Exercises from lecture 11 (auctions) TEK5010 Multiagent systems 2020

Question 1

A combinatorial auction of goods $\mathcal{Z} = \{a, b, c\}$ are to be evaluated. The bidders $Ag = \{1,2,3\}$ have the following XOR bids in this auction:

$$\beta_1 = (\{a\}, 3)XOR(\{c\}, 1)XOR(\{a, b\}, 5)XOR(\{a, b, c\}, 7)$$
$$\beta_2 = (\{c\}, 5)XOR(\{a, b\}, 6)XOR(\{a, b, c\}, 14)$$
$$\beta_3 = (\{b\}, 3)XOR(\{c\}, 4)XOR(\{a, b\}, 11)XOR(\{b, c\}, 15)$$

a) Could you calculate the valuation function for all possible auction bundles?

b) Determine the winner in this auction assuming the auctioneer is maximizing social welfare.

c) What is the price each agent must pay if we use the VCG mechanism instead?