	a	b	c
A	3,2	5,0	2,2
B	2,2	4,4	1,2
C	1,2	0,2	2,3

P1

a) (5 points) Is it possible for B and b to be played forever, in a subgame perfect equilibrium, even though (B; b) is not a Nash equilibrium in the payoff table above, if δ = 0?

Clearly the column player has no incentive to deviate. We only need to check the row player. EU(A) = 5 + 2δ + … = 3 + 2/(1-δ) = 5 if δ=0. The EU(B) = 4/(1-δ) = 4 if δ=0. Hence, (B,b) is not a NE.

b) (5 points) Define a grim trigger strategy for this game.

Row player: Play B as long as the column player played b in the previous period. Play A until forever if the column player played a or c in any period in the past.

Colmn player: Play b as long as the row player played B in the previous period. Play c until forever if the row player played A or C in any period in the past.

c) (5 points) Reconsider part a) if δ = 0:9:

EU(A) = 3+2/.1 = 23 , EU(B) = 4/.1=40 Hence, (B,b) always is a NE.

d) (10 points) What is the minimum value of δ needed to sustain cooperation?

4/(1-δ) > 3+2/(1-δ) --> δ > 1/3

P2

a) (10 points) Is it possible to have B,b as part of a SPNE in the first round of a 2-round game?1 Why or why not?

The NE in the second round is either (A,a) or (C,c).

We can add (3,2) or (2,3) to each cell to evaluate if (B,b) could be a NE in the first round. Doing so yields a NE of (A,a) or C,c) still. Hence (B,b) cannot be a part of a SPNE in the first round. Also, this is quite obvious since row player always has the incentive to deviate to A in the first round and the column player also could deviate to c.

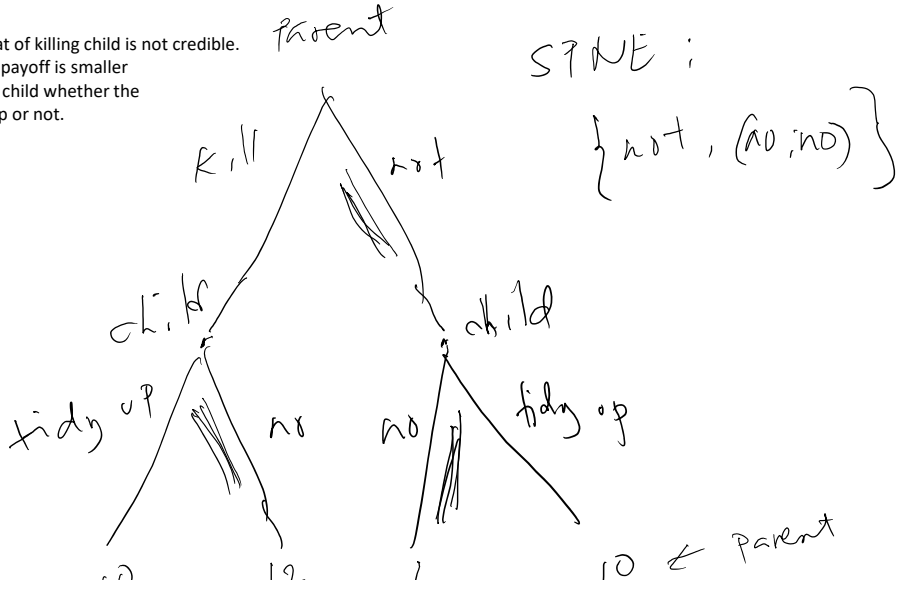
		Player 2		
		a	b	c
Player 1	A	3,2	5,0	1,1
	B	2,2	4,4	1,5
	C	1,2	0,2	2,3

b) (15 points) Is it ever possible to have B,b as part of a SPNE in the first round of a multi-round game?

Why or why not?

No. The only way for B,b to be part of SPNE in the first round is when we have an infinitely repeated game. A finite game would always result to the one-shot NE, which is either (A,a) or (C,c) in the final period, and results to the one-shot NE in the second to the last period, and so on all the way to the first period.

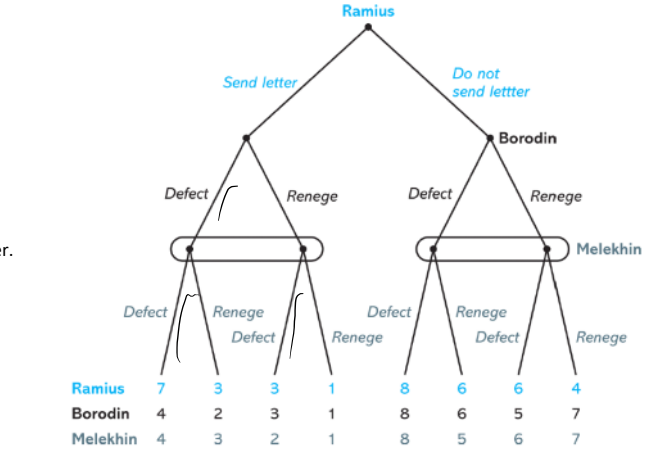
P3. The threat of killing child is not credible. The parent's payoff is smaller if he kills the child whether the child tidies up or not.

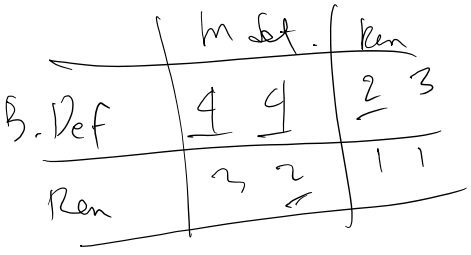


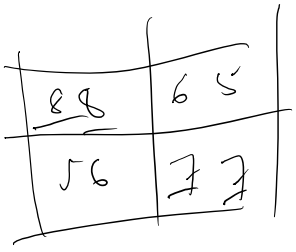
P4

a. SPNE: { (send letter, B defect, M defect),
(do not send letter, B defect, M defect),
(do not send letter, B renege, M renege) }

b. Ramius would send letter because he is getting a payoff of 7 for sure compared to a gamble between 8 and 4 if he does not send letter.







P5

x/(1-δ) > 5+ 2δ +2δ^2 + … = 3 + 2/(1-δ)

(x-2)/(1-δ) > 3 --> x > 3(1-δ) + 2

x> 3*(1-.7) + 2 = 2.9
X > 2.9

		Player 2	
		c	d
Player 1	C	x,x	1,5
	D	5,1	2,2