3665 - XAR

Asia - Beijing - 2006/2007

XAR lab recently develops a new computer for data compression - ``XAR08". Each time, XAR08 will get an integer sequence from input, and output it after compression.

XAR08 is composed of several 8-bit binary storage units. Each storage unit can store an 8-bit unsigned integer and support 4 directives. A program in XAR08 is a directive sequence composed of these 4 directives as follows:

X n

the integer in each storage unit XOR n, $0 \le n < 256$,

Equivalence: V=V^n

A n

add n to each storage unit and mod 256, $0 \le n < 256$,

Equivalence: V=(V+n)%256

R n

rotate each storage unit n-bit binary left, $0 \le n < 8$,

Equivalence: V=(((V»(8-n))|(V«n))&0xFF)

E n

the program ends, $0 \le n < 256$, ignore the value of n. Every program should end with this directive.

Each time, XAR08 gets an integer sequence with the length of N from input. These N integers will be stored in the first N storage units in order (The number of storage units is enough). After compression, the value in these N storage units will be sent to output in the same order.

XAR08's data compression operation is based on a transformation f: Transform the input sequence (all elements are different) $D = (d_0, d_1,...d_{n-1})$ to the sequence (0, 1,..., n - 1), i.e. $f(d_i) = i (0 \le i < n)$.

Your task is, for each input sequence, write an XAR08 program composed of the above four directives to implement the transformation f. XAR08 is still in research stage, so it can only execute a program with no more than 40, 000 directives.

Input

Input contains several cases. The first line in each case contains an integer n ($n \le 128$), which is the length of sequence D, followed by a line of n different integers, $d_0, d_1,..., d_{n-1}$, $0 \le d_i < 128$.

The last case is followed by a line containing a zero.

Output

For each case, the first line outputs ``Case ?:". If exists a XAR08 program composed of no more than 40, 000 directives, output the program from the second line. Otherwise output ``Impossible!" (quotes for clarity) in the second line.

Don't print any extra spaces or blank lines.

Sample Input

```
1
123
3
2 1 0
0
```

Sample Output

```
Case 1:
X 123
E 0
Case 2:
X 3
A 255
E 0
```

Beijing 2006-2007