

Economics 316

Fall 2017

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Problem Set 7

1. Consider the two-candidate voting game studied in class for the case in which the number of citizens is odd. Specifically, there are two candidates, A and B . Each citizen can vote for A or vote for B . The candidate who gets the most votes wins. Each citizen cares only about the candidate who wins. A majority of citizens prefer a win by A to a win by B ; the remaining citizens prefer a win by B to a win by A . (Because everyone votes and the number of citizens is odd, a tie is not possible.)
Find all the Nash equilibria of this game. Is there an equilibrium in which no citizen uses a weakly dominated action?
2. Consider the three-candidate voting game studied in class. For any given preferences, find a Nash equilibrium of the game in which at least one player's action is not weakly dominated and that player does not vote for her favorite candidate.
3. In the system of "approval voting", as discussed in class, a citizen may vote for as many candidates as she wishes. If there are two candidates, say A and B , for example, a citizen may vote for neither candidate, for A , for B , or for both A and B . The candidate who obtains the most votes wins.
 - (a) Show that any action that includes a vote for a citizen's least preferred candidate is weakly dominated.
 - (b) Show that any action that does not include a vote for a citizen's most preferred candidate is weakly dominated.
4. Suppose there are four people and three candidates, A , B , and C . Persons 1, 2, and 3 prefer A to B to C whereas person 4 prefers A to C to B .
 - (a) Suppose a candidate is elected by plurality rule (each of the four people votes for one candidate and the candidate with the most votes wins). In a Nash equilibrium in which no person uses a weakly dominated action, which candidates can be the winner?

- (b) Suppose that a candidate is elected by an approval vote. In a Nash equilibrium in which no person uses a weakly dominated action, which candidates can be the winner?
5. A group of eight people selects one of three options, A , B , and C , using the single transferable vote system. Persons 1, 2, and 3 prefer A to B to C ; persons 4 and 5 prefer B to C to A ; and persons 6, 7, and 8 prefer C to A to B .
- (a) If each person submits her preference ordering as her ranking (e.g. persons 1, 2, and 3 submit the ranking A, B, C), what is the outcome?
- (b) Consider the strategic game in which each person may submit any ranking. Show that the action profile in which each person submits her preference ordering as her ranking is not a Nash equilibrium. (That is, show that at least one person can submit a ranking different from her preference ordering that generates a better outcome for her, given that everyone else submits their preference ordering.)
6. Consider the variant of the mechanism for collective decision-making in which the policy chosen is the *mean*, rather than the median, of the policies named by the players. Does a player's action of naming her favorite policy weakly dominate all her other actions?