



UNIVERSITY OF WISCONSIN
PLATTEVILLE
DEPARTMENT OF MATHEMATICS

PROBLEM OF THE WEEK #5
(Spring 2021)

I've designed two robots to play a game on an $m \times n$ grid of squares. The “guard” robot starts the game by marking each square on the grid with an arrow pointing at one of the eight neighboring squares, in such a way that the arrows on a pair of neighboring squares never differ in direction by more than 45° . Then the “runner” robot starts from a randomly selected square on the grid and follows the arrows from square to square. Show that the runner will eventually reach a square on the edge of the grid.

[Please fully explain your answer.]

Email your solution to kwonmi@uwplatt.edu by 4:00pm on Wednesday, March 3, 2021.

Every week, the best solution submitted earns a \$10 Platteville gift certificate; the top scorer each semester also wins a cash award. Good luck!

You can always see the Problem of the Week (and complete rules) online at:

<http://uwpmath.weebly.com/>