South Central USA Regional Programming Contest

Window Pains

Introduction:

Boudreaux likes to multitask, especially when it comes to using his computer. Never satisfied with just running one application at a time, he usually runs nine applications, each in its own window. Due to limited screen real estate, he overlaps these windows and brings whatever window he currently needs to work with to the foreground. If his screen were a 4 x 4 grid of squares, each of Boudreaux's windows would be represented by the following 2 x 2 windows:

When Boudreaux brings a window to the foreground, all of its squares come to the top, overlapping any squares it shares with other windows. For example, if window 1 *and then* window 2 were brought to the foreground, the resulting representation would be:

If window 4 were then brought to the foreground:

. . . and so on . . .

Unfortunately, Boudreaux's computer is very unreliable and crashes often. He could easily tell if a crash occurred by looking at the windows and seeing a graphical representation that should not occur if windows were being brought to the foreground correctly. And this is where you come in . . .

Input:

Input to this problem will consist of a (non-empty) series of up to 100 data sets. Each data set will be formatted according to the following description, and there will be **no blank lines** separating data sets.

A single data set has 3 components:

1. *Start line* - A single line:

   ```
   START
   ```

2. *Screen Shot* - Four lines that represent the current graphical representation of the windows on Boudreaux's screen. Each position in this 4 x 4 matrix will represent the current piece of window showing in each square. To make input easier, the list of numbers on each line will be delimited by a single space.

3. *End line* - A single line:

   ```
   END
   ```

After the last data set, there will be a single line:

```
ENDOFINPUT
```

Note that each piece of visible window will appear only in screen areas where the window could appear when brought to the front. For instance, a 1 can only appear in the top left quadrant.

Output:

For each data set, there will be exactly one line of output. If there exists a sequence of bringing windows to the foreground that would result in the graphical representation of the windows on Boudreaux's screen, the output will be a single line with the statement:

```
THESE WINDOWS ARE CLEAN
```

Otherwise, the output will be a single line with the statement:

```
THESE WINDOWS ARE BROKEN
```

Sample Input:

```
START
1 2 3 3
4 5 6 6
7 8 9 9
7 8 9 9
END
START
1 1 3 3
4 1 3 3
7 7 9 9
7 7 9 9
END
ENDOFINPUT
```

Sample Output:

```
THESE WINDOWS ARE CLEAN
THESE WINDOWS ARE BROKEN
```