Trails

2020, Phil Leduc, https://sites.google.com/site/theowlsnest02/home/trails

Trails, formerly *Trail Mix*, is a simple two player, connection game similar to *Bridg-it* (1960, aka., *Gale's Game*, or *Connections*). The game is played on a square 5 x 5 or 7 x 7 gridded game board. The nodes of the grid are colored in an alternating pattern. *Note that the nodes form (n+1) x (n+1) array.* Initially, the grid is empty. The game can be played with graph paper and pens/pencils, but the use of a 5 x 5 board and tokens is assumed in these rules. The 5 x 5 board, which is more tactical than strategic, is recommended for beginners as this aids in learning how and when to set up cold spaces (traps) for the opponent.

Rules

Players use a shared supply of trail tokens of the same two colors as the nodes and can play either color on any turn. The first player may only place uphill (slash diagonals, "/") trail tokens, and the second player may only place downhill (back-slash diagonals, "\") trail tokens. Trail tokens may only be placed in an empty grid squares and its color must match the two nodes it connects. For example, in Figure 1, the uphill player's red diagonal in a1, but not in d5; however a blue uphill diagonal in d5 would be legal.

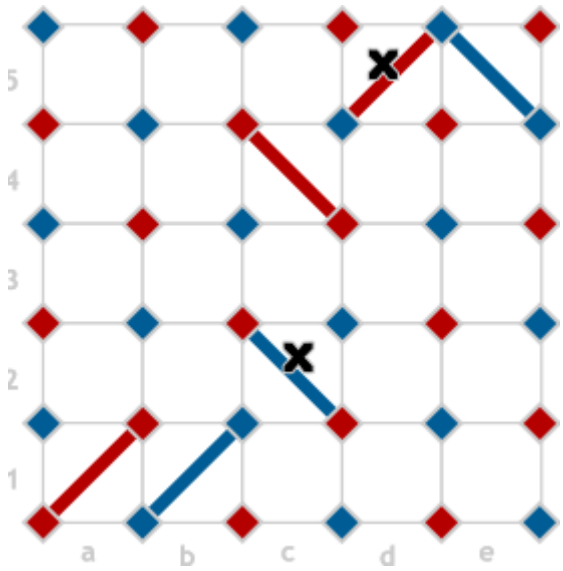


Figure 1. Token Placement Token color must match the nodes that it connects.

The goal of the game is to complete a path consisting of uphill and downhill trail tokens of one color that connects *either* pair of opposite sides of the grid. (The four grid corner nodes are considered to be on both of their respective adjacent sides of the board.) The first player to do so wins the game.

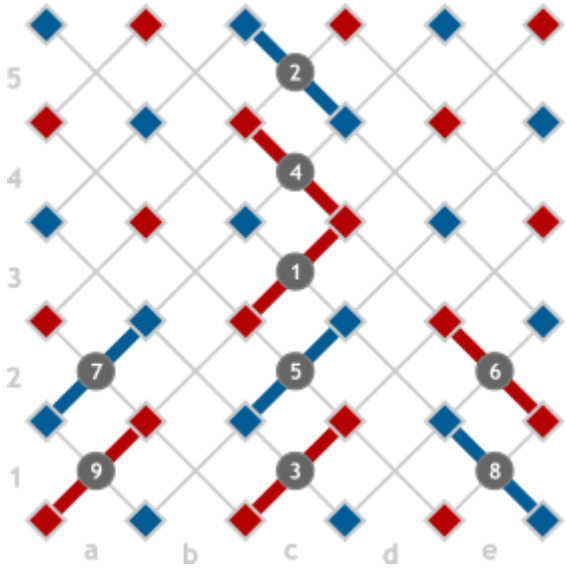


Figure 2. A "symmetric" game by the first/uphill player loses in three placements.

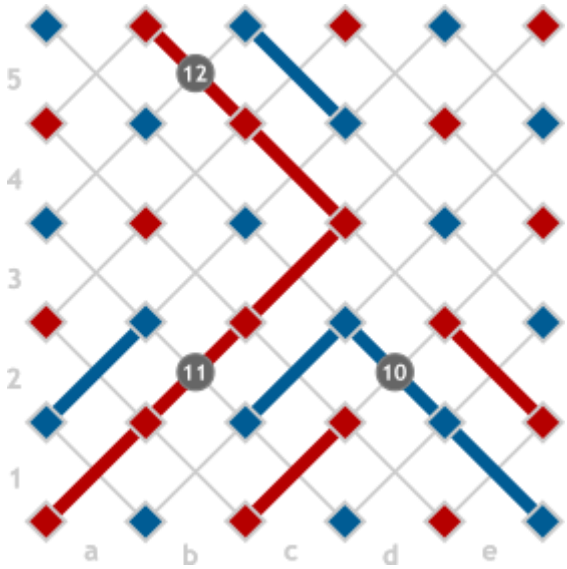


Figure 3. The completed game won by the downhill player. D3 also wins!

Designer Comments

The game of *Trails* is derived from *Bridg-it* and may be thought of as a variant. *Trails* shares one of *Bridg-it*'*s* deterministic attributes but also differs from its ancestor in three important ways. Both games *always* end with a completed trail! The game of *Bridg-it* has been proven to terminate with a completed path. The proof involves graph theory that can be applied to any *Shannon Switching Game* which includes games like *Bridg-it* and *Trails*. In *Shannon Switching Games*, one player is trying to connect two given points on a graph by coloring lines and the second player is trying to prevent this by cutting/erasing edges from the graph. Think of blue diagonals as cutting the use of red diagonals in the same cell. (See the *Shannon Switching Game*

topic at Wikipedia for more details.) Note that if you turn the *Trails* board 45 degrees; the diamond array is clearly a sub-portion of a *Bridg-it* game board and thus shares this property too. Refer to the Board Game Geek (BGG) Bridg-it(1960) web page.

The first way that *Trails* differs from *Bridg-it* is that *Bridg-it* is a won-game for the first player. (See *Marvin Gardner's New Mathematical Diversions from Scientific American*, Chapter 18, Bridg-it and Other Games, pg. 210 – 215.) It is not clear if *Trails* is a won-game for the first player on any n x n grid where n is odd. However, it is the case, that on an n x n grid where n is even, the second player appears to have a winning strategy by simply using mirror symmetry! Below is an example of symmetric game play on a 4 x 4 grid.

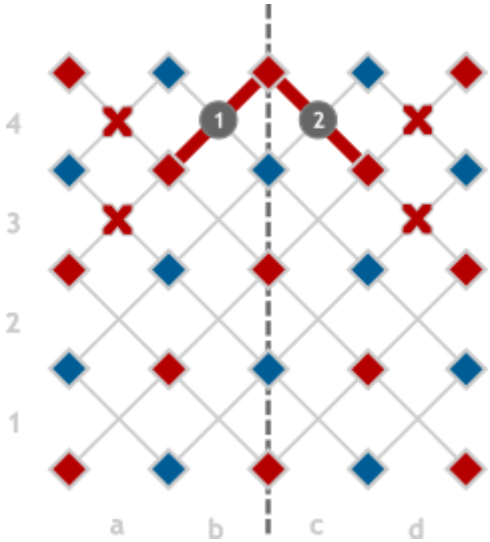


Figure 4. Player 2 mirrors Player 1. The X's indicate where neither player should place a red trail token since this leads to a loss on the next player's move.

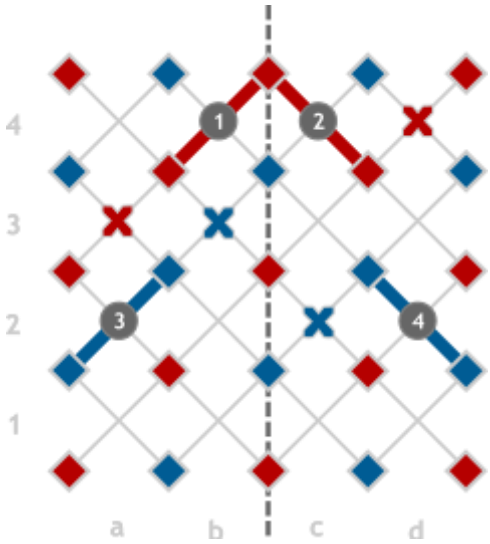


Figure 5. Here the X's indicate where only the first player should not play. Her options are shrinking. Player 2 can still use some of these X'ed squares.

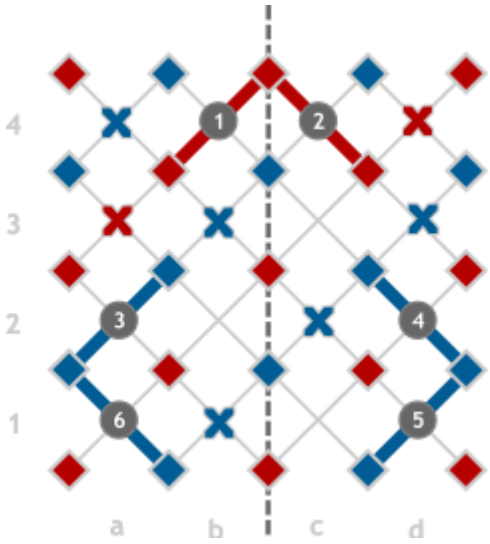


Figure 6. More spaces become unusable by the first player.

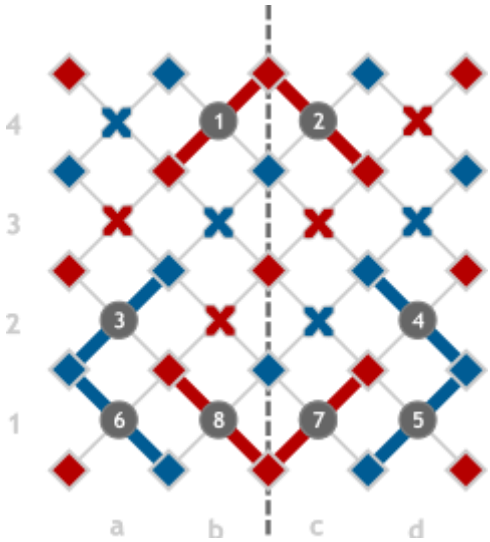
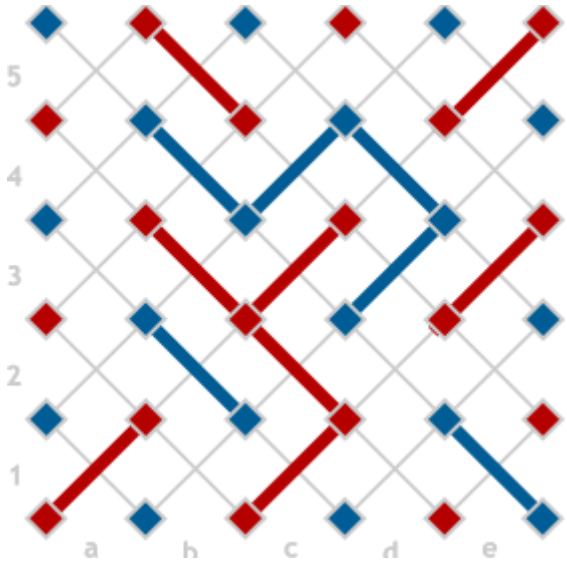


Figure 7. After only 4 rounds, Player 1 has no safe moves and will lose on Player2's next move. For example, Red /d4 loses to Red \a4.

The second difference between *Trails* and *Bridg-it* is that in *Bridg-it*, each player must build his or her entire path. In *Trails*, each player has only one winning trail that they can build solely on their own, along the main diagonals of the grid, which can easily be blocked by the opponent. Therefore, players must depend on "help" from their opponent to build a winning trail. Each placement of a diagonal can benefit either player! This attribute creates the cold aspect of *Trails*. Player will not want to play to certain squares because doing so would lose the game.

The last point of differentiation is that in *Bridg-it*, each player is assigned a single pair of opposite sides of the board. In *Trails*, players can connect either pair of opposite sides of the grid.



Puzzle 1. Uphill player to move and win in two.

Trails is a challenging game and requires concentration especially in the end game. The early game is quiet with players usually playing for the center diagonals. In the middle game players start setting up forced moves. Players most often win by *forcing* opponent's to make one or more losing moves. Blunders are common if a player does not use foresight. It is recommended players allow Mulligans/do-overs when blunders occur.