

STA Online Computer Programming Contest (DWITE)
November 2003

Problem 3
Count Shapes II

(Based on Count Shapes from the 2002 ECOO Board Programming Contest)

An input text file contains a rectangular arrangement of dots and X's. The X's form shapes that are separated by space. The dots (periods) represent empty space which separate one shape from another. It is your task to count the number of shapes in the rectangle, the size of the largest shape in the rectangle, and the size of the smallest shape in the rectangle. For the purpose of defining a shape, please note that any given X belongs to the same shape as any other X that is its neighbour above, below, to its left and to its right. Any two X's on a diagonal are not connected. In the rectangle below, in data set 1, there are 6 discrete shapes: two of these are touching diagonally and two shapes are positioned one inside the other.

The input file (DATA3) will contain five sets of data. Each set of data will be made up of two lines containing integers and then the rectangle itself. The first integer, w, represents the width of the rectangle (length of each line) and the second integer, h, represents the height of the rectangle to be examined (number of lines). $1 \leq w, h \leq 100$ There will be at least one shape in each rectangle.

The output file (OUT2) will contain five lines of data, corresponding to each set from the input file. Each line will contain three integers, separated by single spaces, representing the number of shapes, the size of the largest shape and the size of the smallest shape.

<u>Sample Input (Three sets of data given)</u>	<u>Sample Output</u>
<pre> 44 18XXXXXX.....XXXXXXXXXXXXX.....X.....XXXXXXXXXXXXXXXXX.....XXXXXXXXXXXX.....XXXXXXXXXXXXXXXXX.....XXXXXX.....XXXX.....XXXXXXXX.....XXXX.....XXX.....XXXX.....XXXXXXXXXXXXXXXXX.....XXXXXXXXXXXXX.....XXXXXXXXXXXXXXXXXXXXXXXXXXXXX.....XX.....XXX.....XX.....XXXXXXXX.....XXX.....XX.....XXXXXXXX.....XXX.....XX.....XXX.....XXXXXXXXXXXXXXXXXXXXXXXXXXXXX..... 5 3 .X.X. X.X.X .X.X. 50 5XXXXXXX.X.....X.....X XX.....X.....XX XX.....XX XX.....XX.....X.....X.....XXXXX.....XX.....XXX.....X.....X </pre>	<pre> 6 64 11 7 1 1 4 60 1 </pre>