Game theory exam 19.11. 2012/Kultti

1. Construct a 2x2 stage game such that i) there is a Pareto-optimal outcome that is not a Nash-equilibrium, ii) if the game is played twice the Pareto-optimal outcome is not played in either period/stage, and iii) if the game is played thrice (three times) then there exists a Nash-equilibrium where the Pareto-optimal outcome is played in the first period/stage.

2. Consider a symmetric two-player strategic form game where both players have three actions. Determine the pay-offs such that no action dominates another action but there exists a mixed strategy that dominates at least one action.

3. There is a circular plate of radius $r>0$ and two players. The players have an unlimited number of titanium balls of radius $0<R<r$. Player-1 first places a ball on the plate, then player-2, then player-1, and so on in turns until the a player cannot place a ball on the place without moving other balls on the plate. The winner is the player who can place the last ball on the plate. Is there a strategy that guarantees a victory to one of the players?

4. In ultimatum game two players have to divide 10 euros. The rules are such that player *1* makes a proposition about the division, and player *2* either accepts or rejects. In the first case the division is implemented. In the latter case both players get zero. i) Determine a subgame perfect equilibrium of the game. ii) Determine a Nash-equilibrium different from the equilibrium in i).