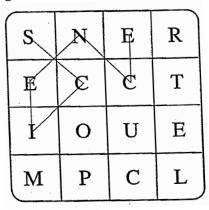
## **Problem 4: It Boggles the Mind**

Source filename: boggle.cpp
Input filename: boggle.in
Output filename: boggle.out

The game of **Boggle** is played by forming words of three letters or more from a 4x4 array of letter cubes randomly arranged in a letter grid as shown below.



Words are formed from *adjoining* letters, starting with any letter cube in the grid. Letters must join in the proper sequeunce to spell a word. *Adjoining* letters may join horizontally, vertically, or diagonally to the left, right, or up-and-down. No letter cube, however, may be used more than once within a single word.

For example, the word SCIENCE can be formed in the above grid in the following way:

- 1 Begin with the 'S' in the upper left corner of the grid.
- 2 Move diagonally down to the right to the letter 'C'.
- 3 Move diagonally down to the left to the letter 'I'.
- 4 Move vertically up to the letter 'E'.
- 5 Move diagonally up to the right to the letter 'N'.
- 6 Move diagonally down to the right to the letter 'C'.
- 7 Move either vertically up or diagonally down to the right to the letter 'E'.

It is your job to write a program that will validate words against a particular array of letter cubes. The first four lines of the input file contain the letter cube array, 4 letters per line. Each line following the 4<sup>th</sup> line contains a word to be validated. The end of the input file is indicated by a line that contains a single asterisk, '\*,'

Your program should indicate whether or not the specified words can be formed from the specified letter cube array. A valid word is a word that conforms to all of the rules outlined above.

All characters in the input file will be in upper case; and all words to be validated will range from 3 to 16 characters in length.

Each line of the output file should contain a word left-justified within a field of 17 spaces followed by either the word "VALID" or the words "NOT VALID".

## Sample Input File (boggle.in)

HDRU

RAIG

RNVN

DIUS

HARDING

RAIN

RAINS

DRAIN

SUN

SUNS

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## Sample Output File (boggle.out)

HARDING	VALID
RAIN	VALID
RAINS	VALID
DRAIN	VALID
SUN	VALID
SUNS	NOT VALID