## 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 ${ }^{2}-C N F$ 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 $\pm x_{i 1} \vee \pm x_{i 2}$ of two literals (by literal, we mean any variable or its negation). Here, $x_{i j} \in\left\{v_{1}, \ldots, v_{n}\right\}$ is one of the variables, and $-x_{i j}$ is its negation: true becomes false, and false becomes true. We say that the formula $f$ is true on a binary vector $v$ if $f\left(v_{1}, v_{2}, \ldots, v_{n}\right)=1$.
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 $\left(2 \leq n \leq 10^{5}\right)$. 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 $m\left(0 \leq m \leq 2 \cdot 10^{5}\right)$. Then output $m$ lines, $i$-th of them containing two integers $a_{i}$ and $b_{i}\left(1 \leq\left|a_{i}\right|,\left|b_{i}\right| \leq n\right)$, denoting that the $i$-th clause is a conjunction of two literals: the first is $v_{a_{i}}$ if $a_{i}>0$ and $-v_{\left|a_{i}\right|}$ otherwise, and the second is, similarly, $v_{b_{i}}$ if $b_{i}>0$ and $-v_{\left|b_{i}\right|}$ 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 |
| :---: | :---: |
| $\begin{aligned} & 5 \\ & 00101 \\ & 10011 \\ & 11011 \end{aligned}$ | $\begin{array}{ll} \hline 6 & \\ -1 & -3 \\ 3 & 1 \\ -1 & 4 \\ -4 & 1 \\ 5 & 5 \\ -2 & 1 \end{array}$ |
| $\begin{aligned} & \hline 3 \\ & 100 \\ & 010 \\ & 001 \end{aligned}$ | $\begin{array}{ll} \hline 3 & \\ -2 & -1 \\ -3 & -1 \\ -3 & -2 \end{array}$ |

