Question 1   Chambers in a castle

The floor plan of a castle indicates where the walls are. The outer boundary of the castle is always an unbroken wall. The castle has no doors, only openings in the walls that lead from one room to another. A *chamber* is a collection of rooms that are connected to each other by gaps in the walls. The problem is to:

(a) Count the number of chambers in the castle.

(b) Calculate the area of the largest chamber.

To simplify the problem, the floor of the castle is divided into square tiles. All walls lie at tile boundaries. The area of a chamber is specified in terms of the number of tiles inside the room (without counting the tiles occupied by the surrounding walls).

Figure 1 is an example of a floor plan. Each square is a tile. White tiles represent open space, while black tiles represent walls. In this castle, there are four chambers. The largest chamber has an area of 58.
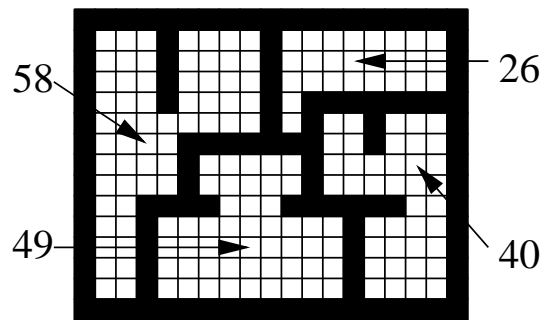

Figure 1

Input format

The first line of input will have two integers M and N, with $0 < M \le 500$ and $0 < N \le 500$. M represents the number of rows and N the number of columns in the floor plan.

This will be followed by M lines of input. Each of these M lines will be a sequence of 0's and 1's of length N, separated by spaces. A 0 represents an open tile (a white square), while a 1 represents a tile with a wall (a black square). The outer boundary of the castle will always consist of an unbroken wall.

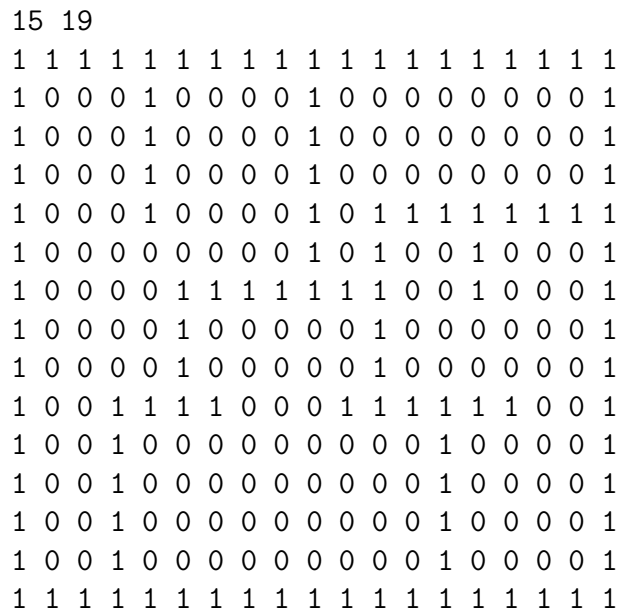The input corresponding to the floor plan in Figure 1 is given in Figure 2.

```
15 19
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1
1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1
1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1
1 0 0 0 1 0 0 0 0 1 0 1 1 1 1 1 1 1 1
1 0 0 0 0 0 0 0 0 1 0 1 0 0 1 0 0 0 1
1 0 0 0 0 1 1 1 1 1 1 0 0 1 0 0 0 1
1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1
1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1
1 0 0 1 1 1 1 0 0 0 1 1 1 1 1 1 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

Figure 2

Output format

The output of your program should be exactly two lines, each line consisting of a single number. The first line should be the number of chambers. The second line should be the size of the largest chamber.

The correct output for the example in Figures 1 and 2 is shown below.

```
4
58
```

Note: Your program should not print anything other than these two numbers. Please remove all diagnostic print statements before making your final submission. A program with extraneous output will be treated as incorrect!