Good Afternoon, Colleagues

Are there any questions?
Logistics

- Progress reports due at beginning of class
  - Attach your proposals
Distributed Rational Decision Making

Self-interested, rational agent
Distributed Rational Decision Making

Self-interested, rational agent

- Self-interested:
Distributed Rational Decision Making

Self-interested, rational agent

- Self-interested: maximize own goals
  - No concern for global good
Distributed Rational Decision Making

Self-interested, rational agent

- Self-interested: maximize own goals
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- Rational:
Distributed Rational Decision Making

Self-interested, rational agent

- Self-interested: maximize own goals
  - No concern for global good

- Rational: agents are smart
  - Ideally, will act optimally
Distributed Rational Decision Making

Self-interested, rational agent

- Self-interested: maximize own goals
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- Rational: agents are smart
  - Ideally, will act *optimally*

The protocol is key
Evaluation Criteria

- Social welfare
- Pareto efficiency
- Stability
Evaluation Criteria

• Social welfare

• Pareto efficiency

• Stability

• Individual Rationality
Evaluation Criteria

- Social welfare
- Pareto efficiency
- Stability
- Individual Rationality
- Efficiency (computational, communication)
Voting vs. auctions

- Voting: maximize social good
  - result affects all
Voting vs. auctions

- Voting: maximize social good
  - result affects all

- Auctions: maximize profit
  - result affects buyer and seller
Auctions

• Valuations:
Auctions

- Valuations:
  - private value
Auctions

- Valuations:
  - private value
  - common value
Auctions

• Valuations:
  – private value
  – common value
  – correlated value
Auctions

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  – private value
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• Types:
  – first-price open-cry (English)
Auctions

- Valuations:
  - private value
  - common value
  - correlated value

- Types:
  - first-price open-cry (English)
  - first-price sealed-bid
Auctions

• Valuations:
  – private value
  – common value
  – correlated value

• Types:
  – first-price open-cry (English)
  – first-price sealed-bid
  – descending (Dutch)
Auctions

- Valuations:
  - private value
  - common value
  - correlated value

- Types:
  - first-price open-cry (English)
  - first-price sealed-bid
  - descending (Dutch)
  - second-price sealed-bid (Vickrey)
Auctions

- Valuations:
  - private value
  - common value
  - correlated value

- Types:
  - first-price open-cry (English)
  - first-price sealed-bid
  - descending (Dutch)
  - second-price sealed-bid (Vickrey)

Revenue equivalence: private-value, risk-neutral
Auction example

- Pick an integer between 1 and 20, write it down
Auction example

• Pick an integer between 1 and 20, write it down
• Draw a line under it
• Pick another number, write it under the line.
Auction example

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- Draw a line under it
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- 1st price auction for my pen
Auction example

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- Pick another number, write it under the line.
- 1st price auction for my pen
- The top number is your utility
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• 1st price auction for my pen
• The top number is your utility
• Goal: as much profit as possible
Auction example

- Pick an integer between 1 and 20, write it down
- Draw a line under it
- Pick another number, write it under the line.
- 1st price auction for my pen
- The top number is your utility
- Goal: as much profit as possible
- Write down your bid
Auction example

- Pick an integer between 1 and 20, write it down
- Draw a line under it
- Pick another number, write it under the line.
- 1st price auction for my pen
- The top number is your utility
- Goal: as much profit as possible
- Write down your bid
- Repeat with 2nd price auction
- Number under the line is your utility
Auctions

- You value a bunch of flowers at $100
Auctions

• You value a bunch of flowers at $100

• What strategy if auction is:
  – English
Auctions

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- What strategy if auction is:
  - English
  - first-price sealed-bid
Auctions

• You value a bunch of flowers at $100

• What strategy if auction is:
  – English
  – first-price sealed-bid
  – Descending
Auctions

- You value a bunch of flowers at $100

- What strategy if auction is:
  - English
  - first-price sealed-bid
  - Descending
  - Vickrey
Auctions

- You value a bunch of flowers at $100

- What strategy if auction is:
  - English
  - first-price sealed-bid
  - Descending
  - Vickrey

- What if it’s an antique?
Auctions

• Vickrey, English are truthful
Auctions

- Vickrey, English are truthful
- First-price sealed-bid: bidders bid lower than values
Auctions

- Vickrey, English are truthful

- First-price sealed-bid: bidders bid lower than values
  - Private value case: why?
Auctions

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- First-price sealed-bid: bidders bid lower than values
  - Private value case: why?
- In common (and correlated) value case, bids lower in all mechanisms
Auctions

• Vickrey, English are truthful

• First-price sealed-bid: bidders bid lower than values
  – Private value case: why?

• In common (and correlated) value case, bids lower in all mechanisms
  – Why?
Class Discussion

Richard Edwards on Vickrey Auctions