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Tsuro Components

The three major components of Tsuro are the Board, the Tiles, and the Players.

      The board initializes as 36 empty cells in a grid on which players may place tiles during the game. The board also has 48 entry/exit points along the outer edges where players may place their piece to start the game and where a player piece may reach during the game, eliminate the player.

      The Tiles may be either on the board, in a player's hand, or in the deck. Each tile has a number of paths with entry/exit points. Player pieces will move around on these paths and sit on the end points of tiles. The player can rotate the tile before placing it, so it must also have an orientation.

      Players should maintain a hand of three tiles when possible which only they can see. After placing a tile on the board, they should draw from the top of the tile deck. If there are no tiles in the deck, and no other player has the Dragon Tile (boolean attribute of player, not part of Tile class), then the player receives the Dragon Tile. The tiles in a player's hand are available to the player to place during their turn. No other player can use it, and the player cannot use any others. The player has a piece which they move across tile paths on the board.

      The player also has a turn, if they have not been eliminated already. They place a tile in an empty cell. It is illegitimate for players to place a tile which eliminates themselves, unless there is no other option. After the tile is placed, if there are any player pieces on an entry/exit point, it must follow the path across an arbitrary number of tiles until it is eliminated or reaches the end of a path. If it reaches the edge of the board, the player is eliminated, or if it collides with another player piece, both players are eliminated. If affected, the player who placed the tile must move their player piece before any other affected piece. If the player is was not eliminated, they draw a tile from the deck. If there are no cards in the deck, and the dragon tile is not claimed, the player takes the dragon tile. After drawing procedures, the games moves to the next non-eliminated player.

      Player Eliminations trigger another set of instructions. The player piece is removed from the board. The tiles in the player's hand returns to the deck and is shuffled. If any player has the Dragon tile, they must draw from the deck until they have 3 tiles in their hands or until the deck reaches 0 again and the player reclaims the Dragon Tile. If the Dragon-Tile holder reaches 3, then other players with less than 3 tiles in their hand pick until they have full hands or until the deck is empty, after which the Dragon Tile would go to whomever does not have a full hand. After the elimination process, the game resumes.

      The game ends when all but one player is not eliminated, or if many player pieces are not able ever take a path to exit the board.

Simple AI Description

For our simple automated player, we propose a simple strategy that, while not necessarily effective in the long run, can appear similar to a naive player and not break any rules. On any given turn, the player would analyze all of the empty board cells, and find all the cells that currently connect to a Tile-piece path on the board. For every connected tile piece, the agent will "try out" each of the tile-pieces in their hand in all orientations. It will then simulate the resulting movements of each tile placement.

For each tile placement, the agent will first check to make sure that the move was legal, and that it did not move their own piece off of the board, or cause a collision that will remove their piece. If the placement is legal, the agent will then check to see how many enemy pieces are potentially knocked off the board. The agent will always prioritize the move that knocks the most enemy pieces off of the board. If no pieces are knocked off of the board, the agent will instead count how many squares each pieces is from the nearest "edge" of the board and sum up the values. The move that is ultimately taken is the one that leaves all the pieces closest to the edges of the board and has the lowest score.

While this system is simple and doesn't represent much complex thinking, it will be easy to predict and sufficient for testing.