Game Theory 06-03

Exercise

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Answer on Google Slides

Use the QR code or the URL to open the shared Google Slides deck and submit your work for each question. Attach photos or screenshots if you work on paper or code.

https://sites.google.com/vju.ac.vn/bcse-gt

Notes

- List the names of teammates who collaborate on your slide.
- Keep each answer on a separate slide so that feedback is easy to provide.

Q1. Tree Construction

Model the following story as an extensive form game in which the follower observes the leader's move. A platform P chooses between releasing an **Early Launch** beta build or waiting for a **Stable Launch**. A developer D observes the decision and then chooses to **Adopt** immediately or **Wait**. If P launches early, the payoffs are $(4, 3)$ when D adopts and $(2, 2)$ when D waits. If P waits for the stable release, the payoffs are $(3, 4)$ when D adopts and $(1, 2)$ when D waits. Label all histories, actions, and payoffs clearly.

Q2. Fresh Tree and Conversion

Design a two-stage hiring game in which an employer E chooses between **Short Training** and **Long Training**, and a worker W subsequently chooses to **Stay** or **Resign**. Assign your own payoffs reflecting the idea that longer training is costly but produces higher productivity if the worker stays. Draw the tree, list all pure strategies, and convert the game into a normal-form matrix.

Q3. Entry Deterrence Credibility Test

Consider the following fixed tree. Stage 1: an entrant E chooses **Enter** or **Stay Out**. Stage 2 (only if entry occurs): an incumbent I chooses **Fight** or **Accommodate**. Payoffs are $(-1, -3)$ for (Enter, Fight), $(3, 2)$ for (Enter, Accommodate), and $(0, 4)$ if E stays out.

Tasks: (a) Convert this tree into its normal-form matrix by listing E's and I's pure strategies. (b) Identify every Nash equilibrium of the matrix. (c) Apply backward induction to the tree and report the credible outcome. (d) Explain which Nash equilibria rely on non-credible threats or promises and why.

Q4. Delayed Observation and Information Sets

Consider the platform story in which P chooses between an **Early Launch** beta build or a **Stable Launch**; if D adopts after Early the payoffs are $(4, 3)$, while $(2, 2)$ arises when D waits. After a Stable launch the payoffs are $(3, 4)$ for Adopt and $(1, 2)$ for Wait. Now suppose D must commit before the build quality becomes public, so the developer cannot tell which launch happened when choosing.

Draw the tree with D's decision nodes merged into a single information set, introduce a belief $\mu = \Pr(\text{Early Launch} \mid I_D)$, and determine the cutoff on μ that makes D indifferent between Adopt and Wait. Explain how this belief threshold shapes credible threats or promises in the normal-form matrix you derive from the same tree.