# Xtreme9.0 - Snakes & Bunnies

A group of engineers are playing the Snakes and Bunnies board game. In this game, each player has one game piece, which moves according to dice rolls. The game-board is composed by a grid of N x N numbered squares, which are ordered row-wise from the bottom-left to the top-right (N is always odd). Some "bunnies" and "snakes" are depicted on the board, each connecting two squares. An example of a 5x5 board is shown in the following figure.
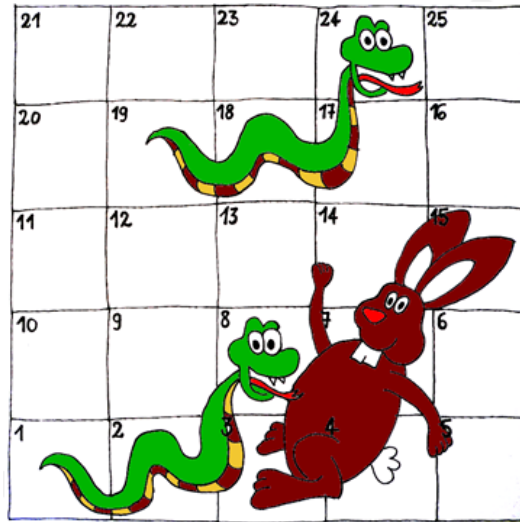
Each player starts off the board, next to the starting square. The gameplay is divided in rounds and players play in sequence, which is the same every round. Rules are simple:

1. Two standard 6-faced die are rolled by the player and his/her game piece moves forward on the board, following the square's numbers. The piece is advanced by a number of squares equal to the sum of the die.

2. If the dice roll is a double, then the player has an additional turn just after the current one. Note that the additional turn begins after applying the additional rules below. The additional turn follows the same rules of standard turns, except that only one die can be rolled.

3. If a square is already taken by another player's token, then the current player's token moves forward to the next square not occupied by a token.

4. If the final position of a player's token is a square with the head of a snake, then it must be moved backwards to the square corresponding to the snake's tail. Similarly, if the token ends on a square with bunny's feet, it goes to the top of the bunny's ears (both ears of the rabbit will always point to the same cell). No square has two or more snake's heads/tails or bunny's ears/feet on it; there is at most one special drawing for each cell. Moreover, the last square is always free of drawings.

5. Game ends when a player arrives at the last square or when a player can move over the last square (for example if the player is on the second-to-last square and rolls 3+4). In this latter case, the player stops on the last square and wins.

Note that infinite loops can happen while a player moves: this is the EVIL CYCLE case! When it happens, the game ends and the player in the evil cycle wins the game.

For example, consider a board in which squares 10 and 11 are already occupied, and there is a slide from square 12 back to square 10. If a player lands on square 10, they would advance to square 11, since square 10 is already occupied. Square 11 is also occupied, so they would advance to square 12. Here they take the slide back to square 10, and then repeat the moves. They would continue to move between squares 10, 11, and 12 forever!

Your task is to find the final position of every player's token, given as input the number of players, the game-board configuration, and the sequence of dice rolls.

Notes:

- The given sequence of dice rolls may not always lead a game to an end. There will be no extra dice rolls after a game has ended. There will always be sufficient dice roles for a player to complete their turn.

- If a player lands on the tail of snake or the ears of a bunny, the player does not make any special moves.

Input Format

The first line of the input contains the integer N ($1 < N < 100$ and N is odd), which is the dimension of the game-board.

The following N lines contain the game-board configuration: each line contains N characters, and each character represents a square of the board. The character '-' represents a normal square, i.e. one with no snake heads/tails nor bunny feet/ears depicted on it; digits (0-9) represent bunnies and letters (a-z) represent snakes. There can be at most 10 bunnies and 26 snakes, and each represented by an appropriate pair of digits or letters. Given a pair of identical letters representing a snake in two numbered squares, the head of the snake are located in the square with the higher number, and the tail is located in the square with the lower number. Given a pair of identical digits representing a bunny in two numbered squares, the feet of the bunny is located in the square with the lower number, and the ears are located in the square with the higher number.

So, for example, the game-board of the figure above could be represented as follows:

```
---a-
-a---
----1
--b--
b-1--
```

After the game board representation, the following line contains an integer M ($2 <= M <= 10$), which is the number of players.

Then, the sequence of dice throws follow, each dice result is represented by a single line containing one integer between 1 and 6, inclusive.

Output Format

The output is a single line containing M integers separated by a blank space. The first integer is the final position on the game-board of the first player (i.e. the one who rolled the dice first), the second integer is the final position of the second player, etc.

In case of evil cycle, the output is a single line containing the string "PLAYER x WINS BY EVIL CYCLE!", where x is the player number (1 to M).

Sample Input

```
5
---a-
-a---
----1
--b--
b-1--
2
6
2
2
1
3
2
1
2
3
4
1
1
5
```

Sample Output

```
13  25
```

Explanation

The board in this test case is the board in the figure below.

21	22	23	24 **SNAKE HEAD**	25
20	19 **SNAKE TAIL**	18	17	16
11	12	13	14	15 **BUNNY EARS**
10	9	8 **SNAKE HEAD**	7	6
1 **SNAKE TAIL**	2	3 **BUNNY FEET**	4	5

Note that in the board above there is one bunny, represented by the number '1'. It's feet are at square 3 and its ears are at square 15. There are two snakes. The snake indicated by the letter 'b' has a head at square 8 and a tail at square 1. The snake indicated by the letter 'a' has a head at square 24 and a tail at square 19.

Next we are told that there are 2 players.

First, player 1 rolls a 6 and a 2, advancing to square 8, at the head of the snake. Here, he moves back to the snake's tail, ending at square 1.

Next, player 2 rolls a 2 and a 1, advancing to square 3. Since 3 is at the feet of a bunny, she advances to square 15.

Next, player 1 rolls a 3 and a 2, advancing to square 6.

Next, player 2 rolls a 1 and a 2, advancing to square 18.

Next, player 1 rolls a 3 and a 4, advancing to square 13.

Next, player 2 rolls double 1's, advancing to square 20. Since the player rolled doubles, player 2 rolls a single die and gets a 5. She then advances to square 25.

Since player 2 has reached the final square, the game is over.

Note: If you click on the "Run Code" button, you will be able to see an additional sample test case with an example of an EVIL CYCLE.