Agent-Based Systems Tutorial 7

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Q1 Prove the following statement: "Bidding one's own valuation in a Vickrey auction is the dominant strategy for a rational agent."
You can assume we are only considering private value auctions among purely self-interested, rational and risk-neutral agents.

Q2 Discuss which of the English, Vickrey, first-price sealed bid, or Dutch auction protocols guards better against bidder collusion.

Q3 Consider the following distribution of utilities for two agents 1 and 2 in a task-oriented negotiation domain:

Deal	$cost_1$	$cost_2$
Θ	5	5
d_1	4	1
d_2	0	4
d_3	2	2
d_4	2	3

Trace the way negotiation would proceed using the monotonic concession protocol in this example if agents used the Zeuthen strategy (you may assume that in the first round, agent 2 proposes deal d_1 and agent 1 proposes deal d_2).

Q4 Consider a situation in which two agents 1 and 2 bid for items a and b. We assume that each agent is allowed to obtain only one item. The agents have the following valuation functions:

$$v_1(\{a\}) = 12$$
$$v_1(\{b\}) = 3$$
$$v_2(\{a\}) = 6$$
$$v_2(\{b\}) = 1$$

1. Which allocation will be assigned by the Vickrey-Clarke-Groves mechanism (VCG mechanism) if both agents are truthful about their valuations?
2. Calculate the utility each agent will pay to the mechanism.
3. Can the agents benefit by lying about their true valuation functions?