

Algorithmic Game Theory

Winter Term 2021/22

Tutorial Session - Week 12

Exercise 1:

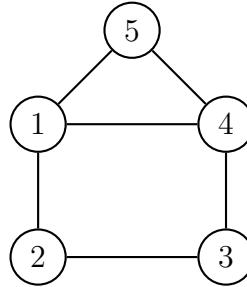
Consider the following instance of the house-allocation problem. There are six agents a, \dots, f and their preferences are given by:

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

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

Exercise 2:

Consider the problem of Pairwise Kidney Exchange by Matching from Lecture 22. The graph below depicts an instance of agents (that is, patient-donor pairs) and possible pairwise exchanges, i.e. nodes represent patient-donor pairs with an edge connecting two nodes if an exchange between the two patient-donor pairs is possible.



Use the mechanism of Section 4 from Lecture 22 and consider agents in ascending order of agent indices (which is independent of the reports) to determine the set of maximum matchings M_5 .