Section Notes 23

Covering material from Lecture on April 18^{th}

Class Outline

1. Collusion with Constant Marginal Costs
2. Practice Noncooperative Games

1 Collusion with Constant Marginal Costs

Problem: (P&R, Chapter 12, Exercise 2a)
Consider two firms facing the demand curve $P = 50 - 5Q$, where $Q = Q_1 + Q_2$. The firms' cost functions are $C_1(Q_1) = 20 + 10Q_1$ and $C_2(Q_2) = 10 + 12Q_2$.

Suppose both firms have entered the industry. What is the joint profit-maximizing level of output? How much will each firm produce? How would your answer change if the firms have not yet entered the industry?

2 Practice Noncooperative Games

Problem: (P&R, Chapter 12, Exercise 9)

Demand for light bulbs can be characterized by $Q = 100 - P$, where Q is in millions of boxes of lights sold and P is the price per box. There are two producers of lights, Everglow and Dimlit. They have identical cost functions:

$$C_i = 10Q_i + \frac{1}{2}Q_i^2 \quad (i = E, D)$$

$$Q = Q_E + Q_D$$

a. Unable to recognize the potential for collusion, the two firms act as short-run perfect competitors. What are the equilibrium values of Q_E, Q_D, and P? What are each firm's profits?

b. Top management in both firms is replaced. Each new manager independently recognizes the oligopolistic nature of the light bulb industry and plays Cournot. What are the equilibrium values of Q_E, Q_D, and P? What are each firm's profits?

c. Suppose the Everglow manager guesses correctly that Dimlit is playing Cournot and publicly announces (commits) to a level of production, therefore making Everglow a Stackelberg leader. What are equilibrium values of Q_E, Q_D, and P? What are each firm's profits?

d. If the managers of the two companies collude, what are the equilibrium values of Q_E, Q_D, and P? What are each firm's profits?