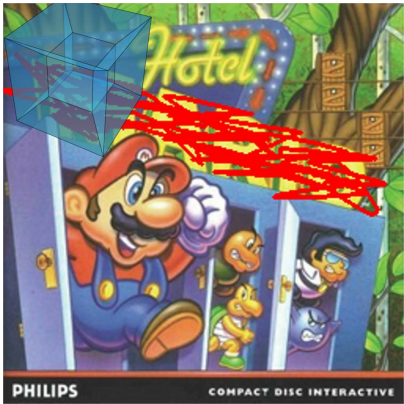


TLE '17 Contest 3 P5 - Hypercube Hotel

The Hypercube Hotel is a strange new mathematically themed hotel, a competitor to Hilbert's Hotel. The hotel has an unusual way of numbering its rooms. Each room has an N digit number so that the i -th digit (from the left) is between 1 and A_i . Conversely, every number in this form has a corresponding room. Room numbers are unique.

Two different rooms are called **neighbours** if for every i , the i -th digit of the two room numbers differ by at most 1. For example, the rooms with numbers 213 and 222 are neighbours but the rooms with numbers 111 and 131 are not neighbours. A room is not a neighbour of itself.

All the rooms in the hotel are occupied, so each room generates a certain amount of noise. If a room has number m call this quantity x_m . For each room, the **noise level** of that room is the sum of the amounts of noise generated by its neighbours. Given the amount of noise generated by each room, find the noise level of each room.



The Hypercube Hotel game is also very popular and universally acclaimed. Get it for the Phillips CD-i while it lasts!

Constraints

$$1 \leq N \leq 9$$
$$1 \leq A_i \leq 5$$
$$0 \leq x_m \leq 10^{14}$$

Subtask	Points	Additional Constraints
1	5	$N = 2$
2	5	$A_i \leq 2$
3	5	$N \leq 5, A_i \leq 4, x_m \leq 100$
4	15	$N \leq 7, A_i \leq 4, x_m \leq 100$
5	70	None

Input Specification

The first line contains the integer N .

The next line contains N integers A_1, A_2, \dots, A_N .

The next $A_1 \times A_2 \times \dots \times A_N$ lines each contain a single integer x_m . The lines are given in increasing order of the room number m .

Output Specification

For each room, output a line containing a single integer, the noise level of that room. Do this in increasing order of room number.

Sample Input

```
2
2 3
1
2
3
4
5
6
```

Sample Output

```
11
19
13
8
16
10
```