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 Tic-Tac-Toe

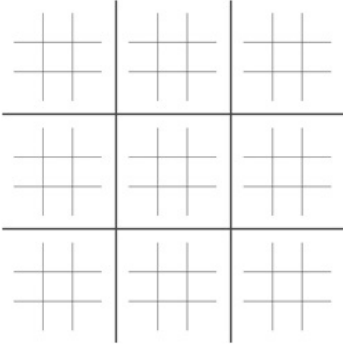
Tic-Tac-Toe is a game, usually played on a piece of paper, in which two players (X and O) take turns placing X's and O's on a 3X3 Grid. X plays first, followed by O in alternating turns until one player places three X's or O's in a row, and thus wins the game. If the game ends with no winner it is considered a draw, which some people call a "Cat's Game."

Here is a sample game in which X wins:

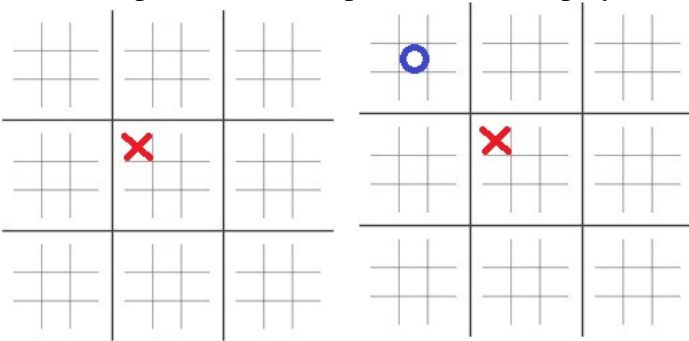


- 1) Can you learn the set-up and rules for Tic Tac Toe?
- 2) Play a few games with a friend or family member, what patterns do you notice?
- 3) Is there a trick to winning? Can you win every game? Why or why not?
- 4) How many opening moves are there for X? Can you list them?
- 5) Assuming X always starts first, how many unique games can be played, that is, how many different ways can the board look at the end of a game?
- 6) There are many games that are similar to Tic Tac Toe, one of which involves using numbers instead of X's and O's. In this version there are nine cards numbered 1-9. Each player takes away one card. The first player to get three cards that add up to 15 (exactly) wins. Try playing the game and see what you notice about strategy for winning and whether or not a player should choose to go first or second.
- 7) Another variation involves nine cards with the following words written on them: row, we, twin, rip, open, pat, grand, gem, got. Each player takes away one card. The first play to get three cards that share a common letter wins. Try playing this game and see if you can figure out a strategy for winning, or not.
- 8) Try arranging the cards from either #6 or #7 in a pattern similar to a Tic Tac Toe board, a 3 X 3 grid. Can you arrange the cards in a pattern that allows for a win in any line? Are there multiple ways to achieve this?

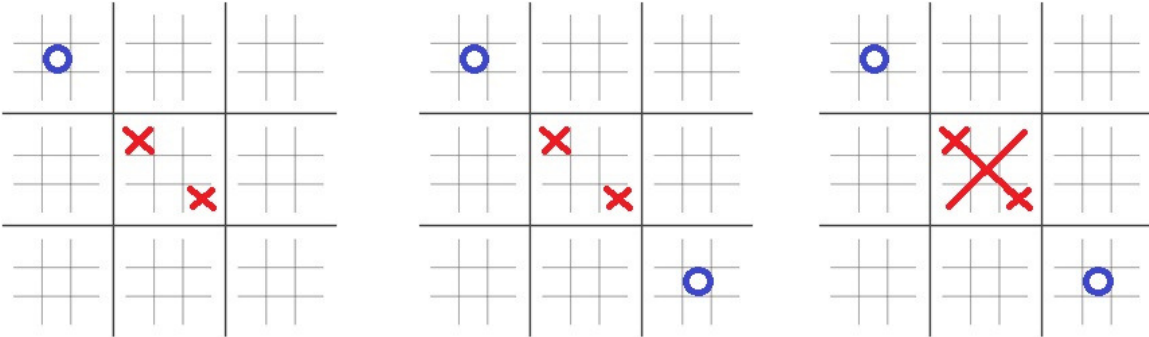
9) There is another variation of Tic Tac Toe called Super Tic Tac Toe (some folks call it Ultimate Tic Tac Toe). This version of the game is played on a large Tic Tac Toe board in which there is a smaller Tic Tac Toe board in each section. Like this:



The first player, X, may play on any board. The second player, O, must play on the board that corresponds with the space in which X played. Like this:



Play continues in this manner until a player wins a board and takes the section. Like this:



Once a board has been won, any move that would send a player to that board instead allows a player to choose to play on whichever board they prefer. The game ends when someone gets three in a row by winning three boards that form a line, just as in regular Tic Tac Toe. Learn the rules and play a few games of Ultimate Tic Tac Toe.

10) How is Ultimate Tic Tac Toe similar to regular Tic Tac Toe? How are the two games different? Are there any strategies or tricks for winning this variation?

11) Have Fun!