# BAYLOR UNIVERSITY
# HANKAMER SCHOOL OF BUSINESS
# DEPARTMENT OF ECONOMICS

ECO 5315 Chapter 11 Problem Set Solutions
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2. The Ulysses Corporation and the Xenophon Company are the only producers of a sophisticated type of camera. They each can engage in either a high or a low level of advertising in trade journals. The payoff matrix is as follows:

| | | Xenophon Company: Low Level | Xenophon Company: High Level |
|---|---|---|---|
| Ulysses Corporation | Low Level | Ulysses's Profit: $12 million<br>Xenophon's Profit: $13 million | Ulysses's Profit: $11 million<br>Xenophon's Profit: $12 million |
| | High Level | Ulysses's Profit: $13 million<br>Xenophon's Profit: $12 million | Ulysses's Profit: $12 million<br>Xenophon's Profit: $11 million |

a. Will Ulysses engage in a high or a low level of advertising in trade journals?
b. Will Xenophon engage in a high or a low level of advertising in trade journals?
c. Is there a dominant strategy for each firm?

SOLUTION:

a. Since Ulysses's profits are higher if it advertises at a high rather than at a low level regardless of what Xenophon does, it will advertise at the high level.
b. Since Xenophon's profits are higher if it advertises at a low rather than at a high level regardless of what Ulysses does, it will advertise at the low level.
c. As mentioned in parts a and b, both players have a dominant strategy.

4. Two rival bookstores are trying to locate in one of two locations. The locations are near each other. Each would like to avoid a bidding war because that will drive up both of their rents. Payoffs are given in the following table:

| | | Borders | |
|---|---|---|---|
| | | **Location 1** | **Location 2** |
| Barnes and Noble | **Location 1** | 10, 10 | 60, 40 |
| | **Location 2** | 25, 55 | 20, 20 |

Does either player have an incentive to bid higher for a location? If so, by how much?

SOLUTION: First, we check for dominant strategies. Neither store has either a strong or weak dominant strategy in this game; this is readily seen by comparing Barnes and Noble's row payoffs, and Border's column payoffs. However, there are two Nash equilibria (the underlining indicates each player's "best response" to the other):

| | | Borders | |
|---|---|---|---|
| | | **Location 1** | **Location 2** |
| Barnes and Noble | **Location 1** | 10, 10 | <u>60</u>, <u>40</u> |
| | **Location 2** | <u>25</u>, <u>55</u> | 20, 20 |

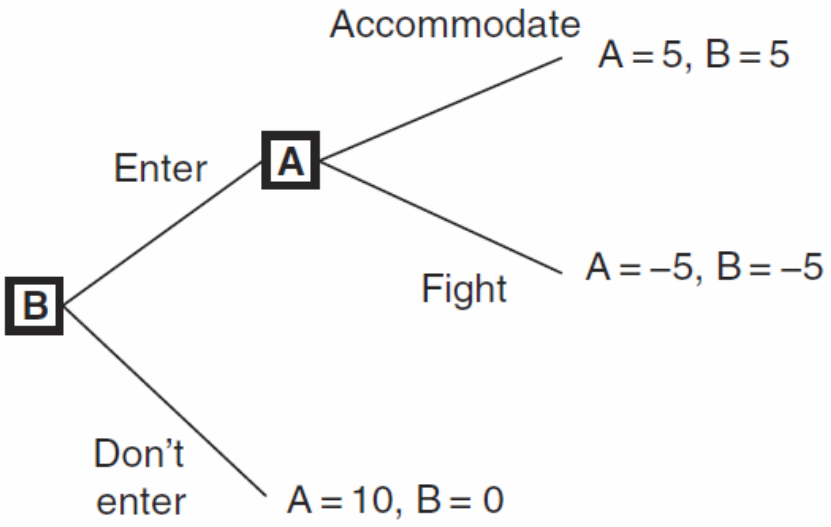
To see how we get two Nash equilibria, suppose Barnes & Noble moves first. If Barnes & Noble selects Location 1, then Borders' best response (conditional upon Barnes & Noble's selection of Location 1) is to select Location 2. Since the firms are playing their "best responses" against each other, this is a Nash equilibrium. Now suppose that Borders moves first. Then it will select Location 1, and Borders' best response is to select Location 2. This is also a Nash equilibrium. Where they end up depends upon who moves first; when one firm makes a choice, the other firm's best response is to choose the other location. Once either Nash outcome is in place, there is no incentive for either player to deviate (i.e., by bidding higher for the other location).

6. **Part 1:** Firm A currently monopolizes its market and earns profits of $10 million. Firm B is a potential entrant that is thinking about entering the market. If B does not enter the market, it earns profits of $0, while A continues to earn profits of $10 million. If B enters, then A must choose between accommodating entry and fighting it. If A accommodates, then A earns $5 million and B earns $5 million. If A fights, then both firms lose $5 million. **Draw the game in extensive form and predict the outcome.**

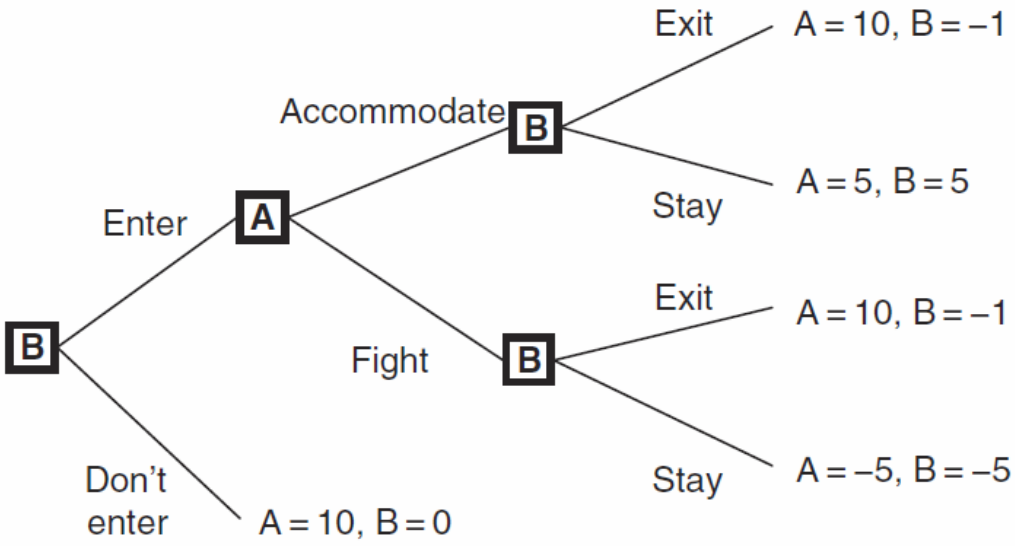
   **Part 2:** Again, consider the above game. Now, suppose the decision of B to enter is reversible in the following way. After B enters the market, and A has decided to either fight or accommodate, B can choose to remain in the market or exit. All payoffs from the above game remain the same. However, if B decides to exit the market, then B suffers a loss of $1 million, while A regains its old profits of $10 million. **Draw the game in extensive form and predict the outcome.**

SOLUTION:

**Part 1:** Firm B will enter and Firm A will accommodate.



**Part 2:** If Firm B enters, Firm A will fight, and Firm B will exit. Therefore, Firm B will not enter at all.



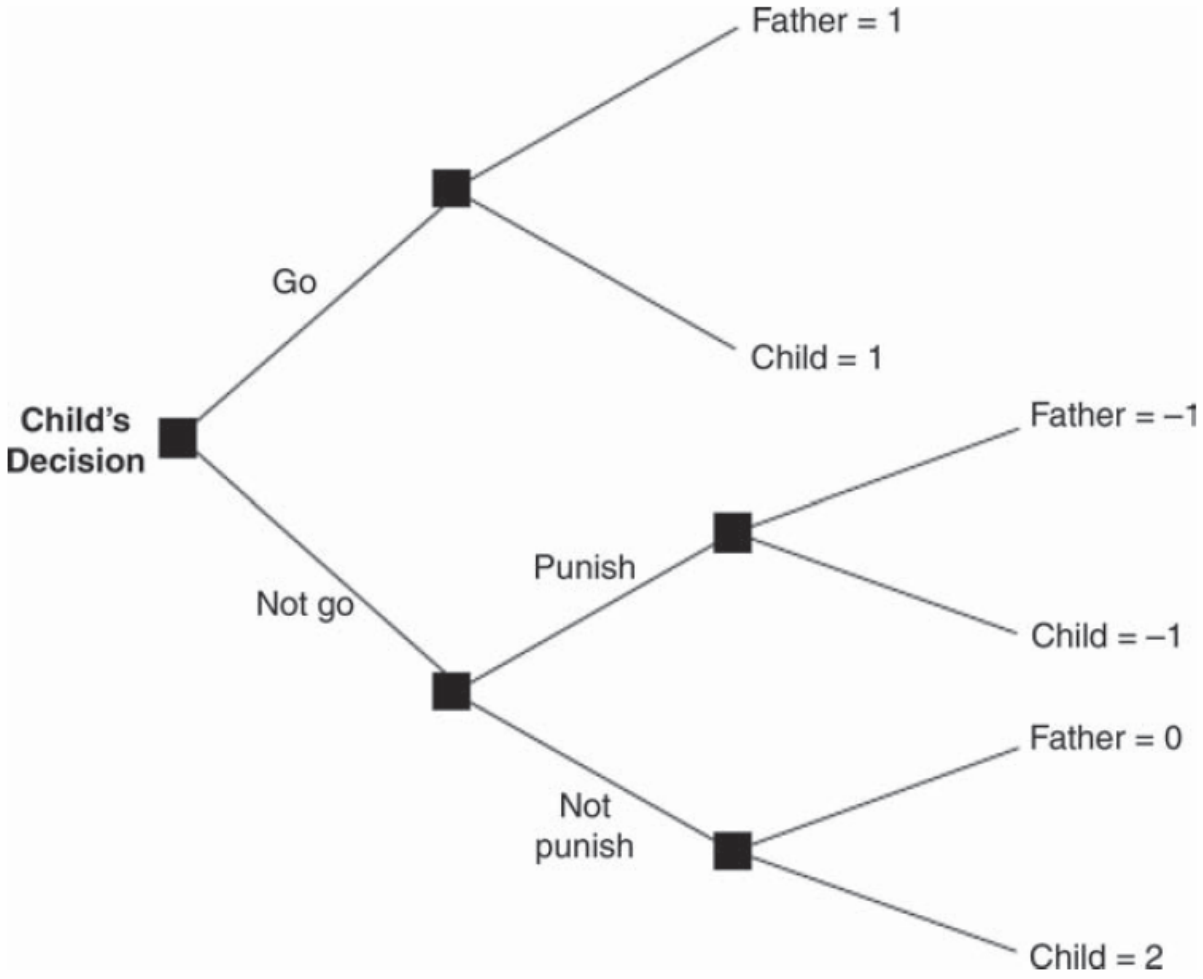

8. Consider a father who is trying to discipline his child. The father insists that the child must go with the rest of the family to visit their grandmother. The child prefers to go to the movies with a friend. The father threatens to punish the child if the child doesn't visit the grandmother. If the child goes with the family to visit the grandmother, both the child and the father receive one unit of utility. If the child refuses to go to the grandmother's house, and the father punishes the child, the child loses one unit of utility, and the father loses one unit of utility. If the child refuses to go and the father relents (does not punish), the child receives two units of utility, and the father receives none.
   a. Draw this game in matrix form.
   b. Draw this game in extensive form.
   c. Solve this game via backward induction.

SOLUTION:

a.

| | | Father: Not Punish | Father: Punish |
|---|---|---|---|
| Child: Go | | Child = 1, Father = 1 | |
| Child: Not go | | Child = 2, Father = 0 | Child = –1, Father = –1 |

b.




c. Via backward induction, the child maximizes by not going. Given that the child doesn't go, the father maximizes (in this single-period game) by not punishing.