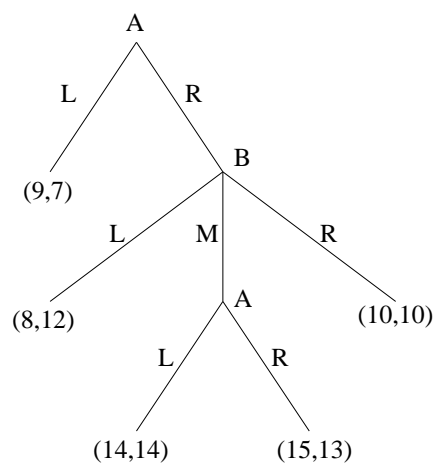


Math 10: The Art and Practice of Mathematics
Assignment 3
Due Wed Mar 5

Your solutions should be written so-as to be clear to an audience of fellow math 10 students.

1. Consider the cola industry, in which Coke and Pepsi are the two dominant firms. (To keep things simple, just forget about all the others.) The market size is 8 billion dollars. Each firm can choose whether to advertise. Advertising costs 1 billion for each firm that chooses to do so. If one firm advertises and the other doesn't, then the former captures the whole market. If both firms advertise, they split the market 50:50 and pay for the advertising. If neither firm advertises, they split the market 50:50 but without the expense of advertising.
 - (a) Write down the payoff table for this ad game.
 - (b) Write down the game tree for this ad game if it is played sequentially with Coke moving first and Pepsi following. Determine rollback strategies and payoffs.
 - (c) Write down the game tree for this ad game if it is played sequentially with Pepsi moving first and Coke following. Determine rollback strategies and payoffs.
 - (d) Does there appear to be any advantage to moving first? How about second? Why or why not?
2. For each of the game tables in Chapter 4 problem #3 find all Nash equilibria using best reply analysis.
3. Chapter 4 problem #6. In part (b), ignore the part about "dominant strategies." Just find the Nash equilibrium.
4. Chapter 4 problem #7.

5. Consider the following game tree:



- Determine rollback strategies and payoffs for the game tree.
- Construct the game table corresponding to this game tree.
- Find all Nash equilibria of strategies for the game table in part (b).