

## Algorithmic Game Theory

Winter Term 2021/22

Tutorial Session - Week 14

### Exercise 1:

Consider the ranking rule which we obtain from plurality voting by ordering the candidates by decreasing number of votes. Prove that this ranking rule is not independent of irrelevant alternatives (IIA).

**Note:** Do not use Arrow's theorem in order to solve this exercise.

### Exercise 2:

A parent offers his two children 100 Euro if they can agree on how to split it. If they can't agree, they will each get 10 Euro. Therefore, from the perspective of a child, we have negative costs (= payoffs)  $c(\{1, 2\}) = -100$  and  $c(\{1\}) = c(\{2\}) = -10$ .

- (a) Show that there are infinitely many vectors in the core.
- (b) Draw the core in a coordinate system.
- (c) How would the parent need to change the payoff in order to satisfy that there is a unique solution in the core? Justify your answer.

**Remark:** You can also consider a payoff-maximization variant of the ideas introduced in Lecture 26 with a payoff function  $v(\{1, 2\}) = 100$  and  $v(\{1\}) = v(\{2\}) = 10$  if you want to avoid negative terms.