Algorithmic Game Theory  
Winter Term 2021/22  
Tutorial Session - Week 10

Exercise 1:
Consider three unit-demand buyers and two items $a, b$ with

$$
v_{1,a} = 5, v_{1,b} = 3, v_{2,a} = 3, v_{2,b} = 4, v_{3,a} = 2, v_{3,b} = 2.\$$

(a) Determine the Walrasian price vector which is determined by the VCG mechanism.

(b) Now find all Walrasian price vectors $q$. Draw these vectors in a coordinate system with axes $q_a$ and $q_b$.
As a remark, note that the prices defined by the VCG mechanism are the smallest Walrasian prices: We can use the prices from (a) as a lower bound for all Walrasian prices.

Exercise 2:
Have a look at the single-minded combinatorial auction with three bidders (red, blue, green) and items $a, b, c$ which is depicted below. State all values of $x \in \mathbb{R}_{\geq 0}$ such that there exists a Walrasian equilibrium and prove your claim.