

ECON 455, Discussion Section 10

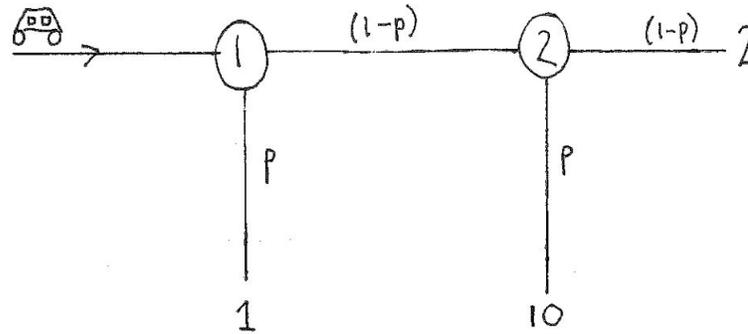
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Office: SS 6470. OH: Wed 8:00-9:30am; Thu 4:15-5:45pm; or by appt.

- Find the mixed Nash equilibrium in the following game. *Note: We're doing this to see how similar it is to finding an interim optimal mixed strategy for a forgetful driver, which we'll do next. Hint: To be willing to mix across actions, a player must be indifferent between those two actions – exploiting this allows us to solve for the mixed Nash equilibrium.*

	B	D
A	1,0	0,3
C	0,2	4,0

- Consider a forgetful driver (doesn't know which intersection he is at) whose payoffs are as described in the picture below:



- Find the *ex ante* optimal pure strategy (i.e. $p = 1$ or $p = 0$).
- Find the *ex ante* optimal mixed strategy.
- Is $p = 1$ interim optimal? Show why or why not.
- Is $p = 0$ interim optimal? Show why or why not.
- Find an interim optimal $p \in (0, 1)$. Compare it to the *ex ante* optimal mixed strategy.

3. You are able to go to two stores to purchase a particular television you want to buy. Your prior belief is that, at each store, the TV could be priced anywhere between 100 and 300 dollars, and any dollar amount in that range is equally likely. Also, you believe that the pricing between the stores is independent, so even if the price at one store is 100, it is still just as likely that the price at the other store will be 300 (or any other $p \in (100, 300]$) as it will be 100. Unfortunately, you're a bit spacey and can't remember the exact price at the first store when you visit the second – you can only remember whether you perceived the price as low or high, and have to decide whether to go back and purchase at the first store or purchase at the second given that memory. You must purchase it from one of the two stores. Assume you're risk-neutral.

- (a) Suppose you define $p_1 \in [100, 250)$ as low and $p_1 \in [250, 300]$ as high. Further suppose that you're now at the second store and you remember that the price at the first store was high. For what p_2 will you choose to purchase from the second store?
- (b) What if you instead remember that the price at the first store was low? For what p_2 will you choose to purchase from the second store?
- (c) What is your *ex ante* expected payment given your partitioning of the price space (i.e. $p_1 \in [100, 250)$ is low and $p_1 \in [250, 300]$ is high)?
- (d) Recall from the lectures that to find the optimal 2-category memory, we solve

$$\lambda^* = \mathbf{E}[p_2 | p_2 \in (E_L, E_H)]$$

where λ^* was the optimal cutoff price between low and high, and E_L and E_H were the average prices amongst those classified as low and high respectively. Solve for the optimal 2-category memory (i.e. a partitioning of $[100, 300]$ into two intervals).

- (e) What is your *ex ante* expected payment given the optimal 2-category memory you found in (d)? Compare it to that in (c).