

Math 167: Mathematical Game Theory – Homework 1

Due: January 13, 2017

Exercise 1 (Tic-tac-toe).

The purpose of this exercise is to study the game *Tic-tac-toe* (see [here](#)). Answer the following questions in details (i.e. I expect more than “yes/no” type answers). Is this game a combinatorial game? Is it partisan or impartial? Show that it is progressively bounded and give an upper bound for the function B ! Explain (either with your own words or mathematically) why the best that both players can hope for is a tie. Why does this not contradict to the theorem where we showed that in certain situations for this kind of games one always has a winning strategy?

Exercise 2.

Exercise 1.1 from the book of Karlin and Peres (page 32).

Exercise 3.

Exercise 1.2 from the book of Karlin and Peres (page 32).

Exercise 4.

Exercise 1.3 from the book of Karlin and Peres (page 32), solve in the special case when the number of the slots is $n = 3$.