# **Exchange Operations**

Given a sequence of 12 numbers consisting of 0 and the first 11 natural numbers. Suppose number 0 is in the i-th position of the sequence (positions are numbered from 0 to 11). You can swap it with the number in the j-th position if the following conditions hold:

- $|i-j| = d_k$ , where k=1..3 and  $(d_1,d_2,d_3,d_4) = (1;3;6;12)$
- floor(i/d<sub>k+1</sub>)=floor(j/d<sub>k+1</sub>)

Your task is to find the minimum number of exchange operations required to sort the sequence in increasing order.

## Input

The first line of the input file contains an integer representing the number of test cases to follow. Each test case contains a sequence of twelve numbers consisting of 0,1,2,..,11, separated by single space. You can assume that the given sequence can always be sorted in increasing order by using the exchange operations

## Output

For each test case, output the minimum number of exchange operations required to sort the given sequence in increasing order.

# Example

#### Input: 2 1 10 2 3 0 5 7 4 8 6 9 11 6 4 1 0 3 5 9 7 2 10 11 8

### Output:

8 9