



Midterm 1 Logistics

- Midterm 1 two weeks from now (Sep 18) in lecture venue
- **6:30-7:15pm (45 minutes). Plan to arrive early!**
- There will be a seating assignment (more details next week)
- **Bring your student ID**
- **Closed-book, closed-notes, no calculators or other electronic devices**
- Bringing your own scratch paper is **not** allowed
 - The exam will be printed one-sided
 - The entire back side plus some space on the front side can be used for scratch work
 - The last sheet of the exam will be entirely blank and can be torn off to use as additional scratch paper



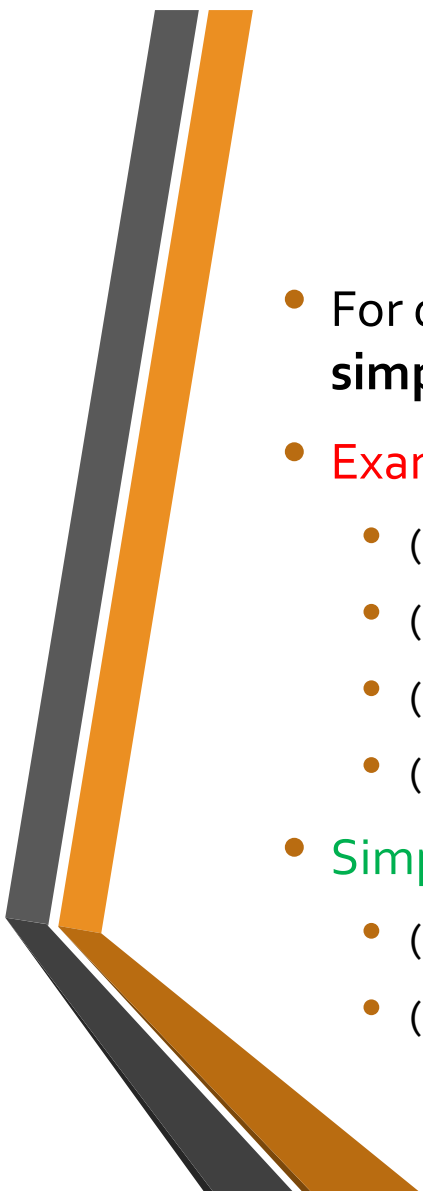
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- Covers up to (and including) routing games
- Technical terms to know:
 - Normal-form game, Nash equilibrium, pure Nash equilibrium, strictly dominated strategy, action
 - First-price auction, second-price auction, VCG mechanism
 - Truthfulness/strategyproofness, total cost, maximum cost
 - Equilibrium flow, optimal flow, price of anarchy
 - (Non-atomic) routing game, atomic routing game



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- All questions **except one** will be answer-only (no proof)
- One proof question worth 6 points (out of 40)
 - Writing “Don’t know” on this question guarantees 1 point
 - Partial credit will **not** be given away cheaply
- Type of questions similar to assignment questions
- Additional questions (from past two years’ exams) posted on Canvas discussion forum
- **Tip:** Plan your time, and be careful with the calculations.
- We will have a half-lecture after the midterm



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- For questions that ask to find Nash equilibria, don't forget to answer in the **simplest form!**
- **Example:**
 - (Split, Steal)
 - (Steal, Split)
 - $(p \cdot \text{Split} + (1-p) \cdot \text{Steal}, \text{Steal})$ for any $0 \leq p \leq 1$
 - $(\text{Steal}, q \cdot \text{Split} + (1-q) \cdot \text{Steal})$ for any $0 \leq q \leq 1$
- **Simplest form:**
 - $(p \cdot \text{Split} + (1-p) \cdot \text{Steal}, \text{Steal})$ for any $0 \leq p \leq 1$
 - $(\text{Steal}, q \cdot \text{Split} + (1-q) \cdot \text{Steal})$ for any $0 \leq q \leq 1$