

UIUC Department of Mathematics

PROBLEM OF THE WEEK

November 4, 2007

Navigating a maze

Fall is prime season for mazes, so here is a maze-inspired problem:

When navigating a maze, you don't want to get lost; ideally, you want to get back to the spot where you started out. A well-known strategy to ensure this is to always take the leftmost route when arriving at a junction. Obviously, taking the rightmost route at every junction achieves the same goal. But what if you mix the two strategies and alternate between left and right?

If you alternate between taking the leftmost and the rightmost route at every junction in a maze, are you guaranteed to get back to the place where you started out?

[For the purposes of this problem, a maze is a finite graph, with the edges being the paths of the maze and the vertices the junctions of paths. Assume that every junction (vertex) connects at least three paths, and in particular that there are no dead-ends, i.e., no vertices connecting with only one path.]

PROBLEM OF THE WEEK ARCHIVE

<http://www.math.uiuc.edu/~hildebr/pow>