**Dodgeball Duel**

As you may know, Austin B., Mehmet, and Julia all sideline as minor league dodgeball players.[[1]](#footnote-0)

They decide to compete in a winner-take-all, last-dodgeballer-standing championship match in which each player takes aim at one of the other players and throws. Any players who survive then take aim again (possibly at a different opponent) and throw. Whoever still survives is the winner.

All three players have perfect accuracy (they always hit the target they aim at), but Julia and Mehmet are fast, while Austin is slow. If Austin and one of the fast players both aim at each other, then the fast player always wins; Austin will not even get to throw. If Julia and Mehmet aim at each other, then they each win with probability 0.5. If Austin aims at a fast player but that player does not aim at Austin, then Austin wins.

The players are all aware of all the players’ abilities and probabilities. When the players throw, they are not aware of the other players’ targets.

Here are two examples of possible outcomes:

* If Mehmet and Julia aim at each other and Austin aims at Mehmet: Then with probability 0.5, Mehmet wins against Julia; but if he does, then he is hit by Austin. So Mehmet and Julia are both eliminated, and Austin wins. On the other hand, with probability 0.5, Julia wins against Mehmet, in which case Austin’s shot at Mehmet is redundant. In the next round, Julia will defeat Austin. Therefore, in this scenario, Austin and Julia each win with probability 0.5.
* If Mehmet aims at Julia, Julia aims at Austin, and Austin aims at Mehmet: Then Mehmet hits Julia and Julia hits Austin, so both are eliminated; and Austin never fires his ball at Mehmet. So Mehmet wins with probability 1.0.

**Assuming each player chooses his or her optimal strategy, what is each player’s probability of winning?**

Answers are due by **Monday at 3 pm ET.** Have fun!

1. Not really. [↑](#footnote-ref-0)