CCO '22 P6 - Good Game

Time limit: 1.0s   **Memory limit:** 1G

Canadian Computing Olympiad: 2022 Day 2, Problem 3

Finn is playing a game of Twos and Threes. Twos and Threes is a one-player game played on a one-dimensional board. In the starting position, there are N blocks arranged in a row, with each block labelled either A or B. Blocks are numbered from 1 to N from left to right. Finn is allowed to make moves of the following form:

- Select 2 or 3 consecutive blocks that share the same label. Remove them from the board. Connect any remaining blocks together. Re-index the blocks from left to right, starting with index 1.

Finn wins the game if all blocks are removed from the board. Your task is to help Finn determine a winning sequence of moves, or determine if the game cannot be won.

Input Specification

The first line of input will contain the integer N.

The second line of input will contain the string S, which is the starting position of the game.

There are N characters in S, and each of these characters in S is either A or B.

Marks Awarded	Bounds on N
3 marks	$1 \le N \le 15$
6 marks	$1 \le N \le 300$
7 marks	$1 \le N \le 6\,000$
9 marks	$1 \le N \le 10^6$

Output Specification

If there is a winning sequence of moves, output K, the number of moves in the winning sequence. On each of the next K lines, print an index i, followed by one space, followed by a number j, denoting a move that will remove the blocks currently at indices i to $i + j - 1$, inclusive.

If there is no winning sequence of moves, output -1.

If there are multiple winning sequences, then any winning sequence will be accepted. There is no need to minimize or maximize K.

Sample Input

```
9
ABAABBBAA
```

Possible Output for Sample Input

```
4
6 2
3 2
2 2
1 3
```

Explanation of Output for Sample Input

The sample output denotes this winning sequence:

$$ABAAB\underline{BB}AA$$
$$AB\underline{AA}BAA$$
$$A\underline{BB}AA$$
$$\underline{AAA}$$