HW3

Answers for 1. (A) no liability

		motorist	
		no care	due care
pedestrian	no care	(-30 ,0)	(-30 , -10)
	due care	(-40 ,0)	(-20 ,-10)

strict liability

		motorist	
		no care	due care
pedestrian	no care	(0 ,-30)	(0 , -40)
	due care	(-10 ,-30)	(-10 ,- 20)

negligence with contributory negligence

		motorist	
		no care	due care
pedestrian	no care	(-30 ,0)	(-30 , -10)
	due care	(-10 ,-30)	(-20 ,-10)

(B) (no care, no care) efficient, (no care, no care) efficient, (due care, due care) efficient. The intuition for the efficiency is that the cost of care is too high, and the reduction of accidents is not sufficient to justify the cost.

2. game matrix

		player 2	
		head	tail
player 1	head	(100 ,-100)	(-50, 50)
	tail	(-50, 50)	(100 ,-100)

mixed strategy: player one chooses probability $p, 1-p,$ player two chooses probability $q, 1-q.$

The equilibrium is determined by two equations

$$100q - 50(1-q) = -50q + 100(1-q)$$

$$-100p + 50(1-p) = 50p - 100(1-p)$$

Solution is $p = q = 0.5.$

3. (A) if the motorist exercises no care, the expected payoff (in money terms) to the motorist is $120 - 100 = 20$. While if he exercises due care, the expected payoff is $120 - 10 - 10 = 100$ which is better than 20. Strict liability in unilateral model

		motorist	
		no care	due care
pedestrian	no care	(0 ,20)	(0 , 100)
	due care	(-10 ,20)	(-10 ,100)

(B) (no care, due care) is the Nash equilibrium. The efficient outcome is (no care, due care). In this model, strictly liability will produce efficient outcome.

(C) The intuition is only the motorist has an incentive problem in the unilateral model.

4. Then payoff when the motorist exercises due care is $0.1\sqrt{120-110} + 0.9\sqrt{120-10} = 9.7555$. The payoff from no care is $\sqrt{120-100} = 4.4721$. In this case, the motorist will exercise due care as the expected utility of due care is higher. The Nash equilibrium is (no care, due care).

		motorist	
		no care	due care
pedestrian	no care	(0 ,4.4721)	(0 , 9.7555)
	due care	(-10 ,4.4721)	(-10 ,9.7555)

5. (A) If the motorist is risk neutral, the expected payoff from exercising due care is (in money terms) $120 - 85 - 10 = 25$. The payoff from no care is $120 - 100 = 20$. Thus a risk neutral motorist will exercise due care under strict liability. The pedestrian however will exercise no care, and this is a Nashe equilibrium.

strict liability in unilateral model with a risk neutral motorist (has incentive for due care)

		motorist	
		no care	due care
pedestrian	no care	(0 ,20)	(0 , 25)
	due care	(-10 ,20)	(-10 ,25)

(B) The expected utility of exercising no care is still $\sqrt{120-100} = 4.4721$. The expected utility of exercising due care is $0.85\sqrt{120-110} + 0.15\sqrt{120-10} = 4.2611$ which is now lower than that of no care. In this case, the strict liability system does not induce the motorist to take due care when the risk aversion effect is taken into consideration. The Nash equilibrium in this case is (no care, no care)

strict liability in unilateral model with a risk neutral motorist (no incentive for due care)

		motorist	
		no care	due care
pedestrian	no care	(0 ,4. 472 1)	(0 , 4. 261 1)
	due care	(-10 ,4. 472 1)	(-10 ,4. 261 1)