Game Theory for Business

Study Questions

Chapter 2: Overview

1. What are the key differences among Decision Analysis, Real Options, and Game Theory? Discuss the suitability of each method of analysis to various situations.
2. Provide examples of industries or settings where the three methods of analysis (Decision Analysis, Real Options, and Game Theory) might apply, and discuss why.
3. Identify and contrast the three dimensions of game situations outlined in the text. Provide an example of each, from the business world or from personal experience, and explain how the examples fit into one (or possibly more) of the three types of game situations.

Chapter 3: Dynamic Framing

4. Identify and describe the three components of background assessment and scoping.
5. What typically distinguishes *key players* from *other players* in a Strategic Gaming model? And why?
6. Explain how uncertainties are treated by Strategic Gaming. Is this approach the same as that used in traditional Decision Analysis? If it differs, then how and why does it differ?

Chapter 4: Strategy Evaluation

7. What is the assumption of economic rationality, and how is it relevant to Game Theory and Strategic Gaming? Do you think that this assumption holds? Why or why not? And what are the implications for Strategic Gaming?

   The following are game theory exercises related to the chapter:

8. Please refer to Figure 1 below for this question. What is the sub-game perfect equilibrium? Why? What implications might you draw from this? Does the result seem optimal? Does it seem a likely result in the real world?

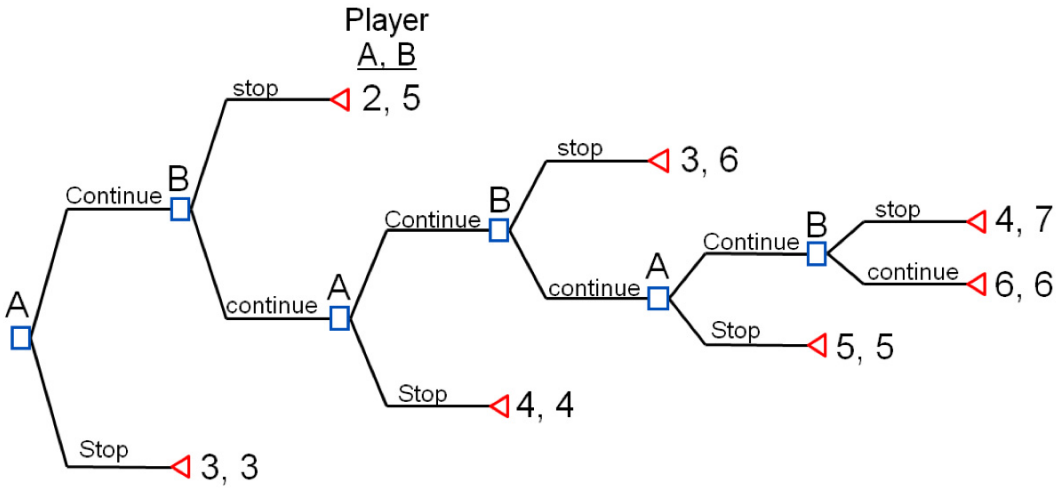

Figure 1: The Centipede Game.

9. Please refer to Figure 2 below for this question. What is the sub-game perfect equilibrium? Why? What implications might you draw from this? Does the result seem optimal? Does it seem a likely result in the real world? *Note: the Chain Store Paradox was one of Reinhard Selten's contributions – Selten shared the Nobel Prize with John Nash and John Harsanyi.*

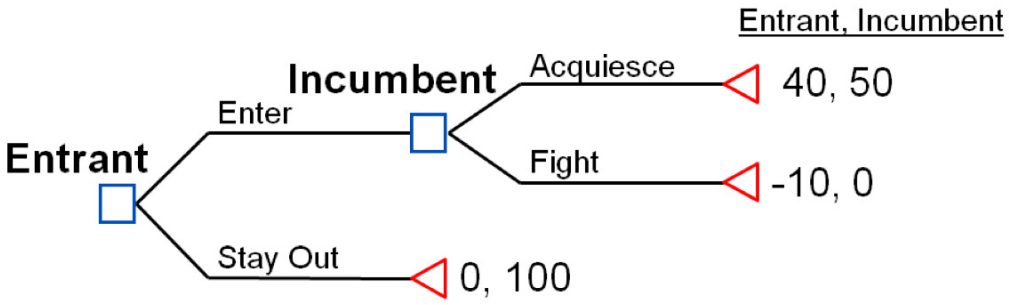

Figure 2: The Chain Store Paradox.

10. Please refer to Figure 3, Figure 4, and Figure 5 below for this question. Find the pure strategy equilibria for each game. What intuitions would you draw?

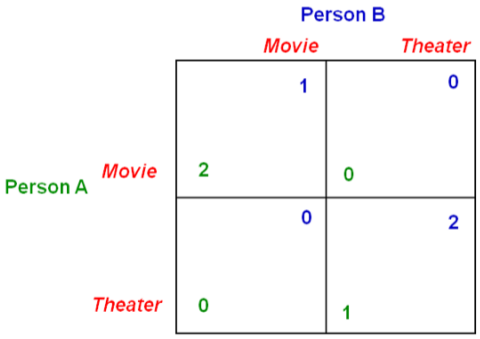

Figure 3.

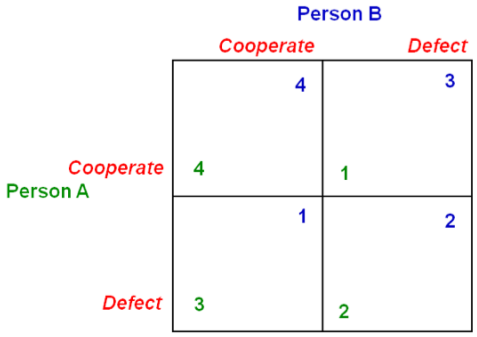

Figure 4.

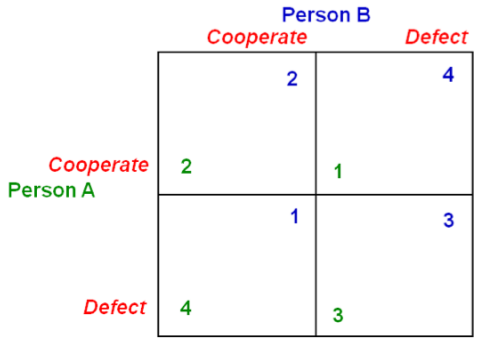

Figure 5.

11. Please refer to Figure 6 below for this question. What is the Nash equilibrium or equilibria?

Person A \ Person B	A	B	C	D	E
α	-1 4	0 3	1 -3	4 -1	0 -2
β	1 -1	2 2	3 2	0 -1	5 2
γ	1 2	-1 -1	4 0	-1 4	2 0
δ	6 1	0 -3	4 -1	1 1	4 -1
ε	0 0	4 1	1 -3	3 -2	-1 -1

Figure 6: Game in normal form with more than 2 strategies for each player (a 5 x 5 game).

12. Please refer to Figure 7 below for this question. Solve the following game between players A and B. *Hint: in some places it will first be useful to calculate expected values.*

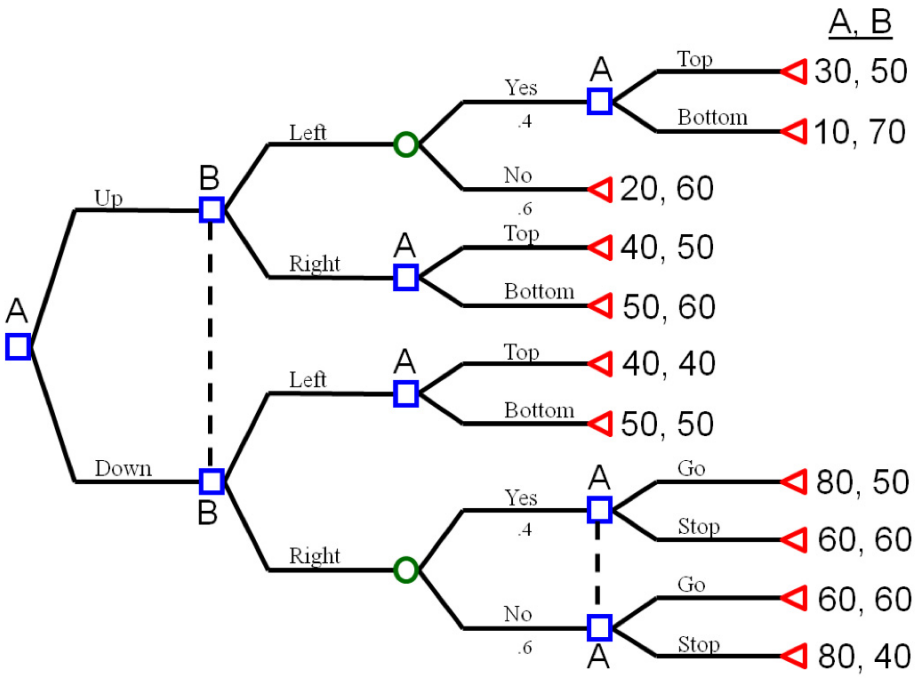

Figure 7.

13. Please refer to Figure 8 below for this question. Use backwards and forward induction where possible and draw out key intuitions of this signaling game (without fully solving game).

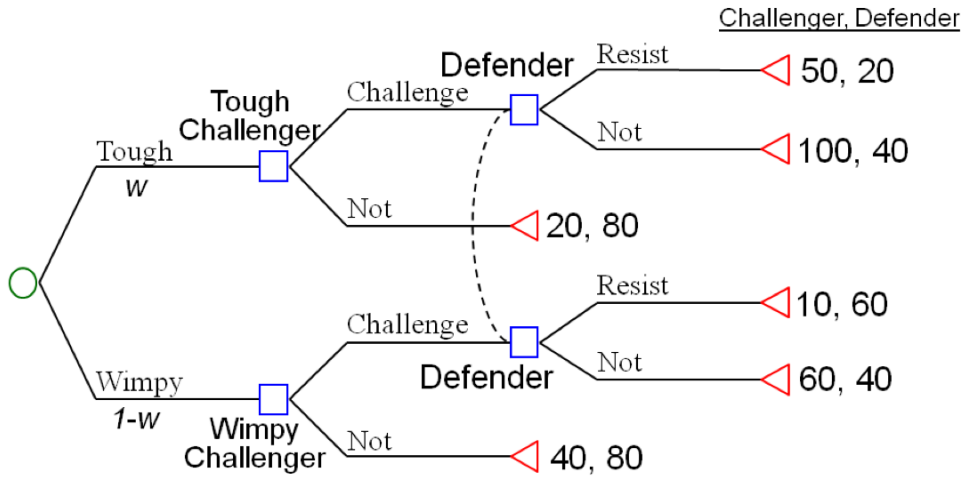

Figure 8.

14. You are driving and running a bit late for a meeting. You therefore have a strong incentive to speed so as not to incur the ill will of your boss. However, the police may also be waiting to nab you. You have a decision to make, to speed or not speed, and your expected utility is determined by whether the police are out enforcing the speed limit.
    a. Solve this first as a decision-theoretic problem where the probability that the police are present is p and where your payoffs are a_1 if you speed and the police are there, b_1 if you speed and the police are not there, c_1 if you don't speed and the police are there, and d_1 if you don't speed and the police are not there. Your preference ordering is $c_1>a_1$ and $b_1>d_1$. What should you do?
    b. With the same preference ordering for you, now consider the police as a strategic actor with payoffs a_2, b_2, c_2, and d_2 corresponding to the outcomes described. The police have preferences $a_2>b_2$ and $d_2>c_2$. What are the equilibrium strategies for the game?
    c. What do the two exercises show you? Discuss the differences in the results, if any.

Chapter 5: Execution Planning

15. Distinguish between strategy and tactics. How do the two concepts relate to one another?
16. What are the four forms of tactics described in the text? Provide a brief explanation of each form.
17. Describe several ways in which one can enhance the credibility of his or her signals and/or threats.

Chapters 6-8: Strategic Gaming in Action

18. Define the "win-win" space in the context of negotiation. How are the boundaries of this space determined?
19. In practice, we find that VOI can sometimes be a misleading concept, because it can decrease value. How is this possible?

Chapter 9: Integrating Strategic Gaming into Your Business

20. What are the seven guidelines for integrating Strategic Gaming into business practice, and why are they important?