1-6-Play-3

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Strategic Reasoning

Game Theory Course:
Jackson, Leyton-Brown & Shoham

Keynes Beauty Contest Game: The Stylized Version

Keynes Beauty Contest Game: The Stylized Version

- Each player names an integer between 1 and 100.
- The player who names the integer closest to two thirds of the *average* integer wins a prize, the other players get nothing.
- Ties are broken uniformly at random.

Strategic Reasoning

- What will other players do?

Strategic Reasoning

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- What should I do in response?

Strategic Reasoning

- What will other players do?
- What should I do in response?
- Each player *best responds* to the others: *Nash equilibrium*

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- If X is no more than 67, then the optimal strategy of any player has to be no more than $\frac{2}{3}67$.

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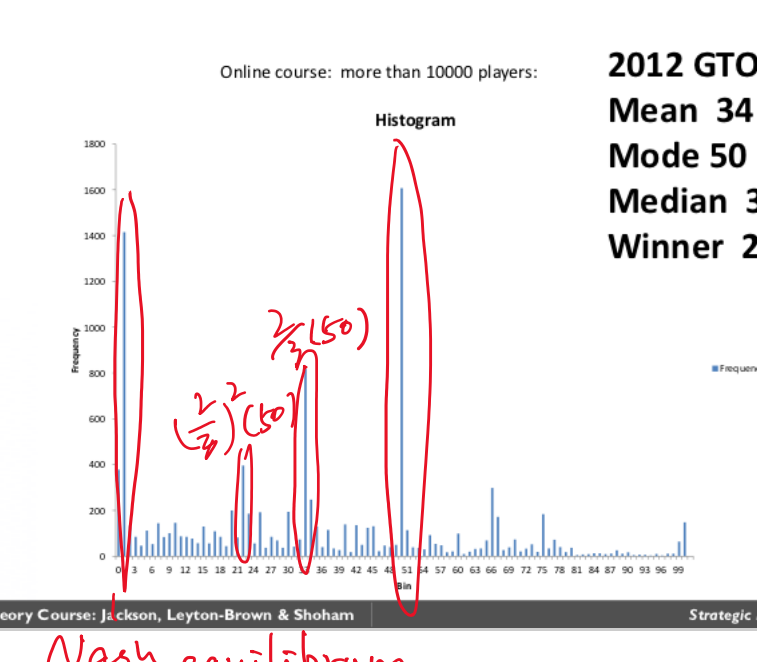
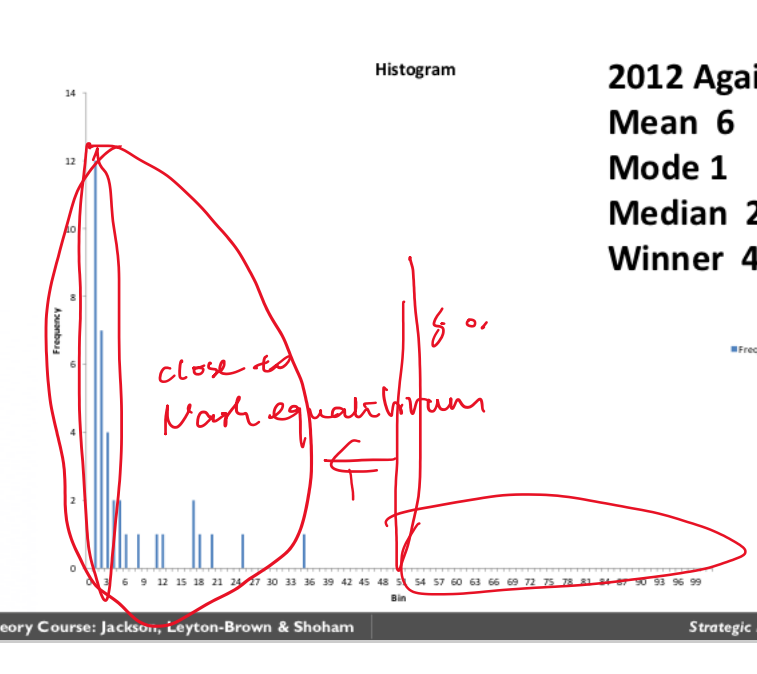
- Iterating, the unique Nash equilibrium of this game is for every player to announce 1!

Online course: more than 10000 players:



2012 GTOC
Mean 34
Mode 50
Median 33
Winner 23

Nash equilibrium



2012 Again
Mean 6
Mode 1
Median 2
Winner 4

Nash Equilibrium

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Nash Equilibrium

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Nash Equilibrium

- A consistent list of actions:
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- A self-consistent or stable profile

Summary Nash Equilibrium

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- Each player's action maximizes his or her payoff given the actions of the others.
- Nobody has an incentive to *deviate* from their action if an equilibrium profile is played.
- Someone has an incentive to *deviate* from a profile of actions that do *not* form an equilibrium.

Nash Equilibrium

- Should we expect equilibria to be played?

Nash Equilibrium

- Should we expect equilibria to be played?
  stable
- Should we expect non-equilibria to be played?
  not stable
  vanish over time → Nash equalibrium
  evolve
  dynamics