Suppose two players play a game on a triangular board where they attempt to specify the position of markers on the board in a unique way before creating a contradiction.

(1) The first player picks a row on the board, and the second player must put a number in the corresponding red box. The number describes how many (invisible) markers are in that row.

(2) If the second player believes they have described a unique board, she can say so. If (a) she can place markers that satisfy the row labels and (b) the other player cannot find another valid way to place the markers, then the second player wins.

(3) If the first player believes that the second player's choice creates a contradiction, she says so, and the second player has a chance to describe a valid board. If the second player can do so, he loses, otherwise he wins.

(4) If neither (2) nor (3) occur, then the players reverse roles, and the next turn begins from step (1).

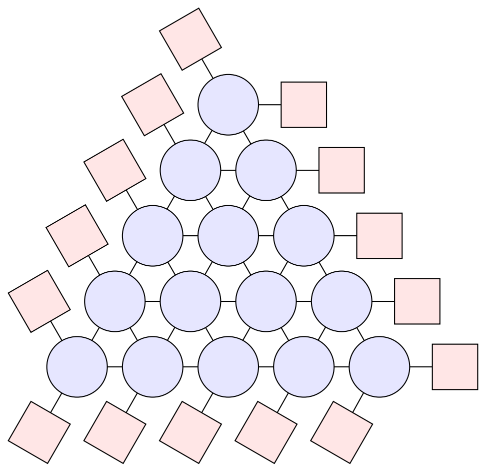

Figure 1: Examples of all known classes of polygonal chains of length 4.

Question. Which player has a winning strategy?

Related.

1. Does perfect play result in a tie?
2. How many turns are required under perfect play where the winner attempts to win in as few turns as possible, and the loser attempts to lose in as many turns as possible?
3. What if multiple markers can be placed in each row?
4. How does this generalize to other geometries?
5. The square analog is essentially the same game under action of the torus. Is there an action (besides rotation) that behaves similarly?

References.

Problem 49.