Problem I
International Olympiad in ICPC

Your university is hosting a competition called the IOI. As an event organiser, you want to create a banner for it. The banner you are preparing can be represented as a $3 \times N$ grid, where each cell will be printed either white or black. Due to printing issues, some of the cells cannot be printed in black.

You start with a white banner, and want to print the word `IOI` on the banner as follows.

- Form the first letter `I` by printing a **solid** rectangle of size $3 \times p$ ($p \geq 1$) in black.
- Form the letter `O` by printing a rectangular **boundary** of size $3 \times q$ ($q \geq 3$) in black.
- Form the second letter `I` by printing a **solid** rectangle of size $3 \times r$ ($r \geq 1$) in black.

The letter `O` must be formed between the letters `I`, and there must be **at least** one column between the letters. It is also required that the width of the letter `O` is **at least** the sum of the widths of the letters `I`, i.e. $q \geq p + r$. All other cells not part of the word `IOI` must remain white. Determine the maximum number of cells that you can print in black, or tell that it's impossible to print the word `IOI`.

Input

The first line contains an integer N ($1 \leq N \leq 200\ 000$), the size of the $3 \times N$ grid. Each of the next three lines contains N characters representing the cells of the grid. Each of the $3N$ characters corresponds to a cell and is either `.` or `#`, meaning you can or cannot print the cell in black, respectively.

Output

A single line representing the maximum number of cells that you can print in black. If it's impossible to print the word `IOI`, output -1 instead.

Sample Input 1	Sample Output 1
7	14

Explanation of Sample 1: You can print your banner in the following way.

```
I.OOO.I
I.O.O.I
I.OOO.I
```

Sample Input 2	Sample Output 2
6	-1

Sample Input 3	Sample Output 3
12 ...#....#... ...#.##.#... ...#....#...	22

Explanation of Sample 3: You can print your banner in the following way.

```
..I#OOOO#III
..I#O##O#III
..I#OOOO#III
```

Sample Input 4	Sample Output 4
20 #...##..... #...##.##....#...#.. #...##.....	39

Explanation of Sample 4: You can print your banner in the following way.

```
#III##OOOOOOOOOO.II
#III##O##....#..O#II
#III##OOOOOOOOOO.II
```