Econ 221
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CHAPTER 3. GAMES WITH SEQUENTIAL MOVES

- Game trees.
  - Sequential-move games with finite number of decision notes.
  - Sequential-move games with Nature's moves.

- Strategies in sequential-move games.
  - A strategy as a complete plan.
  - List of all strategies for each player in a sequential-move games.
- Rollback method and rollback equilibrium.
  - Mark game tree to find rollback equilibrium (not just equilibrium outcome).
  - Find all rollback equilibria when there are ties.

- Game tables.
  - Simultaneous-move games with two players and finite number of strategies for each player.
- Strict dominance.
  - One strategy strictly dominates another strategy for a given player.
  - A strictly dominant strategy for a given player.

- Iterated elimination of strictly dominated strategies.
  - Games solvable through iterated elimination of strictly dominated strategies.
- Weak dominance.
  - One strategy weakly dominates another strategy for a given player.
  - A weakly dominant strategy for a given player.
  - Iterated elimination of weakly dominated strategies.

- Pure-strategy Nash equilibrium.
  - Find all Nash equilibria using best response analysis in game tables.
  - Only strategies surviving iterated elimination of strictly dominated strategies can be part of Nash equilibrium.
  - Players may use weakly dominated strategies in some Nash equilibria.

- Best response function.
  - Derive best response function.
  - Find all Nash equilibria by solving the simultaneous equations given by best response functions.
  - Illustrate in a diagram Nash equilibria as intersections of best response functions.

- Rationalizability.
  - Find rationalizable strategies in a simultaneous-move game through iterated elimination of never best responses.
  - Nash equilibrium strategies are rationalizable.
  - Strictly dominated strategies are never best responses, but never best responses may not be strictly dominated.

- Information set.
  - Use information set in game trees to represent games with both sequential and simultaneous moves.
  - Degenerate versus non-degenerate information sets.
  - Adapt strategy as a complete plan to information sets.

- Nash equilibrium.
  - Derive strategic form from extensive form (game tree) by listing all strategies, and find all Nash equilibria.
  - Verify Nash equilibrium without using strategic form.
- Subgame prefect equilibrium.
  - Subgames in games that combine sequential moves and simultaneous moves.
  - Subgame perfect equilibrium forms a Nash equilibrium in every subgame.

- Find all subgame perfect equilibria by combining rollback method with Nash equilibrium.
  - Find all subgame perfect equilibrium outcomes.
  - With multiple Nash equilibria in some subgames, each Nash equilibrium requires a separate rollback and yields a different subgame perfect equilibrium.

- Subgame perfect equilibrium and Nash equilibrium.
  - In sequential-move games, subgame perfect equilibrium is same as rollback equilibrium.
  - In simultaneous-move games, subgame perfect Nash equilibrium is same as Nash equilibrium.
  - Nash equilibrium is not subgame perfect if it does not form a Nash equilibrium in some subgame.

- Mixed strategies.
  - A mixed strategy of a given player assigns a probability number to each of the player's pure strategies, with the total probabilities equal to 1.
  - Pure strategy as a degenerate mixed strategy.
- Expected payoffs.
  - Compute expected payoff to each player from using a pure strategy against a mixed strategy of his opponent.

- Mixed-strategy Nash equilibrium.
  - For simultaneous-move games with two players and two pure strategies for each player, find all the Nash equilibria, in pure strategies and in mixed strategies, by finding each player's best response in mixed strategy against the opponent's mixed strategies, and illustrate in a diagram.
  - Use the principe of making your opponent indifferent to find mixed-strategy Nash equilibrium in 2-by-2 games.

- Modified principle of making your opponent indifferent, when some players have more than two pure strategies, and when there are more than two players.
  - A player uses a mixed strategy in a Nash equilibrium if and only if, against equilibrium strategies used by other players, the player is indifferent among all pure strategies used in the mixing, and weakly prefers each of them to any pure strategy not used in mixing.
  - Use the modified principle of making your opponent indifferent to verify mixed-strategy Nash equilibrium.