

Algorithmic Game Theory

Summer Term 2026

Tutorial Session - Week 10

Exercise 1:

Consider the following instance of the house-allocation problem. There are six agents $a, \dots, f$ and their preferences are given by:

$$\begin{aligned} a : b > d > f > e > c > a, & \quad b : d > a > c > e > f > b, \\ c : e > f > a > c > b > d, & \quad d : e > a > b > c > d > f, \\ e : f > e > c > b > d > a, & \quad f : d > a > b > c > f > e. \end{aligned}$$

Find a stable allocation π using the Top Trading Cycle Algorithm.

Exercise 2:

Show that there is not necessarily a solution to the stable roommates problem: In this problem, there is a set of $2n$ people, each with a total preference order over all the remaining people. A matching of the people (each matched pair will become roommates) is stable if there is no pair of people that are not matched that prefer to be roommates with each other over their assigned roommate in the matching.