

# 1992 ACM MID-CENTRAL REGIONAL

## PROGRAMMING CONTEST

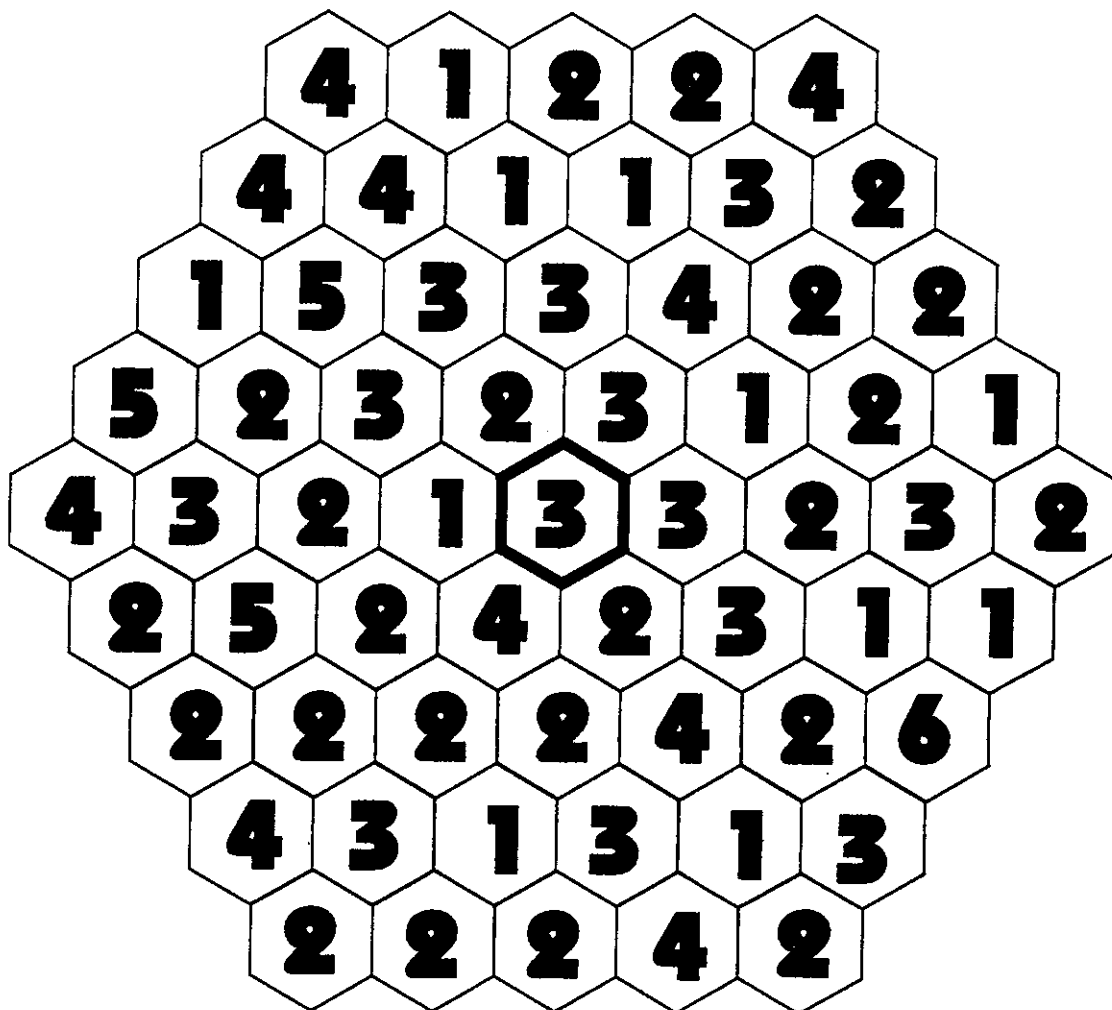
### Problem #1 - Puttin' on the Hex

Program File: **HEX.PAS** or **HEX.C**

Input File: **None** (Use figure below)

Output File: **HEX.OUT**

The tiled hexagons in the figure below form a maze. The starting position is the heavily outlined hex in the very center of the maze. The number in each hex indicates how far you may travel, in a single direction, on each move. On the first move you are free to leave the starting hex in any of the six possible directions (west, northwest, northeast, east, southeast, and southwest). Each subsequent move must continue in the same direction as the previous move, or turn left or right 60 degrees. A turn of 120 or 180 degrees from one move to the next is not allowed. The goal is to return, by exact count, back to the center hex where the maze began.



The first hex in the first row (the hex in the uppermost left corner which contains the 4) is identified as row 1 hex 1. The hex just to its right is row 1 hex 2, followed to its right by row 1 hex 3, etc. The first hex in the second row is row 2 hex 1, followed to its right by row 2 hex 2, etc. Using this identification scheme the last hex in the bottom row is row 9 hex 5.

The maze begins at row 5 hex 5. The 3 in the starting hex indicates that you may travel three hexes in a straight line. You may leave the starting hex in any direction, but a bit of observation will reveal that the only move from the start which does not lead to a dead end is to move 3 hexes southeast to row 8 hex 5, which contains a 1. From there, you may continue 1 hex southeast, or turn left or right 60 degrees (east and southwest, respectively) and move 1 hex. It is not legal, however, to turn more than 60 degrees from the previous move, which means it is not possible to turn west, northwest, or northeast from this hex after entering in a southeast direction.

Write a program to search for and display a solution to this maze. The output of the program should appear as shown below (note that the output shown here is not necessarily part of an actual solution, it is shown to indicate output format only). Use the symbols W, NW, NE, E, SE, SW to represent west, northwest, northeast, east, southeast, and southwest, respectively.

MOVE NUMBER	MOVE TYPE	TO	
-----	----	row	hex
0	GO	5	5
1	3SE	8	5
2	1E	8	6
.	.	.	.
.	.	.	.
.	.	.	.
29	2NE	5	4
30	1E	5	5

If no solution to the maze exists, then your program should simply output:

No solution exists.