GT1// Zhehai’s Computing Cup Castle

In a stroke of luck almost beyond imagination, Zhehai (Mark) Zhang was sent a ticket to the Canadian Computing Olympiad (really a lottery). After impressing Mr. McKenzie by miles, Mr. McKenzie awards Zhehai with fabulous castle in the land of Python.

Bragging rights being what they are in Python, Zhehai Zhang wished to tell his students all about the castle. He wanted to know how many rooms it has and how big the largest room was. In fact, he wants to take out a single wall to make an even bigger room.

Your task is to help Zhehai know the exact room count and sizes.

The castle floor plan is divided into M (wide) by N (1 <=M,N<=50) square modules. Each such module can have between zero and four walls. Castles always have walls on their "outer edges" to keep out the wind and rain.

Consider this annotated floor plan of a castle:

```
     1   2   3   4   5   6   7
   #############################
 1 #   |   #   |   #   |   |   #
   #####---#####---#---#####---#
 2 #   #   |   #   #   #   #   #
   #---#####---#####---#####---#
 3 #   |   |   #   #   #   #   #
   #---#########---#####---#---#
 4 # ->#   |   |   |   |   #   #
   #############################

#  = Wall     -,|  = No wall
-> = Points to the wall to remove to
     make the largest possible new room
```

By way of example, this castle sits on a 7 x 4 base. A "room" includes any set of connected "squares" in the floor plan. This floorplan contains five rooms (whose sizes are 9, 7, 3, 1, and 8 in no particular order).

Removing the wall marked by the arrow merges a pair of rooms to make the largest possible room that can be made by removing a single wall.

The castle always has at least two rooms and always has a wall that can be removed.

Input Specification:
The map is stored in the form of numbers, one number for each module ("room"), M numbers on each of N lines to describe the floorplan. The input order corresponds to the numbering in the example diagram above.

Each module descriptive-number tells which of the four walls exist and is the sum of up to four integers:

- 1: wall to the west
- 2: wall to the north
- 4: wall to the east
- 8: wall to the south

Inner walls are defined twice; a wall to the south in module 1,1 is also indicated as a wall to the north in module 2,1.

Line 1: Two space-separated integers: M and N
Line 2…: M x N integers, several per line.

Output Specification:
The output contains several lines:

- Line 1: The number of rooms the castle has.
- Line 2: The size of the largest room
- Line 3: The size of the largest room creatable by removing one wall
- Line 4: The single wall to remove to make the largest room possible

Choose the optimal wall to remove from the set of optimal walls by choosing the module farthest to the west (and then, if still tied, farthest to the south). If still tied, choose 'N' before 'E'. Name that wall by naming the module that borders it on either the west or south, along with a direction of N or E giving the location of the wall with respect to the module.

Sample Input:
7 4
11 6 11 6 3 10 6
7 9 6 13 5 15 5
1 10 12 7 13 7 5
13 11 10 8 10 12 13

Sample Output:
5
9
16
4 1 E