HOMEWORK 6 (due in class April 29)

On May 6 we have Test 4 covering the content of this homework (i.e., repeated Prisoner's Dilemma game)

In the following problems assume that games considered are games of repeated Prisoner's Dilemma with one-shot payoffs of 0, 1, 3 and 5 and "w=1" (i.e., take an average per-period payoff).

Problem 1.
Consider the following strategy "Tit for Two Tats" (TF2T): Cooperate in periods 1 and 2. Thereafter defect in any period k>2 if and only if your opponent defected in k-1 and k-2. Consider the best response strategies to TF2T. How many such strategies can you list? Can you construct two strategies, j and k, such that both of them are the best responses to TF2T and (TF2T, j) is in Nash equilibrium while (TF2T,k) is not?

Problem 2.
Recall the strategy "Virgin" (V): V defects unconditionally in the first ten periods and then from period eleven on (1) V cooperates unconditionally if and only if the opponent cooperated in all ten initial periods, and (2) defects unconditionally otherwise. Consider the best response strategies to V. How many such strategies can you list? Can you construct two strategies, j and k, such that both of them are best responses to V and (V,j) is in Nash equilibrium while (V,k) is not? Can you make a general observation from your conclusion here?

Problem 3.
Recall the strategy "Casanova" (C): C cooperates unconditionally in the first fifteen periods and then from period sixteen on it defects unconditionally. Consider what would be the best response strategies to C? How many such strategies can you list? Can you construct two strategies, j and k, such that both of them are best responses to C and (C,j) is in Nash equilibrium while (C,k) is not?

Problem 4.
Can you construct two strategies, i and j, such that the pair of strategies (i,j) is in Nash equilibrium and $u(i,j) < 1$ (in terms of an average per period payoff). Why, why not?