

DEPARTMENT OF MATHEMATICS

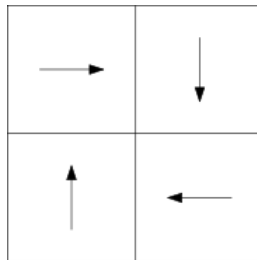
Math Club



Problem of the Fortnight

“Cliffhanger”

Peter lives on an n by n grid consisting of n^2 many squares. In each square there is an arrow pointing either up, down, left or right. When Peter is standing in one of the squares he moves one step in whatever direction the arrow in his current square is pointing, and then he rotates the arrow (the one in the square he just moved from) 90 degrees clockwise. If he happens to be on the edge and the arrow is pointing outside of the grid then unfortunately he falls off a cliff and dies. For example, if $n = 2$ and Peter starts with the following configuration then he will fall off the cliff on the 9th step (no matter what square he starts in).



Now suppose $n = 100$. Peter may choose any initial configuration of arrows to start, and he may start in any square he likes. Is it possible for him to go forever without falling off the cliff?

Please turn in your solutions to Patrick Bennett, by noon on **Friday, October 26**. Strive for clarity, neatness and legibility! Solutions may be turned into the Math Dept office in 3319 Everett Tower. Electronic submissions may be sent to patrick.bennett@wmich.edu. Please include your name and email address. If you are currently taking a math class, please include the instructor's name and the course number.

<http://www.wmich.edu/mathclub>