Microeconomics II (PhD)
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Exercises:

1. There is a set of n men, $M = \{m_1, ..., m_n\}$, and a set of p women, $W = \{w_1, ..., w_p\}$. If man m_i and woman w_j are paired, they create a monetary value of $v(m_i, w_j)$, single individuals do not create value. Utility is given by the monetary value an agent realizes.

   (a) Suppose that utility is transferable, $n = p = 2$ and match values are given as follows:

	w_1	w_2
m_1	10	18
m_2	1	10

   Compute the core of the game and draw the set of payoffs for men that are part of core allocations.

   (b) Now one additional man arrives, corresponding match values are given as follows:

	w_1	w_2
m_1	10	18
m_2	1	10
m_3	3	5

   Determine the payoff vector in the core that men prefer the least. Compare to the payoff vector men prefer the least in part (a).

   (c) Consider the general setting with n men and p women and arbitrary match values. Suppose that utility is not transferable across agents and each men that is matched receives a share $s \in (0, 1)$ of the match value, each woman receives a share $1 - s$. Assume that match values are such that individuals have strict preferences. Show that there is a unique stable matching.

2. Consider the Derman-Lieberman-Ross model from the lecture. Suppose there are 2 objects with quality $0 < q_2 \leq q_1$. Suppose there are 3 agents and agents' types are distributed iid uniformly on the unit interval.

   (a) Calculate the cutoffs that implement the dynamically efficient policy.

   (b) Compute expected welfare.

   (c) Calculate the payments that implement this policy.

3. Consider Albright's model. Suppose the seller has a single object for sale. Buyers arrive accoring to a Poisson process with arrival rate $\lambda = 3$. Valuations are iid uniformly on the unit interval. There is a fixed deadline $T = 1$ after which no object can be sold.

   (a) Suppose the seller uses cutoff $\frac{1}{2}$ throughout. Compute his expected revenue given this policy.

   (b) Suppose the seller uses cutoff $\frac{1}{2}$ until period $\frac{T}{2}$ and cutoff $\frac{1}{4}$ thereafter. Compute his expected revenue given this policy.

4. Consider the example about learning from the lecture: There is one object for sale and 2 potential buyers arriving sequentially. Buyers' valuations are drawn uniformly from $[0, 1]$ (with probability 0.5) or from $[1, 2]$ (with probability 0.5). Buyers must be served upon arrival and the object cannot be reallocated. Buyers are privately informed about their valuations. Delayed payments are not possible.

   (a) Compute the second-best optimal policy that maximizes welfare among all implementable deterministic policies.

   (b) Compute the second-best optimal policy that maximizes revenue among all implementable deterministic policies.