

Negotiation

1.

Consider the following evaluation functions for three agents (Agent 1, Agent 2 and Agent 3), in relation to items x and y :

$$\begin{array}{lll} v_1(x) = 7 & v_2(x) = 6 & v_3(x) = 0 \\ v_1(y) = 0 & v_2(y) = 4 & v_3(y) = 0 \\ v_1(x,y) = 10 & v_2(x,y) = 0 & v_3(x,y) = 9 \end{array}$$

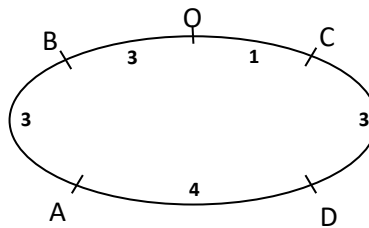
Following the VCG auction, determine the result of the allocation of goods x and y and the amount paid by each of the agents.

2.

Two couriers (E1 and E2) are responsible for delivering the following orders:

- Courier E1: location A and C (at the lowest cost)
- Courier E2: location B and D (at the lowest cost)

The following indicates the locations and distances between them. Both couriers depart from point O and do not need to return to it after delivering orders.



The couriers decide to negotiate with each other in order to reduce delivery time. For that, they follow the Monotonous Concession Protocol and use the Zeuthen strategy. Consider the following negotiation set:

- δ_1 : (E1 goes to C and D; E2 goes to A and B)
 - δ_2 : (E1 goes to A and B; E2 goes to C and D)
 - δ_3 : (E1 goes to C, D and A; E2 goes to B)
 - δ_4 : (E1 goes to B; E2 goes to C, D and A)
- Show that all enumerated agreements are individually rational and Pareto-optimal (they are not dominated)
 - According to the strategy used, indicate the initial proposals of each of the two agents. Justify.
 - According to the strategy used, which of the agents must concede and making the following proposal?
 - What new agreement δ_i should this agent propose? Justify.
 - What is the result of the negotiation?