

Boxes (Hard)

There are n boxes on the circle. The boxes are numbered from 1 to n in clock wise order. There are balls in the boxes, and the number of all the balls in the boxes is not greater than n .

The balls should be displaced in such a way that in each box there remains no more than one ball. In one move we can shift a ball from one box to one of it's neighboring boxes.

Write a program that: reads from the standard input the number of boxes n and the arrangement of balls in the boxes, computes the minimal number of moves necessary to displace the balls in such a way that in each box there remains no more than one ball, writes the result in the standard output.

Input

The first line of the input file contains an integer t representing the number of test cases. Then t test cases follows. Each test case has the following form:

- The first line contains one positive integer n - the number of boxes
- The second line contains n nonnegative integer separated by single spaces. The i -th number is the number of balls in the i -th box.

Output

For each test case, output one nonnegative integer - the number of moves necessary to displace the balls in such a way that in each box there remains no more than one ball.

Example

Input:

```
1
12
0 0 2 4 3 1 0 0 0 0 1
```

Output:

```
19
```

Note

There are two input files.

In the first input file, $t=19$, $n \leq 1000$, time limit=0.1 second;

In the second input file, $t=3$, $n \leq 200000$, time limit=2 seconds.

Warning: large input/output data, be careful with certain languages