



## **Problem J. Three Vectors**

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	512 mebibytes

You are given three distinct binary vectors of length n. Find any 2-CNF formula which satisfies the following conditions:

- The formula is true on these vectors;
- The number of vectors on which the formula is true is minimal possible;
- The formula is not too long.

Recall that a 2-CNF formula is a propositional formula of n boolean variables  $v_1, \ldots, v_n$  which looks like

$$C_1 \wedge C_2 \wedge \ldots \wedge C_m,$$

where each clause  $C_i$  is represented as a disjunction  $\pm x_{i1} \vee \pm x_{i2}$  of two literals (by literal, we mean any variable or its negation). Here,  $x_{ij} \in \{v_1, \ldots, v_n\}$  is one of the variables, and  $-x_{ij}$  is its negation: true becomes false, and false becomes true. We say that the formula f is true on a binary vector v if  $f(v_1, v_2, \ldots, v_n) = 1$ .

If there are several valid formulas, you are allowed to output any one of them.

## Input

The first line of input contains a single integer n which denotes the length of the three vectors  $(2 \le n \le 10^5)$ . The *i*-th of the following three lines contains a binary string of length n denoting the *i*-th binary vector.

No two vectors coincide.

## Output

On the first line, print a single integer m ( $0 \le m \le 2 \cdot 10^5$ ). Then output m lines, *i*-th of them containing two integers  $a_i$  and  $b_i$  ( $1 \le |a_i|, |b_i| \le n$ ), denoting that the *i*-th clause is a conjunction of two literals: the first is  $v_{a_i}$  if  $a_i > 0$  and  $-v_{|a_i|}$  otherwise, and the second is, similarly,  $v_{b_i}$  if  $b_i > 0$  and  $-v_{|b_i|}$  otherwise. If your formula is empty (that is, m = 0), it is considered to be true for every possible input vector of size n.

Please note that, if you use too many clauses, your answer will be considered incorrect.

## Examples

standard input	standard output
5	6
00101	-1 -3
10011	3 1
11011	-1 4
	-4 1
	5 5
	-2 1
3	3
100	-2 -1
010	-3 -1
001	-3 -2