Exercise 9.1: Pretty Puzzle

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Setup:

- you are playing a game against your n classmates.
- pick an integer between 0 and 100
- the students who pick the number closest to 1/2 the average wins.

Questions:

- Play the game!
- Identify an action that is in a Nash equilibrium. (Answer on Canvas)

Lecture 9: Auction Equilibria

Due soon: Project 2 peer reviews due tonight.

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Last Time:

- game theory
- bimatrix games
- Nash equilibria
- dominant strategy equilibria

Lecture 9: Auction Equilibria

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Last Time:

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Today:

- auction theory
- second-price auction
- first-price auction
- complete information analysis (Nash equilibrium)
- incomlpete information analysis (Bayes-Nash equilbrium)

Exercise 9.2: Winning Probabilities

Recall

- cumulative distribution func. for $X \sim U[0,1]$: $F_X(z) = \mathbf{Pr}[X < z] = z$
- first-price auction: highest bidder wins, winner pays bid.
- indendent and identical distributions (i.i.d.):
  - $X_1, \ldots, X_n \sim F_X$
  - $\mathbf{X}_{-i} = (X_1, \ldots, X_{i-1}, ?, X_{i+1}, \ldots, X_n)$
  - $\mathbf{Pr}[X_i < z \mid \mathbf{X}_{-i}] = \mathbf{Pr}[X_i < z]$

Exercise 9.2: Winning Probabilities

Setup:

- you are bidding in a first-price auction
- other bidders with i.i.d. uniform bids on $[0,1]$

Questions: If you bid $b = 1/2$,

- What is the probability you win against one other bidder?
- What is the probability you win against two other bidders?