Exercises from lecture 8 (non-cooperative game theory) TEK5010 Multiagent systems 2020

Question 1

The following payoff matrix (A) is for the "Prisoner's dilemma".

		j	
		Defect	Coop
i	Defect	2,2	4,1
	Coop	1,4	3,3

The following payoff matrix (B) is for the "Matching pennies".

		j	
		Heads	Tail
i	Heads	1,-1	-1,1
	Tails	-1,1	1,-1

The following payoff matrix (C) is for the "Battle of the sexes".

		j	
		Opera	Football
i	Opera	3,2	0,0
	Football	0,0	2,3

a) For each of these payoff matrices:
   i. Identify all (pure strategy) Nash equilibriums
   ii. Identify all Pareto optimal outcomes
   iii. Identify all outcomes that maximize social welfare

b) What is Nash's theorem?

c) What is the mixed strategy Nash equilibrium in each of these games? Comment on your findings in relation to the pure strategy Nash equilibrium of a).