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July 13, 2026
Due date: July 20, 2026 at 8:00 p.m.

Algorithmic Game Theory

Summer Term 2026

Exercise Set 11

If you would like to submit your solutions for this problem set, please send them via email to aheuser1@uni-bonn.de by Monday evening. Submitting solutions in groups is also possible.

Exercise 1:
Recall the setting for Cake Cutting from Lecture 23. Show that if valuations are identical, i.e. $v_i(.) = v_j(.)$ for all $i, j \in N$, then the notions of Proportionality, Envy-Freeness and Equitability coincide.

Exercise 2:
Consider the algorithm (which is also known as the *moving-knife algorithm*) given in Section 4 of Lecture 23 that determines a proportional allocation for any number of agents n.
Show that even in the case of three agents the allocation of the algorithm might not be envy-free.

Exercise 3:
The *participation criterion* requires that the addition of a voter who strictly prefers candidate A to B should not change the winner from candidate A to candidate B.
Prove that plurality voting satisfies the participation criterion.