# ACTIVITY 10.1

## The Prisoner's Dilemma

Curly and Moe are crooks. They have been caught stealing auto parts and are now sitting in separate rooms in the city jail. The district attorney is delighted to have finally caught Curly and Moe in the act of committing a crime. The DA knows that Curly and Moe are guilty not only of this crime but also several other burglaries that have occurred during the past year. She *knows* they are guilty of these crimes, but she can't prove that in court.

The DA decides to try to persuade Curly and Moe to confess by offering each of them a deal. She talks to each one separately: "I have enough on both of you to send you to jail for 2 years. But if you confess to the other robberies, which carry a 10-year sentence, you will get off with 1 year and only your partner will serve 10 years. If you both confess to the other robberies, you will both get 5 years."

Don't worry here about whether the constitutional rights of Curly and Moe are being violated or whether they would actually serve these sentences if convicted. Those are interesting and important issues, but for another course. For now, accept the five following statements:

- If Curly confesses and Moe doesn't, Curly goes to jail for 1 year and Moe for 10 years.
- If Moe confesses and Curly doesn't, Moe goes to jail for 1 year and Curly for 10 years.
- If both Curly and Moe confess, they both go to jail for 5 years.
- If neither Curly nor Moe confess, they both go to jail for 2 years.
- Both Curly and Moe want to serve as little jail time as possible.

Given this situation, answer these questions:

1. What would you do if you were Curly and you expected Moe to confess? Why?
2. What would you do if you were Curly and you expected Moe NOT to confess? Why?
3. What would you do if you were Moe and you expected Curly to confess? Why?
4. What would you do if you were Moe and you expected Curly NOT to confess? Why?
5. Under what circumstances would Curly and Moe NOT confess?

# ACTIVITY 10.2

## Dueling Gas Stations

Alex and Pat each own and operate gasoline stations across the street from each other on the edge of town, near an interstate highway. There are no other service stations in this town. They are now selling their gasoline for the same price and they both have large signs announcing their price.

1. Alex is considering raising his price because he thinks people will buy about the same amount of gasoline even if the price is a little higher. He figures that he can more than make up for the few sales he will lose with the higher price for the sales he makes. Would you advise Alex to do this? Explain your answer.

2. Pat is considering lowering her price because she thinks that she can take business away from Alex if her price is a little lower. She believes she can more than make up for the small decrease in revenue from each gallon sold by selling a lot more gallons. Would you advise Pat to do this? Explain your answer.

3. Can you think of any other actions that Pat or Alex might take to increase the profitability of her or his business?

## ACTIVITY 10.2 (Continued)

| | | Alex: High Price | Alex: Low Price |
|---|---|---|---|
| Pat | **High Price** | $1000, $1000 | $100, $1200 |
| Pat | **Low Price** | $1200, $100 | $250, $250 |

4. Consider the matrix above. The payoffs to each player are the resulting profits. In other words, if both Pat and Alex choose a high price, they both have profits of $1,000. If they both choose a low price, they both have profits of $250. Assume that as rational business owners, they both want to maximize profits. Based on the matrix, was Pat or Alex correct about what would happen if one person charged a low price and the other a high price?

5. Does Pat have a dominant pricing strategy? If so, what is it?

6. Does Alex have a dominant strategy? If so, what is it?

7. Does this problem have a Nash equilibrium? If so, what is it?

## ACTIVITY 10.3

### Split or Steal

Cut out the "Split" and "Steal" cards, and glue each of them to notecards. Label each of two envelopes "Split or Steal?" Inside each envelope should be two cards—one Split card and one Steal card.

| | |
|---|---|
| Split | Split |
| Steal | Steal |

# ACTIVITY 10.4

## Practice Problems

1. The town of Oliville has two bagel shops, J & M Bagels and Tiny Town Bagels. Both bagel shops sell a variety of bagels with several different cream cheese spreads, as well as coffee and juice. Neither store sells bagel sandwiches. Both stores are considering adding bagel sandwiches to the menu. Consider the payoff matrix below. The numbers in the matrix represent daily profits.

| | | **J & M** | |
|---|---|---|---|
| | | **Offer Sandwiches** | **Don't Offer** |
| **Tiny Town** | **Offer Sandwiches** | $500, $500 | $1200, $200 |
| | **Don't Offer** | $200, $1200 | $800, $800 |

   a. What is J & M's dominant strategy? Explain.

   b. What is Tiny Town's dominant strategy? Explain.

   c. What will J & M's daily profits be at the Nash equilibrium?

2. Coke and Pepsi are major rivals in the soft drink market, with over 70 percent of the total market. Both companies are constantly considering new strategies to increase profits. Both companies independently are considering a major new advertising campaign. If one company launches a campaign and the other doesn't, this will bring significant rewards to the company that advertises. However, advertising is expensive, and if both companies launch new ads, they will cancel each other out and hurt profits. Consider the payoff matrix below. The numbers are daily profits, in millions.

| | | **Coke** | |
|---|---|---|---|
| | | **Advertise** | **Don't Advertise** |
| **Pepsi** | **Advertise** | $450, $450 | $1000, $100 |
| | **Don't Advertise** | $100, $1000 | $600, $600 |

   a. What is Pepsi's dominant strategy? Explain.

   b. What is Coke's dominant strategy? Explain.

   c. What will the two companies most likely do? Explain.

# ACTIVITY 10.4

## Practice Problems ANSWER KEY

1. The town of Oliville has two bagel shops, J & M Bagels and Tiny Town Bagels. Both bagel shops sell a variety of bagels with several different cream cheese spreads, as well as coffee and juice. Neither store sells bagel sandwiches. Both stores are considering adding bagel sandwiches to the menu. Consider the payoff matrix below. The numbers in the matrix represent daily profits.

| | | **J & M** | |
|---|---|---|---|
| | | **Offer Sandwiches** | **Don't Offer** |
| **Tiny Town** | **Offer Sandwiches** | $500, $500 | $1200, $200 |
| | **Don't Offer** | $200, $1200 | $800, $800 |

   a. What is J & M's dominant strategy? Explain.

      *Offer sandwiches. J & M benefits from offering sandwiches if Tiny Town does ($500 > $200) or does not ($1,200 > $800).*

   b. What is Tiny Town's dominant strategy? Explain.

      *Offer sandwiches. Tiny Town benefits from offering sandwiches if J & M does ($500 > $200) or does not ($1,200 > $800).*

   c. What will J & M's daily profits be at the Nash equilibrium?

      *$500—both companies will offer sandwiches in a Nash equilibrium.*

2. Coke and Pepsi are major rivals in the soft drink market, with over 70 percent of the total market. Both companies are constantly debating new strategies in order to increase their profits. Each company is independently considering a major new advertising campaign. If one company launches a campaign and the other doesn't, this will bring significant rewards. However, advertising is expensive, and if both companies launch new ads, they will cancel each other out and hurt profits. Consider the payoff matrix below. The numbers are daily profits, in millions.

## ACTIVITY 10.4 (Continued)

| | | Coke | |
|---|---|---|---|
| | | **Advertise** | **Don't Advertise** |
| **Pepsi** | **Advertise** | $450, $450 | $1000, $100 |
| | **Don't Advertise** | $100, $1000 | $600, $600 |

a. What is Pepsi's dominant strategy? Explain.

*Advertise. Pepsi is better off advertising when Coke does ($450 > $100) and when Coke doesn't ($1,000 > $600).*

b. What is Coke's dominant strategy? Explain.

*Advertise. Coke is better off advertising when Pepsi does ($450 > $100) and when Pepsi doesn't ($1,000 > $600).*

c. What are the two companies most likely to do? Explain.

*They will both advertise because it is the dominant strategy for each company.*