

Dodge Ball

Adapted by Dr. Sarah from The Heart of Mathematics: An Invitation to Effective Thinking

Dodge Ball is a game for two players: Matcher and Dodger. Each player has his or her own board and is given n turns. Matcher begins by filling in the first horizontal row of his table with X's and O's. Dodger then places either one X or one O in the first box of her board. At this point, Matcher has filled in the entire first row of his board and Dodger has filled in the first box of her board with one letter. The game continues with Matcher writing down X's and O's in order to fill in the second horizontal row of his board followed by Dodger writing one letter in the second box of her board. This game proceeds in this fashion until all of Dodger's boxes are filled with X's and O's. **All marks are visible to both players at all times.** Matcher wins if any horizontal row he wrote down is identical to the row that Dodger created (ie Matcher matches Dodger). Dodger wins if her string is not the same as any of the rows on Matcher's board (ie Dodger dodges Matcher). Let's look at an example of the game for when the number of columns is three:

Move 1 for Matcher

X	O	X

Move 2 for Matcher

X	O	X
X	X	X

Move 3 for Matcher

X	O	X
X	X	X
X	O	O

Move 1 for Dodger

X		
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Move 2 for Dodger

X	O	
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Move 3 for Dodger

X	O	X
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Since the boards are filled in, we have reached the end of the game. Notice that Dodger loses because her board matches row one of Matcher's board.

Play this game a few times with a partner; switch roles so that each of you has the opportunity to be both Matcher and Dodger. Remember, if you are Matcher, your goal is to match one of your rows with your opponent's row. If you are Dodger, you want to dodge all of your opponent's rows; that is, you want your row to differ in at least one spot from each of the other rows of your opponent. It is easiest to just play on just one board instead of using a different board for each move.

Game 1

Matcher's Board

Dodger's Board

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Game 2

Matcher's Board

Dodger's Board

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Game 3

Matcher's Board

Dodger's Board

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Question 1: Would you rather be the Matcher or the Dodger? Who has the advantage?

Question 2: Can you devise a strategy for either side that will always result in victory? If so, write down your strategy. If not, explain why not.

Question 3: What if the game boards have 6 columns each? Can you devise a strategy for either side that will always result in victory? Play a few games with a partner in order to help you answer this question.

Matcher's Board

Dodger's Board

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Matcher's Board

Dodger's Board

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Question 4: What if the game boards have n columns each, where n is an arbitrary natural number? Can you devise a strategy for either side that will always result in victory? If so, write down your strategy. If not, explain why not.