

Review, Final Quiz: Solutions  
Managerial Economics: Eco 685  
Quiz Date: Friday March 4 from 8 am to 10 am.

**Question 1**

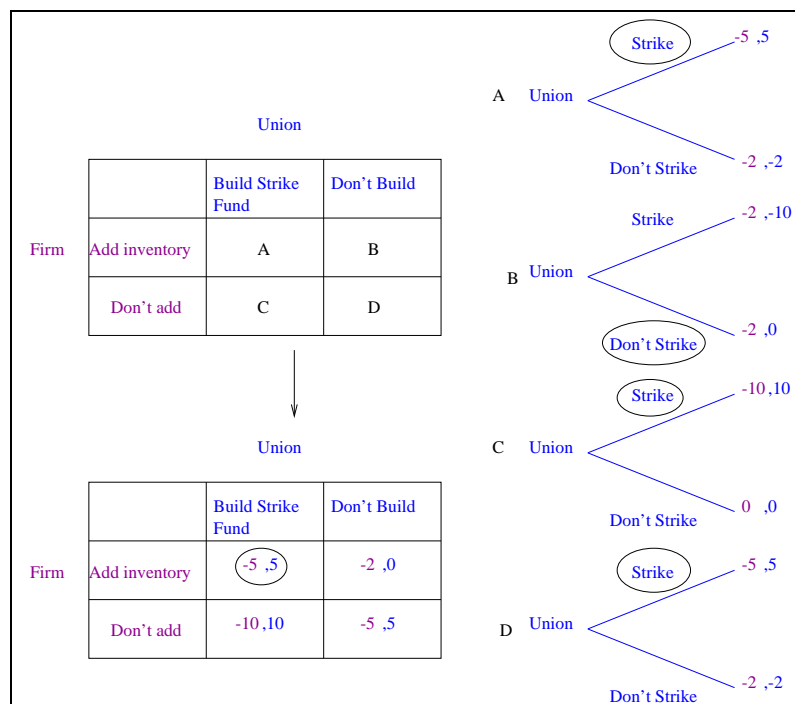
The claim was that Microsoft needed to keep prices low to deter entry, especially from sellers of pirated software.

**Question 2**

- a. Intel could add to capacity, making it cheaper to build the large number of chips necessary for a price war less expensive should NEC enter.
- b. A surety bond or similar could be used to guarantee that Company B will deliver the goods at the agreed price.
- c. Folgers could enter the West Coast market, tying up Maxwell House's resources and thus preventing Maxwell House from entering on the East Coast. Folgers could also try to line up exclusive distribution rights with suppliers and retailers. The book also argues Folgers could launch an ad campaign on the East Coast to prevent entry.
- d. The union can build a strike fund or delegate the strike decision to an agent, such as a larger union.
- e. Home Depot could move first and locate even in marginal towns, thus preventing other hardware chains from building the large number of stores required to take advantage of economies of scale.

**Question 3**

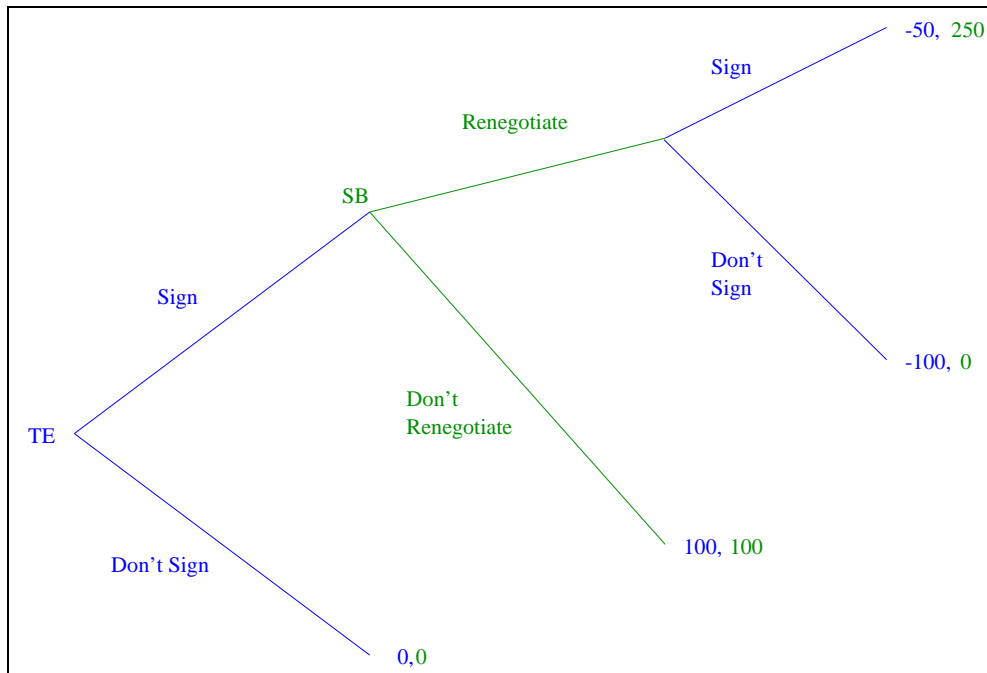
- a. For the sub game perfect equilibrium, we need to solve each sub tree starting at the end. The union moves last, with the decision to strike or not. If both the firm and union prepare for a strike (A), the union should strike ( $A1 = 5 > A2 = -2$ ). If the firm prepares for a strike but the union does not, the union is unlikely to outlast the firm and thus should not strike ( $0 > -10$ ). The best case is where the union prepares but the firm does not (C), in which case a strike is a good idea because the strike will likely be over quickly with a favorable outcome for the union ( $10 > -2$ ). Finally, if neither prepare (D) a strike is still optimal ( $5 > 0$ ). Now, working backwards, we need to find the Nash Equilibrium of the initial game. If the union predicts the firm prepares for a strike, the union should prepare (and then strike) rather than not prepare and then not strike ( $5 > 0$ ). And if the union prepares, the firm should also prepare ( $-5 > -10$ ) since the union will strike regardless. Thus the prediction is correct and the sub game perfect equilibrium for the whole game is for both sides to prepare and then for the union to strike  $(-5, 5)$ .



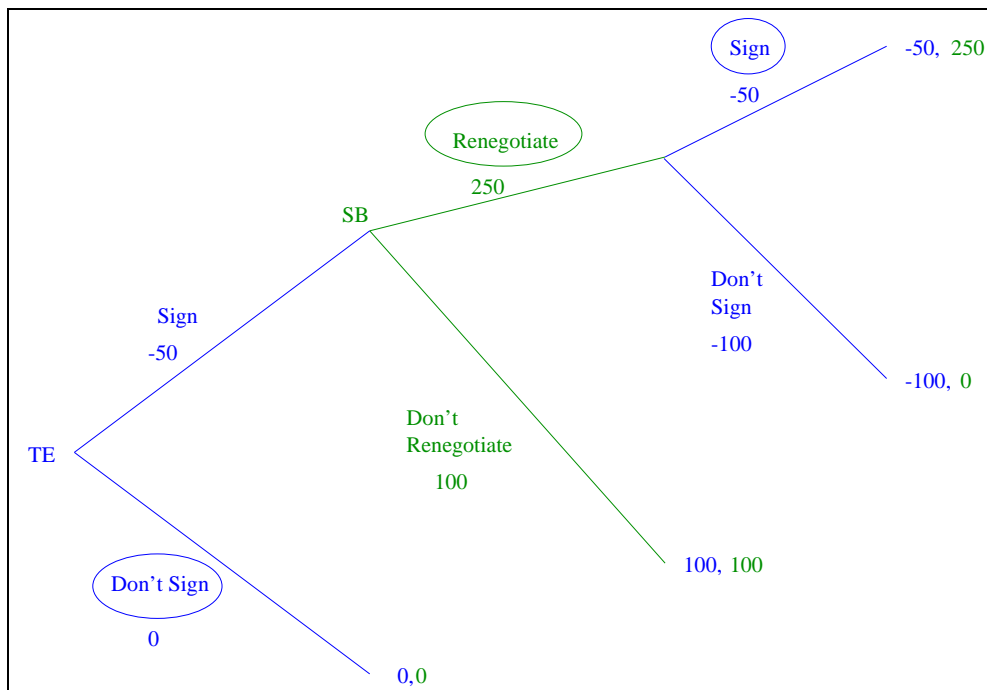
- b. No. If the union promises (non-credibly) not to strike if the firm does not prepare, then the equilibrium will be for both the union and the firm not to prepare. But then the union will strike, so the prediction that the union would not strike is incorrect.  $(0, 0)$  is not even a Nash Equilibrium for the whole game since the Nash equilibrium requires all predictions to be correct along the equilibrium path.

#### Question 4

- a. In the first move, TE can either sign or not sign. If TE chooses not sign, the game is over and both players get zero. If TE signs, the game continues so we have another sub tree. In the second sub tree, SB can either renegotiate or not. If SB chooses not to renegotiate, the game is over and SB saves  $\$300 - \$200 = \$100$  by using TE and TE makes  $\$200 - \$100$  in profits, including the cost of the facility. Notice that the problem states the facility is built before SB decides whether or not to renegotiate. If SB chooses to renegotiate, the game continues. In the third move, TE can either sign the renegotiated contract or not. If TE signs, SB saves  $\$300 - \$50 = \$250$  by using TE rather than the alternative firm. TE gets  $\$50 - \$100 = \$ - 50$  in profits, including the cost of the facility. Finally if TE does not sign, then SB must use the alternative supplier and saves nothing  $\$300 - \$300 = 0$ , and TE gets no profits and is out the cost of the facility  $0 - 100 = -\$100$ .

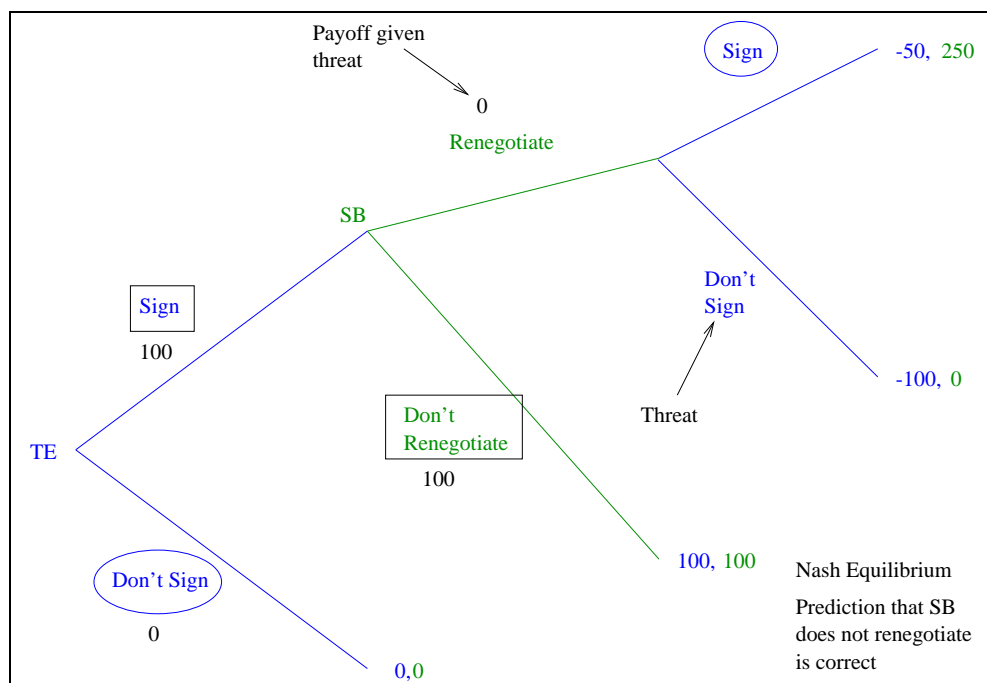


b. The first step is to find the equilibrium in each sub tree. These are circled below:



It is immediate that TE not signing the contract  $(0,0)$  in the first move is a Nash Equilibrium. TE chooses first and decides not to sign, after which the game is over. The two outcomes in which the contract is renegotiated cannot be equilibria. To get to the outcome  $(-\$50, \$250)$ , SB must renegotiate. In this case, however, TE will always choose not to sign the original contract  $(0 > -\$50)$ . Similarly, to get to the

outcome  $(-\$100, 0)$ , TE must not sign. But TE will always sign the renegotiated contract  $(0 > -\$50)$  if SB renegotiates. There is no threat SB can make to get TE not to sign the renegotiated contract because the game is over after TE signs. One can come up with a Nash where the original contract is not renegotiated  $(\$100, \$100)$ . TE can threaten not to sign the renegotiated contract, in which case SB gets 0 by renegotiating and 100 by not renegotiating and hence does not renegotiate. Then, working backwards, TE gets 100 by signing and 0 by not signing the original contract and so signs. Now we check that all predictions come true on the equilibrium path. TE signs the contract, predicting SB does not renegotiate. SB does not renegotiate based on the threat from TE. Hence TE's prediction that SB would not renegotiate comes true. SB's prediction that TE would not sign the renegotiated contract does not need to be checked because SB never renegotiates.



- c. The sub game perfect equilibrium is 0, 0. TE knows SB will renegotiate in which case TE will sign, so TE plays the smart move and does not sign. SB may promise not to renegotiate, but the promise is not credible since SB earns \$250 by renegotiating rather than \$100.
- d. The easy way to avoid the problem is to have SB pay up front. When contract enforcement is questionable, people make down payments so that the parties lose something if the contract is not fulfilled.