

CSC304 Fall'26

Solutions to Tutorial 1

Q1 Identifying Strict and Weak Domination

For every pair of actions (pure strategies) of each player, identify if there is a strict or weak dominance relation. Identify all strictly or weakly dominant actions (pure strategies) of each player.

$P_1 \backslash P_2$	L	C	R
T	(2,0)	(1,1)	(3,2)
M	(3,4)	(1,2)	(2,3)
B	(3,3)	(2,2)	(4,2)

Solution to Q1

For player 1:

- (T,M): Neither even weakly dominates the other.
- (T,B): B strictly dominates T.
- (M,B): B weakly dominates M.
- Hence, B is a weakly dominant action (and no action is strictly dominant) for player 1.

For player 2:

- (L,C): Neither even weakly dominates the other.
- (L,R): Neither even weakly dominates the other.
- (C,R): R weakly dominates C.
- Hence, no action is even weakly dominant for player 2.

Q2 Strict vs Weak Domination

Check if the statements below are true or false.

- (a) If s_i weakly dominates s'_i , then s_i must also strictly dominate s'_i .
- (b) If s_i strictly dominates s'_i , then s_i must also weakly dominate s'_i .
- (c) If s_i weakly dominates s'_i , then there must be a strategy profile of the other players $\vec{s}_{-i}$ such that $u_i(s_i, \vec{s}_{-i}) = u_i(s'_i, \vec{s}_{-i})$.
- (d) If s_i strictly dominates s'_i , then there can be no strategy profile of the other players $\vec{s}_{-i}$ such that $u_i(s_i, \vec{s}_{-i}) = u_i(s'_i, \vec{s}_{-i})$.

Solution to Q2

(a) False. It could be that s_i and s'_i yield equal reward to player i for some strategy profile $\vec{s}_{-i}$ of the other players.

(b) True. Strict domination logically implies weak domination.

(c) False. It could be that s_i actually strictly dominates s'_i , and hence, $u_i(s_i, \vec{s}_{-i}) > u_i(s'_i, \vec{s}_{-i})$ for every strategy profile $\vec{s}_{-i}$ of the other players. In this case, it would still be true to say that s_i weakly dominates s'_i (as strict domination implies weak domination).

(d) True. If s_i strictly dominates s'_i , then by definition, $u_i(s_i, \vec{s}_{-i}) > u_i(s'_i, \vec{s}_{-i})$ for every strategy profile $\vec{s}_{-i}$ of the other players.