Problem Set 9 Solution

17.881/882

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1 Gibbons 2.11 (p.135)

In the stage-game, there are three Nash Equilibria $((T, L), (M, C), (1/2T + 1/2M, 1/2L + 1/2C))$.

Note that (B, R) is not an equilibrium of the stage game, since then player 1 has an incentive to deviate to T. In order to enforce compliance by player 1, let us think of 'punishments/rewards' in the second stage. Of the three Nash Equilibria, (M, C) $((T, L))$ is that which gives player 1 his/her lowest (highest) payoff. So let us devise the following strategies:

-In the first stage: play (B, R)

-In the second stage: if (B, R) obtained in the first stage, play (T, L); otherwise, play (M, C)

Then, we obtain the following payoff matrix as a function of first-period strategy:

	L	C	R
T	$(4, 3)$	$(1, 2)$	$(6, 2)$
M	$(3, 3)$	$(2, 4)$	$(4, 3)$
B	$(2, 4)$	$(1, 3)$	$(7, 5)$

There, we see that neither player 1 nor player 2 has an incentive to deviate from their prescribed strategy.

We have thus constructed a subgame perfect Nash Equilibrium with (B, R) as the outcome of the first stage.