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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 $n \times m$ with bracelet designs, please help Alice count the number of different bracelet types and for each type, count the number of identical bracelets. Note that, if the bracelet has only one drawing, Alice will glue it horizontally.

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.



#####

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..#...#  
#####
```