Alex Johnson
CS 581
I pledge my honor that I have abided by the Stevens honor system.

Assignment 4

1a.

		Player 2 H	Player 2 F
Player 1	H	7,7	0,3
	F	3,0	4,4

1b. There is no dominent strategy in this situation. This is because each player relies on the other's choice in order to get the best reward. If a player is going to hunt, the other player gains the most from hunting as well. If a player will forage, the other gains the most from foraging with them.

1c. There is a pure nash equilibrium at H,H and F,F because each player benefits the most from making the same decision as the other player.

2a.

		Player 2 T	Player 2 A
Player 1	T	-1, -1	-4,0
	A	0,-4	-3, -3

2b. One player has a strictly dominant strategy because alternate always provides the greatest reward. If the other player is going to choose TCP, it benefits most to choose an alternative. If the other player chooses alternate, then it benefits most to choose alternate as well.

2c. There is a nash equilibrium at A,A because both players benefit the most from choosing the alternative method.

3a.

		Player 2 Sw	Player 2 St
Player 1	Sw	0,0	-10,+10
	St	+10,-10	-50, -50

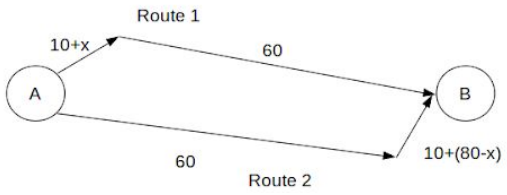
3b. The dominant strategy in this game is to go straight. This is because if the other player swerves then you gain from going straight. If the other player is going to go straight you should still go straight because even though you will lose a lot, you both lose the same amount keeping it tied.

3c. There is a nash equilibrium as (St, St) because both players going straight gives the most benefit. Straight is the best response to straight.

4.

Player 1 \ Player 2	Rock	Paper	Scissor	Lizard	Spock
Rock	0,0	-1,1	1,-1	1,-1	-1,1
Paper	1,-1	0,0	-1,1	-1,1	1,-1
Scissor	-1,1	1,-1	0,0	1,-1	-1,1
Lizard	-1,1	1,-1	-1,1	0,0	1,-1
Spock	1,-1	-1,1	1,-1	-1,1	0,0

5a.



5b. R1(80) = 10 + 80 + 60 = 150 minutes

5c/d. The nash equilibrium value of x would be 40. This is because if you have 2 cars for example, if 1 car chose to take route 1 it would make sense to choose route 2 because it would be 1 minute faster without any cars. The idea is that each car would choose the route which would currently be less time (by 1 minute) and then drive that road, making it even with the other. Each car would drive for 110 minutes and the drive time of all cars would be 110 * 80 which is 8800 minutes.

5e. R3(80) = (80 + 10) + 0 + (80 + 10) = 180 minutes
5f. R4(80) = 60 + 0 + 60 = 120 minutes
5g. Nothing would happen to the total travel time because it would still be the most efficient if 40 cars took route 1 and 40 cars took route 2. The two new routes would not be used due to inefficiency.
5h.

Route 1: 20 cars = 20 + 10 + 60 = 90	Total Travel Time = 90 * 20 = 1800
Route 2: 20 cars = 20 + 10 + 60 = 90	Total Travel Time = 90 * 20 = 1800
Route 3: 20 cars = 20 + 10 + 20 + 10 = 60	Total Travel Time = 60 * 20 = 1200
Route 4: 20 cars = 120	Total Travel Time = 120 * 20 = 2400
	Total Time = 7200 minutes

- This reduced the total travel time by spreading out the cars between the routes and reducing X in each of the routes.

6a. Your firm should submit a bid at the value of the good C. The reasoning for this is if you win the good at C then you gain nothing but lose nothing because you value it at the same price you purchased it at. However you are in a second-price auction so hopefully you buy it for less than its value C because the price becomes that of the second highest bid.

6b. The more bidders that show up the higher the price of the good so you would need to bid higher so that the next bid under you is at most the value of the good.

7a. The value of 6/4 can be calculated as follows…
Both bid on the same value: Probability ¼
1 and 1: ¼
3 and 3: ¼
Both bid seperate values: Probability ½
1 and 3: 2/4
3 and 1: 2/4

If you total all these probabilities together you get 6/4 which is what they would expect their revenue to be.

7b. This case of three bidders gives 8 possibilities. The combination (3,3,3) gives the revenue of 0. Therefore 7 situations yield revenue so, R = ⅛ * (1 * 7 + 3) = 10/8

7c. Changing the number of bidders decreases the revenue because the lowest bid becomes the revenue of the good. Only when all the bids are the same and highest that the winner gets the total revenue out of the good.