

Problem 1—Toric Boggle  
*written by Andy Poe*

Michelle Kwan loves doughnuts! She loves them so much that she even likes to play word games with them. Michelle knows, just as we all do, that the mathematical word for “doughnut” is “torus” and you can turn a rectangle into a torus by pasting its top and bottom edges together and its left and right edges together.

Given a toric grid of letters, you are to find how many times one specific word (or sequence of letters) appears in the grid. As in the popular game “Boggle,” from each letter, you may jump to an adjacent letter, horizontally, vertically, or diagonally. You need not move in the same direction all the way through the word; you may change directions as many times as you like, but you may not visit the same square more than once. Since this is Toric Boggle, you must imagine that the top and bottom edges and the left and right edges are pasted together, like a doughnut!

If a word can be found more than once by visiting the same set of letters in a different sequence, you are to count each sequence as a distinct solution. (For example, palindromes (of length greater than one) count (at least) twice!)

**INPUT SPECIFICATION.** You will be given a set of input cases. Each case will be a non-empty rectangular grid of capital letters (each line terminated by <EOLN> with an extra <EOLN> after the last line in the grid), followed by a non-empty string of capital letters (representing the search word) and two <EOLN> characters. The last case will be followed by <EOF>. The rows and columns of the grid will never be more than ten characters long.

**OUTPUT SPECIFICATION.** The output cases should appear in the same order as the input cases. Each output case will be of the form “Case  $c$ :  $w$  appears  $t$  time(s).” where  $c$  is the number of the input case,  $w$  is the search word and  $t$  is the number of times that word appears in the grid. Each output case should be followed by two <EOLN>'s.

**SAMPLE INPUT.**

```
AAX<EOLN>
AXA<EOLN>
XAA<EOLN>
<EOLN>
XXX<EOLN>
<EOLN>
BOOB00<EOLN>
OBOOBO<EOLN>
OOBOOB<EOLN>
<EOLN>
BOO<EOLN>
<EOLN>
<EOF>
```

**SAMPLE OUTPUT.**

```
Case 1::XXX appears 6 time(s).<EOLN>
<EOLN>
Case 2::BOO appears 180 time(s).<EOLN>
<EOLN>
<EOF>
```