

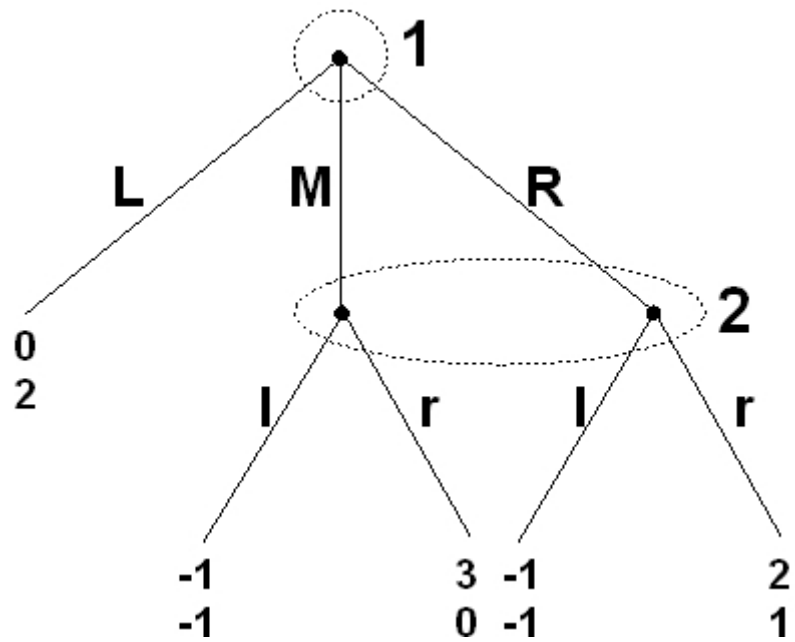
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Commitment and Information in Games

Problem Set 12

(Dynamic Games of Incomplete Information: PBNE in Finite Games)

Name: _____

12.1 Consider the following extensive form game:



a) Construct the normal form of this game and find all pure strategy NEs.

b) Find all SPNEs in pure strategies.

c) Find all PBEs in pure strategies

12.2 Consider the following relationship between a customer (C) and a bank (B). The customer is rich (t_R) with probability $\frac{1}{4}$ or poor (t_P) with probability $\frac{3}{4}$. Whether he is rich or poor is his private information. The customer first decides whether to visit the bank by bike (B) or by car (C) with a rented Porsche. He prefers to ride the bike, so using the Porsche causes him a (dis)utility of -1 . Moreover the customer thinks renting the car is too expensive, which causes an additional (dis)utility of -3 if he is poor and of -1 if he is rich. The bank observes the customer's vehicle choice and decides then whether to offer good service (G) or not (N). The bank gains 1 when offering good service to a rich customer and loses 1 when offering good service to a poor customer. Both rich and poor gain $+3$ from a good service.

a) Represent this situation as an extensive form game.

b) Why is it never optimal for the poor customer to visit the bank by car?

c) Check whether there exists a separating PBE where the rich customer drives up by car and the poor customer drives up by bike.

d) Examine whether there is a pooling PBE where rich and poor customers go to the bank by bike. How does the bank's belief $\mu(\cdot | B)$ have to look like when the customer arrives by bike? Will the bank offer good service? How does the bank's belief $\mu(\cdot | C)$ have to look like when the customer arrives by car?

e) The government introduces a subsidy for rented cars such that poor customers don't incur a disutility from renting a car any more (utility of θ instead of -3). The disutility for rich customers remains constant. Is there still a separating PBE? Prove your answer formally or at least give a justification for it.