Difficulty: 3/4 Interest: 2/4

From correspondence with Alec Jones: Consider a game played on the $m \times n$ rectangular grid, where players take turns placing their pieces onto the board. Each player gets a point for each 3-in-a-row that they make.

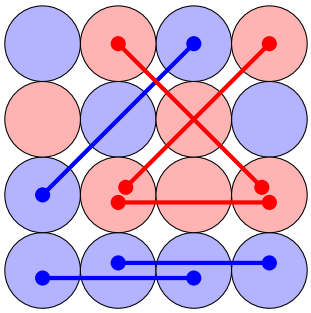

Figure 1: In this game on a 4×4 board, the red player and blue player tie with three points each.

Question. Which player has a winning strategy?

Related.

1. What is the score differential under perfect play?
2. If players cooperate, what is the greatest score differential?
3. What if this is generalized to a torus or cylinder or Möbius strip?
4. What if the game is played with k players or requires ℓ-in-a-row?
5. What if the game is played on a triangular grid?
6. What if the game is played in d dimensions?

References.

Problem 38.