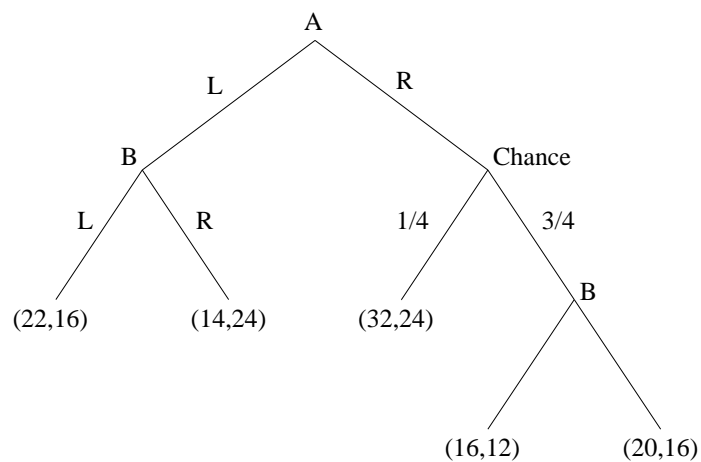


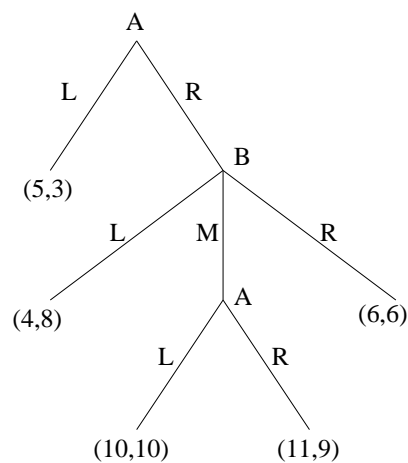
Math 10: The Art and Practice of Mathematics  
 Review 1 worth 10 points Homework Extra Credit  
 Due Fri Mar 28 in class

*Justify your answers using relevant terms and results from the course.*

- Determine the equilibrium strategies and payoffs for each player by rolling back the game tree below.



- Construct a game table for the game tree below.



3. Suppose that JavaBucks (a chain of coffee shops) and KrispyDoo (a chain of doughnut shops) will each market a single new product in 2006. JavaBucks has developed two new products – the SugarCino which appeals to customers with a sweet-tooth, and the MegaCaf which appeals to coffee addicts – and must pick one to market. KrispyDoo has also developed two new products – the PlainDoo and the FancyDoo – and must pick one to market. The FancyDoo attracts more customers than the PlainDoo, but it costs more to produce.

The profit made from a new product depends on the product released by the competing chain, as expressed in the table below:

	KrispyDoo PlainDoo	KrispyDoo FancyDoo
JavaBucks SugarCino	(5,13)	(9,14)
JavaBucks MegaCaf	(12,12)	(7,11)

where the payoffs represent (JavaBuck's profit, KrispyDoo's profit) in millions of dollars per year.

For each of the scenarios described below, determine the profit maximizing product for each chain by drawing and rolling back a game tree.

- (a) Suppose that JavaBucks is further along in its product development cycle than KrispyDoo, and so will bring its new drink to market first.
- (b) Suppose that KrispyDoo is further along in its product development cycle than JavaBucks, and so will bring its new doughnut to market first.

4. Use best response analysis to find all Nash equilibria in the game table below.

(2,6)	(10,8)	(3,7)
(0,4)	(8,1)	(1,2)
(3,5)	(7,4)	(0,3)
(1,3)	(4,5)	(2,6)

5. Find the maximin strategy for each player in the game table below.

(2,6)	(10,8)	(3,7)
(0,4)	(8,1)	(1,2)
(3,5)	(7,4)	(0,3)
(1,3)	(4,5)	(2,6)

6. Suppose that when firms X and Y sell product at prices  $p_x$  and  $p_y$ , respectively, their daily sales  $q_x$  and  $q_y$  are given by the formulas

$$\begin{aligned} q_x &= 44 - 2p_x + p_y, \\ q_y &= 44 - 2p_y + p_x. \end{aligned}$$

If firm X has a production cost of \$6/unit, and firm Y has a production cost of \$6/unit, then the daily profits are given by the formulas

$$\begin{aligned} b_x &= (p_x - 6)q_x, \\ b_y &= (p_y - 6)q_y. \end{aligned}$$

Find a Nash equilibrium of prices.