

In-Class Problems — Week 6, Mon

Problem 1. (Carried over from last Friday (Week 5).)

In Week 5 Notes we considered win-lose games, ignoring games which can end in a draw. Such games have finite-path game trees in which the leaves are labelled with *win*, *lose*, or *draw*, indicating the outcome for the first player.

While a winning strategy for a player ensures the player will win no matter what moves the other player makes, there is now the possibility of a *non-losing* strategy which ensures that the player will *win or draw* no matter what moves the other player makes. (A winning strategy counts as a kind of a non-losing strategy.)

For example, in tic-tac-toe there is no winning strategy for either player, but *both* players have non-losing strategies. For chess, no one knows if white or black has a winning strategy. However, on general principles, we can be sure that at least one player has a non-losing chess strategy.

Explain why for any two-person win-lose-draw game with a finite path game tree, either one player has a winning strategy or *both* players have non-losing strategies.

NOTE: There were two more problems on the class handout that we didn't get to.