Exercises from lecture 12 (Bargaining) TEK5010 Multiagent systems 2021

## **Question 1**

In this exercise agents are bargaining for resource allocations given by  $\langle Ag, Z, v_1, ..., v_N \rangle$ . The set of goods  $Z = \{z_1, z_2\}$  are distributed between the set of agents  $Ag = \{1,2\}$ . The initial endowment of the goods is given by  $Ag_1 = \{z_2\}$  and  $Ag_2 = \{z_1\}$ . The valuation functions are given by:

$$v_1(\{z_1\}) = 4$$

$$v_1(\{z_2\})=1$$

$$v_2(\{z_1\}) = 5$$

$$v_2(\{z_2\}) = 7$$

- a) What would be a suitable protocol for bargaining in this case? Specify the needed requirements.
- b) What is the set of possible allocations? Could you calculate the social welfare of the different allocations? What allocations are Pareto optimal if no side payments are allowed?
- c) What would be allocation if agent 1 is selected to give the first bargaining proposal and side payments are allowed?
- d) What would be allocation if agent 2 is selected for first proposal instead?
- e) Comment on your findings.