Problem F: Paper Bracelet

Time limit: 1s; Memory limit: 256 MB

Alice wants to make paper bracelets by gluing the two ends of a long piece of paper together. On a piece of paper, there are 3×3 drawings in a row. The drawings are decorated by drawing on 1×1 cells with 'o'. In addition, a bracelet is surrounded by the characters '#' like the examples below:

#	#	#	#	#	#	#	#	#	#	#	#	#
#	.	o	.	#	.	.	.	#	.	.	.	#
#	.	o	.	#	.	.	.	#	.	.	.	#
#	.	o	.	#	.	.	.	#	.	.	.	#
#	#	#	#	#	#	#	#	#	#	#	#	#

#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
#	o	o	o	#	o	o	o	#	o	o	o	#	o	o	o	#
#	.	.	.	#	.	.	.	#	.	.	.	#	.	.	.	#
#	o	o	o	#	o	o	o	#	o	o	o	#	o	o	o	#
#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Bracelets are considered to be identical if their length and their drawings from left to right are the same. Note, when gluing a piece of paper into a bracelet, it always leaves the side with the drawing out. Also, it can flip over when comparing. The picture below shows 3 identical bracelets.

For example:

#	#	#	#	#	#	#	#	#	#	#	#	#
#	o	.	.	#	.	.	.	#	.	.	.	#
#	o	.	.	#	.	.	.	#	.	.	.	#
#	o	.	.	#	.	.	.	#	.	.	.	#
#	#	#	#	#	#	#	#	#	#	#	#	#

```
# # # # # # # # # # # # #
# . . o # . . . # . . . #
# . . o # . . . # . . . #
# . . o # . . . # . . . #
# # # # # # # # # # # # #
```

```
# # # # # # # # # # # # #
# . . . # o . . # . . . #
# . . . # o . . # . . . #
# . . . # o . . # . . . #
# # # # # # # # # # # # #
```

```
# # # # # # # # # # # # #
# . o . # . . . # . . . #
# . o . # . . . # . . . #
# . o . # . . . # . . . #
# # # # # # # # # # # # #
```

The first three pieces of paper can make three identical bracelets. The 2th bracelet can flip over 180 degree to be the same as the 1st and the 3rd. And the 4th piece of paper can make a different bracelet from the rest. Hence, there are two types of bracelets.

Initially, given a large paper, Alice will design and draw bracelets on this large paper, then she will cut out each bracelet and glue them. After designing, Alice wonders how many different and identical bracelets she has.

Given a large paper of size n x m with bracelet designs, please help Alice count the number of different bracelet types and for each type, count the number of identical bracelets.

Input

The first line contains two integers n and m ($1 \leq n, m \leq 10^3$).

In the next n lines, each line contains m characters including only '.', '#', 'o'. Characters '#' and 'o' are used to draw bracelets. Characters '.' represent empty cells. The large paper includes only complete bracelets, with no unused characters. Number of 3×3 drawings on a bracelet is not more than 6.

Output

In the first line, output k – number of different bracelets.

In the second line, output k integers – the numbers of identical bracelets of each type, in ascending order.

Sample

Input	Output

<pre>23 28
....
.#############.##########...
.#o..#...#...#.#o.o##o.o#...
.#o..#...#...#.#.o.##.o.#...
.#o..#...#...#.#o.o##o.o#...
.#############.##########...
....................#o.o#...
.################..#.o.#....
.#ooo#ooo#ooo#ooo#..#o.o#...
.#...#...#...#...#..#####...
.#ooo#ooo#ooo#ooo#..#o.o#...
.#################..#.o.#...
.#############......#o.o#...
.#..o#...#...#......#####...
.#..o#...#...#############.
.#..o#...#...##.o.#...#...#.
.#############.o.#...#...#.
.#############.o.#...#...#.
.#...#o..#...#############.
.#...#o..#...#.............
.#...#o..#...#.............
.#############.............
............................</pre>
	<pre>5
	1 1 1 1 3</pre>

Explanation:

There are 5 types of bracelet.

There is one identical bracelet of type 1:

```
#####
#o.o#
#.o.#
#o.o#
#####
```

There is one identical bracelet of type 2:

```
############
#o.o#o.o#o.o#
#.o.#.o.#.o.#
#o.o#o.o#o.o#
############
```

There is one identical bracelet of type 3:

```
################
#ooo#ooo#ooo#ooo#
#...#...#...#...#
#ooo#ooo#ooo#ooo#
################
```

There is one identical bracelet of type 4:

```
############
#.o.#...#...#
#.o.#...#...#
#.o.#...#...#
############
```

There are 3 identical bracelets of type 5:

```
############
#o..#...#...#
#o..#...#...#
#o..#...#...#
############

############
#..o#...#...#
#..o#...#...#
#..o#...#...#
############

############
#...#o..#...#
#...#o..#...#
#...#o..#...#
############
```