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## Problem Set 2: More Static Game Theory

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### 1. Nash Equilibrium

For each of the games in Problem Set 1, find the all of the Nash equilibria.

### 2. Duopoly

Stephen J. Seagull and Clod VandeCamp are making movies. The amount that movie-goers are willing to pay (the revenue) to attend depends on the amount of violence  $x_i$  in the two movies:  $r_i = 1 + 2x_i - (x_i)^2 - ax_ix_{-i}$ . There is a fixed number of movie-goers who will attend the films; and  $a$  is a constant. Violence is produced at constant marginal cost  $c = 1$ , so that the total cost of  $x_i$  units of violence is simply  $cx_i = x_i$ . Both stars simultaneously determine how much violence to produce. Determine the symmetric Nash equilibrium level of violence. Notice that the constant  $a$  measures how increases in the violence of one film lowers the demand for the other film. What happens to the equilibrium level of violence as  $a$  increases?

### 3. The Challenge

Stephen J. Seagull and Clod VandeCamp once again meet in a bar. Now Stephen must decide whether or not to challenge Clod to a duel. If he does not, both get a utility of 0. If Stephen does challenge Clod to a duel, Clod must decide whether to accept the challenge or leave the bar. If he leaves the bar, he gets a utility of -1 and Stephen gets a utility of 10. If he accepts the challenge, both get a utility of -5. Draw the extensive form of this game. Find the normal form. Find all the Nash equilibria. Find all the subgame perfect equilibria.