Problem 1

1. If I could not engage in price discrimination, I would charge at the price of $50 since if I charge at the price of $20, my profit would be ($20 - $5) * 2 = $30 which is smaller than the profit, ($50 - $5) = $45, if I charge at the price of $50. I would earn a profit of $45 because ($50 - $5) + $0 = $45.

2. If I could engage in price discrimination, I would charge Joseph at the price of $50 and charge Monique at the pricce of $20. I would earn a profit of $60 because ($20 - $5) + ($50 - $5) = $60.

Problem 2

1. Yes, Astounding has a dominant strategy to choose a medium advertising budget.

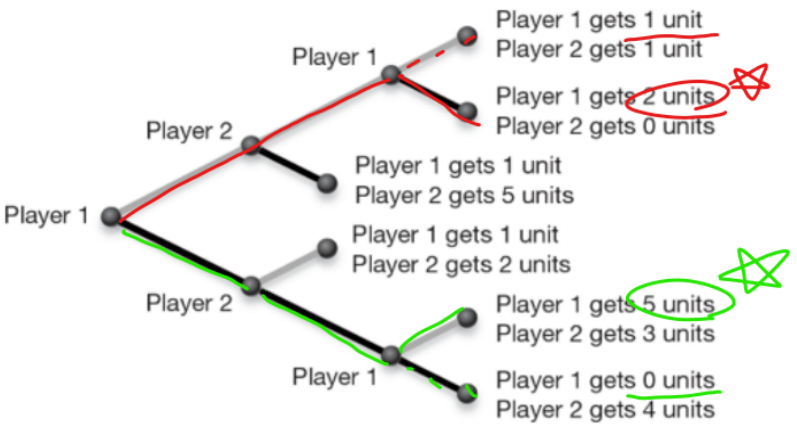
2. No, Broadcast does not have a dominant strategy.

3. No. Since Broadcast does not have a dominant strategy, there isn't a dominant equilibrium in this game.

4. Yes, the Nash equilibrium is when both choose medium advertising budget.

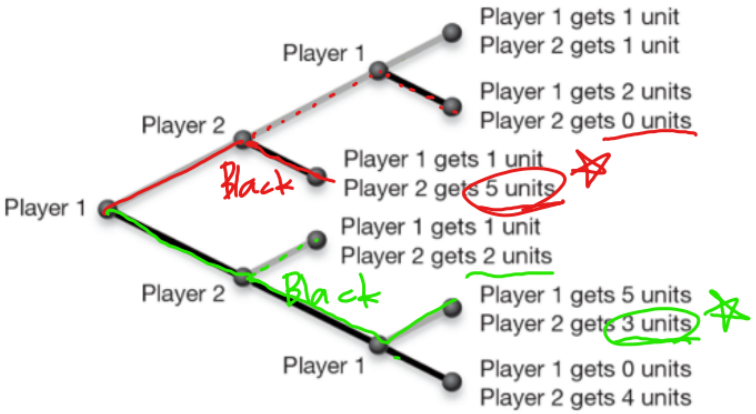
Problem 3

1.
    a. Player 1 would choose black because he would get 2 units if he chose black but only 1 unit if he chose gray. (routes in red)
    b. Player 1 would choose gray because he would get 5 units if he chose gray but 0 units if he chose black. (routes in green)



2.

a. Player 2 would choose <u>black</u> because if player 2 chose black he would get 5 units; but if player 2 chose gray then he knows that player 1 would choose black which results in player 2 getting 0 units. (route in red)
b. Player 2 would choose <u>black</u> because if player 2 chose gray he would get only 2 units; but if player 2 chose black then he knows that player 1 would choose gray which results in player 2 getting 3 units. (route in green)



3. Player 1 would choose <u>black</u> because if player 1 chose gray, player 2 would choose black, thus resulting in player 1 getting 1 unit; but if player 1 chose black, player 2 would choose black, and then player 1 would choose gray, thus resulting in player 1 getting 5 units. Since 5 units is larger than 1 unit, player 1 would choose black in his first move.

4. The path of equilibrium is for the first move <u>player 1 choose black</u>; for the second move <u>player 2 choose black</u>; and for the third move <u>player 1 choose gray</u>.

Problem 4

1.

price for (Low, Low): 9 - (2 + 2) = 5 -> each firm's payoff: (10, 10)
price for (Low, High): 9 - (2 + 3) = 4 -> each firm's payoff: (8, 12)
price for (High, Low): 9 - (3 + 2) = 4 -> each firm's payoff: (12, 8)
price for (High, High): 9 - (3 + 3) = 3 -> each firm's payoff: (9, 9)

		Firm 2	
		Low	High
Firm 1	Low	(10, 10)	(8, 12)
	High	(12, 8)	(9, 9)

2.

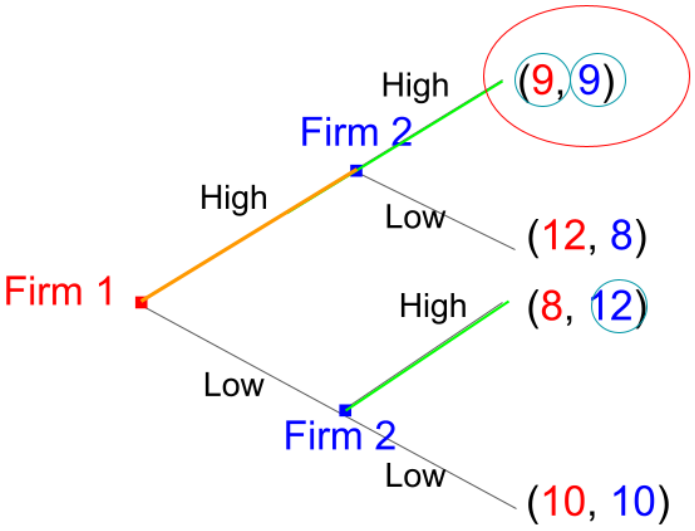
a. If Firm 2 chose "Low", Firm 1 would choose "High"; If Firm 2 chose "High", Firm 1 would also choose "High".
b. If Firm 1 chose "Low", Firm 2 would choose "High"; If Firm 1 chose "High", Firm 2 would also choose "High".

From a. and b. , we found out that Nash Equilibrium happened when both firms choose high using the graph we have below.

		Firm 2	
		Low	High
Firm 1	Low	(10, 10)	(8, 12)
	High	(12, 8)	(9, 9)

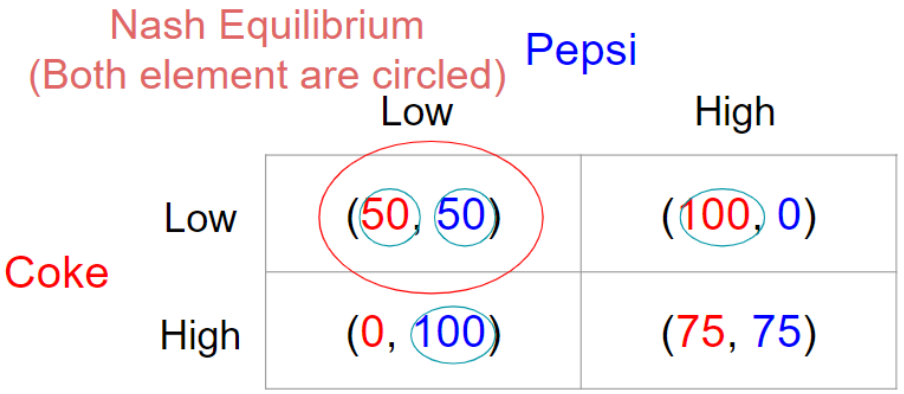
Nash Equilibrium
(Both element are circled)

3. No. From backward induction, we first consider Firm 2's decision (using green lines) when Firm 1 chose "High", which would result in Firm 2 choosing "High"; when Firm 1 chose "Low", Firm 2 would choose "High". We then get the two residual results which are (High, High) and (Low, High) for Firm 1 to choose from (using orange line). Firm 1 would choose (High, High) since it would earn 9 instead of 8 if he chose (High, High) rather than (Low, High). Thus, we get the same result of choosing (High, High) even if the game was played sequentially. There is no first-mover advantage.

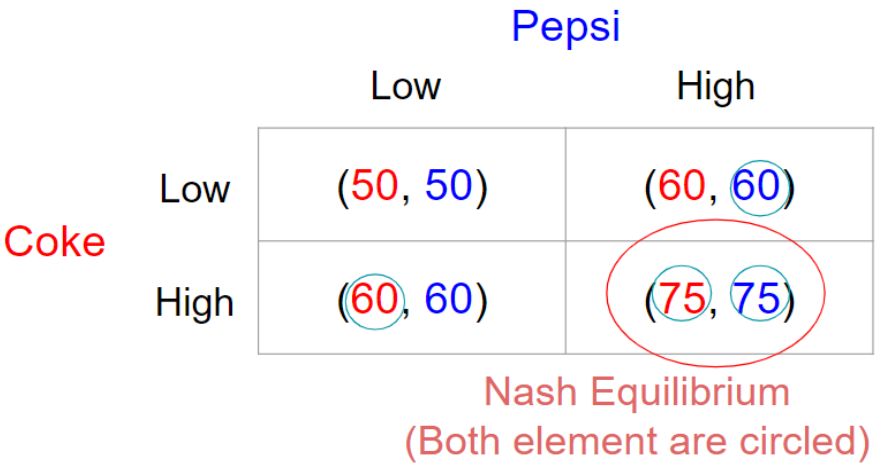


Problem 5

1. The Nash Equilibrium occurs when both Coke and Pepsi choose to sell at a lower price, which gives them the profit of $50 for each. From the payoff matrix below, we could see that there is a Nash equilibrium when the two companies produce at (Low, Low), where the payoff for each company couldn't be better off if the other company didn't change its choice.



2. The Nash Equilibrium of having 20 loyal customers for each firm is when both Coke and Pepsi choose at a higher price, which gives them the profit of $ 75 for each.



Problem 6

1. When (Q = 10, Q = 10), the profit would be (10 * 125, 10 * 125)
   When (Q = 10, Q = 20), the profit would be (10 * 75, 20 * 75)
   When (Q = 20, Q = 10), the profit would be (20 * 75, 10 * 75)
   When (Q = 20, Q = 20), the profit would be (20 * 50, 20 * 50)

		B	
		Q = 10	Q = 20
A	Q = 10	(1250, 1250)	(750, 1500)
	Q = 20	(1500, 750)	(1000, 1000)

2. There is a dominant equilibrium at (Q = 20, Q = 20), so if the two country produce simultaneously and without consulting each other, they would both choose to produce 20 and each earn the profit of 20 * 50, which is $1,000.

		B	
		Q = 10	Q = 20
A	Q = 10	(1250, 1250)	(750, 1500)
	Q = 20	(1500, 750)	(1000, 1000)

3. We could see from the graph above that if both countries produce 10, which is the (Q = 10, Q = 10), each country would earn a profit of 1250, which is a higher profit for both compared to producing at (Q = 20, Q = 20).

4. Both countries will have an incentive to cheat and produce 20 instead of 10. For country A, if it changes to produce 20 instead of 10, its profit would increase $250 (1500 - 1250); For country B, if it changes to produce 20 instead of 10, its profit would also increase $ 250 (1500 - 1250). So both countries will have an incentive to produce 20 instead of 10 when the current situation is both producing 10.