

HOMEWORK # 3 (for due date see web page)

Two investors have each deposited \$100 million in a bank. The bank has invested these deposits in a long-term project. If the bank is forced to liquidate the investment before the project matures, a total of \$160 million can be recovered. On the other hand, if the bank allows the investment to reach maturity, the project will pay out a total of \$300 million.

There are two dates at which the investors can make withdrawals from the bank: date 1, before the bank's investment matures, and date 2, after its maturity. If both investors make withdrawals at date 1 then each receives \$80 and the game ends. If only one investor makes a withdrawal at date 1 then that investor receives \$100, the other receives \$60, and the game ends. If neither investor makes a withdrawal at date 1 then the project matures and the investors make withdrawal decisions at date 2. If both investors make withdrawals at date 2 then each receives \$150. If only one investor makes a withdrawal at date 2 then that investor receives \$200 and the other receives \$100. Finally, if neither investor makes a withdrawal at date 2 then the bank returns \$150 to each investor. At each date the decision whether or not to make a withdrawal is made simultaneously by both investors. Each investor is selfish and greedy, that is, cares only about his own wealth and prefers more money to less.

- (a) Represent this game in extensive form.
- (b) How many proper subgames are there?
- (c) Find the pure-strategy subgame-perfect equilibria.
- (d) Convert the original extensive-form game (of part a) into a strategic-form game.
- (e) Find all the pure-strategy Nash equilibria of the game of part (d).
- (f) Are all the pure-strategy Nash equilibria subgame perfect?