1. Consider again the game frame of Homework 1. Player 2 values the object at $7, while Player 1 values it at $5.

(a) Suppose that Player 1 is selfish and uncaring and Player 2 is selfish and benevolent. Write the strategic form game (in the form of a table). For Player 2 use a utility function with values from the set \( \{0,1,2,\ldots,8\} \).

(b) Find all the Nash equilibria of the game of part (a)

(c) Now consider the situation where both players are selfish and benevolent. Write the strategic form game (in the form of a table). For Player 1 a utility function with values from the set \( \{0,1,2,\ldots,7\} \) and for Player 2 use a utility function with values from the set \( \{0,1,2,\ldots,8\} \).

(d) Find all the Nash equilibria of the game of part (c)

2. A pharmaceutical company has discovered a new drug, called REJUV, which is claimed to delay the aging process. There are 100 consumers who are interested in this product. The fraction \( q \) (with \( 0 < q < 1 \)) of these consumers are willing to pay up to $15 for it, while the remaining consumers are willing to pay up to $10. The pharmaceutical company is going to sell REJUV in packets to a retailer at a price of $w per packet. The retailer takes the price \( w \) as given and chooses the price \( p \) (per packet) to consumers. Every consumer buys one packet, as long as the price does not exceed the maximum price the consumer is willing to pay for it. Both the pharmaceutical company and the retailer know what has been said so far and nothing more (in particular, the retailer cannot tell if a particular consumer has a reservation price of 15 or 10). Production and retailing costs are zero (of course, \( w \) is a cost for the retailer). The objective of the pharmaceutical company and of the retailer is to maximize their own profits; the profit of the pharmaceutical company is \( wQ \) (where \( w \) is the price per packet that the retailer pays to the pharmaceutical company and \( Q \) is the number of packets sold) while the profit of the retailer is \( (p - w)Q \) (where \( p \) is the price that the consumer pays per packet).

(a) Suppose that \( w \) can only be either 3 or 5 or 8 and \( p \) can only be either 10 or 15. Suppose also that \( q = \frac{1}{10} \). Represent this as a two-player extensive game with perfect information, where the two players are pharmaceutical company and the retailer. Find the backward-induction solution.

(b) Redo the above (draw the game and find the backward-induction solution) for the case where \( q = \frac{4}{5} \) (the possible values of \( w \) and \( p \) are the same as in part a).