Math 167: Mathematical Game Theory – Homework 7
Due: February 24, 2017

Exercise 1.

Explain why Sperner's lemma in 1D can be seen as "a discrete version" of the intermediate value theorem for continuous functions. If you are not familiar with this theorem, look at it for instance here.

Exercise 2.

Let us consider two people and a bounded cake. Show that there is a fair cutting of the cake into 2 pieces, such that whenever the cake is cut using this cutting, it is clear for each of them which piece they want to pick, i.e. in particular they do not want both the same piece. We suppose that both of them are hungry (i.e. they always prefer to choose something from the cake, instead of not choosing anything). Design an algorithm to find this fair cutting. *Hint: you may use Sperner's lemma and the ideas from the 3 people problem, that we do/did during the lectures.*

Exercise 3.

Exercise 4.11 from the book of Karlin and Peres (pages 96).

Exercise 4.

Exercise 4.13 from the book of Karlin and Peres (page 96).