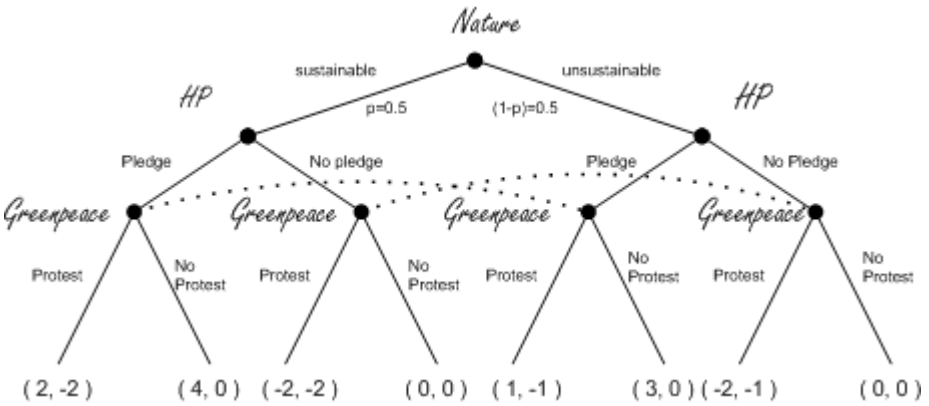
Quiz #2. EPA2142 Policy and Decision Models
Use additional paper as provided. Sign all sheets with name and student number.

Hewlett-Packard is considering signing a sustainability pledge to recycle consumer electronics. Only the top management knows for sure whether the company currently follows sustainability practices or not. Greenpeace is considering protesting HP headquarters in Europe, and would prefer to protest against an unsustainable company, and to use their protests to prompt sustainable companies to recycle.



Questions

1. What does HP know and not know according to the game tree (2 points)?
2. What does Greenpeace know and not know according to the game tree (2 points)?
3. Enumerate the strategies for both HP and Greenpeace (2 points).
4. Describe the strategies choosen by each player across all strategies in the normal form game (1 point).
5. Quantify the pay-off matrix of the normal form game (1 point).
6. Identify pure strategy equilibria if they exist. You may eliminate weakly dominated strategies (1 point).

This game is known in the literature as a "signalling game"

1. HP knows whether they are a sustainable company.
2. Greenpeace knows whether HP has pledged. Greenpeace does not know whether HP is a sustainable company.
3. The strategies are as follows.

   Strategies for HP
   a. HP can pledge always.
   b. HP can pledge if Nature is sustainable; or HP does not pledge
   c. HP can pledge if Nature is unsustainable; or HP does not pledge
   d. HP can never pledge

   Strategies for Greenpeace
   a. Greenpeace can always protest.
   b. Greenpeace can protest if HP signs pledge, otherwise not.
   c. Greenpeace can protest if HP does not sign pledge, otherwise not.

d. Greenpeace can never protest.

Question 4. Another way of phrasing this question is to ask which outcome nodes are actually reached by the play of the strategies. The point of the question is that the conditional strategies of the players are actualized as they respond to the choices of the opponent.

		Greenpeace			
		A	B	C	D
HP	A	Pledge, Protest	Pledge, Protest	Pledge, No Protest	Pledge, No protest
	B	(Pledge, No Pledge), Protest	(Pledge, No Pledge), (Protest, No Protest)	(Pledge, No Pledge), (No Protest, Protest)	(Pledge, No Pledge), No protest
	C	(No Pledge, Pledge), Protest	(No Pledge, Pledge), (No Protest, Protest)	(No Pledge, Pledge), (Protest, No Protest)	(No Pledge, Pledge), No protest
	D	No Pledge, Protest	No Pledge, No Protest	No Pledge, No Protest	No pledge, No Protest

Question 5.

		Greenpeace			
		A	B	C	D
HP	A	(1.5, -1.5)	(1.5, -1.5)	(3.5, 0)	(3.5, 0)
	B	(0, -1.5)	(1, -1)	(1, -0.5)	(2, 0)
	C	(-0.5, -1.5)	(0.5, -0.5)	(0.5, -1)	(1.5, 0)
	D	(-2, -1.5)	(0, 0)	(0, 0)	(0,0)

Question 6.

		Greenpeace			
		A	B	C	D
HP	A	(1.5, -1.5)	(1.5, -1.5)	(3.5, 0)	(3.5, 0)
	B	(1, -1.5)	(1, -1)	(2, -0.5)	(2, 0)
	C	(1, -1.5)	(0.5, -0.5)	(1.5, -1)	(1.5, 0)
	D	(0, -1.5)	(0, 0)	(0, 0)	(0,0)

HP strategies B, C and D are dominated by HP A.
Greenpeace strategies A, B and C are dominated by D.

Question 6.
The pure strategy Nash equilibrium is that HP always signs, and Greenpeace never protests. This is a very clear equilibria, but it need not be the case. It would be interesting to experiment with different payoffs, perhaps by parameterizing the values.

Question 7. The game would converge on the right-hand side of the tree. However, HP pledging and Greenpeace protesting is also a Nash equilibria of this subgame, so nothing would change.