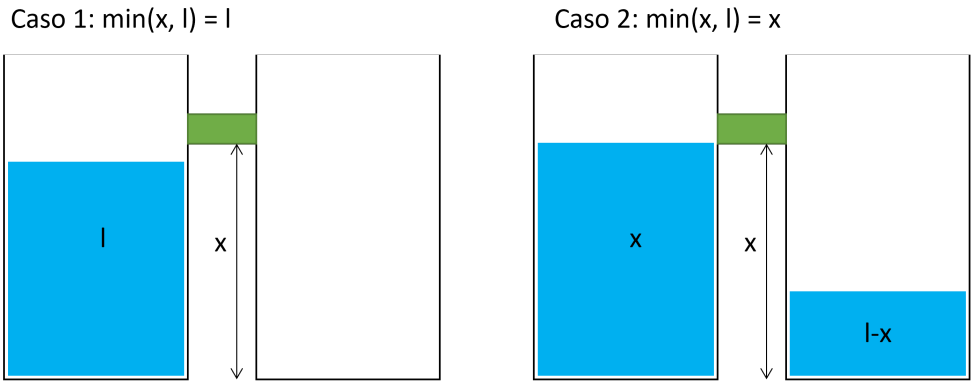
Final día 2
vasos

If two contiguous glasses are connected by a straw at a height x, and we pour l milliliters of water into the first glass, if $x \leq \frac{l}{2}$, both glasses will end up with $\frac{l}{2}$ milliliters.



On the other hand, if $x > \frac{l}{2}$, the first glass will end up with $\min(x, l)$ milliliters and the second with l minus this amount.



These patterns will be repeated when there are more than two glasses. That is, when we start pouring water into the first glass, initially all the water remains in the first glass until it reaches the height of the first straw, at which time all the water that continues to be poured fills the second glass, maintaining the height of the first, until the water in the second glass reaches the height of the first or the second straw.

If it reaches the height of the first, from then on the water poured is distributed equally between the first two glasses until the second reaches the height of the second straw, at which time the water that is poured is all filling the third glass until the height of this reaches the height of the second or third straw and the sequence continues.

However, if the water in the second glass reaches the height of the second straw before, the water that is poured will all go to the third glass until it reaches the height of the second or third straw and again we would continue the sequence.

The main two rules to keep in mind is that if we have m isolated glasses and L milliliters of water and the heights of the straws are all equal or inferior to $\frac{L}{m}$ centimeters, there will be $\frac{L}{m}$ milliliters of water in each of the glasses and that, once water begins to fall into the i-th glass, until the height of the water in that glass does not reach that of the previous straw, the height of the water in the previous steady glass will not increase.

We will tell you the list of heights A, where A_i is equal to the height between the i-th glass and the $i+1$-th glass (where the first glass is numbered 1). Knowing that she has poured x milliliters of water into the first glass (we assume that no water will ever flow out of the top of the glass, since Alexandra pours it very carefully and there will never be more water than the system can hold), how much water will be in the j-th glass when it stops flowing? You should print this height truncated to be an integer.

Once the list of heights is read, you will receive q queries. However, these queries can come to you in two formats. Before you start reading them, you will receive an integer F, which will be equal to 1 or 2. If $F = 1$, you will receive q queries in the format (x, j), where x and j represent the explanation above. However, if $F = 2$, you will receive q queries with format $(x + C, j)$, where in the first query $C = 0$ but in the following C will be equal to the result of the previous query. If $F = 2$ you should answer the queries with the original value of x, not with $x + C$.

Input and output

The ticket consists of:

- A line with an integer n.
- A line with the $n - 1$ heights that make up A.
- A line with two integers: q and F.
- q lines with two integers: x y j (or $x + C$ and j if $F = 2$).

You must write one line for each query with the amount of water that will be in the glass.

Examples

Example 1

Input:

```
3
1 2
6 1
1 1
1 2
2 2
3 2
10 2
15 3
```

Output:

```
1
0
1
1
3
5
```

Example 2

Input:

```
10
1 3 4 2 3 4 5 3 1
20 2
0 1
6 3
6 4
1 1
2 2
2 2
4 2
5 3
5 3
20 7
7 3
9 4
15 6
19 8
30 10
100 10
60 10
15 10
3 9
0 5
```

Output:

```
0
0
0
1
0
1
1
0
0
0
1
0
0
0
0
10
5
0
0
0
```

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Final día 2
`vasos`

Constraints

- F equals 1 or 2
- $2 \leq n \leq 10^5$
- $1 \leq j \leq n$
- $0 \leq x \leq 10^9$
- $1 \leq q \leq 10^5$
- $1 \leq A_i \leq 10000$ fall all i

Subtasks

1. (4 points) $2 \leq n \leq 10$ y $1 \leq q \leq 20$.
2. (7 points) $A_i = A_s$ for all i and all s.
3. (10 points) $A_i \leq A_{i+1}$ for all i.
4. (22 points) $A_i \leq 100$ for all i.
5. (37 points) $F = 1$.
6. (20 points) No additional restrictions.