CS344M
Autonomous Multiagent Systems

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Good Afternoon, Colleagues

Are there any questions?

Logistics

- Next week's readings up

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  - All readings up

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  - Jeopardy agent (Fri., 11am 2.302)

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  - Hand graded version in with your final reports

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- Final projects due in 3 weeks!

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  - Use pseudocode and/or diagrams

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  - Use pseudocode and/or diagrams
- Break into sections

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  - How? Why? What alternatives?
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- Slides on resources page
- Final projects: content matters more

Bidding for Multiple Items

	utility
camera alone	$50
flash alone	10
both	100
neither	0

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  - Auctions are independent (no combinatorial bids)

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- $\in [10, 50]$ — **Depends on the price of the camera**

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- Already bought camera $\Rightarrow$ price = \$0$\Rightarrow$ value(flash) $= 100 - 50 = \$50$

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- Let current camera price = $\$20$, flash = $\$10$
  - value(flash) would be $80 - 30 = \$50$
  - value(camera) would be $90 - 0 = \$90$
- But what if prices jump at the end?

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  - Let average past camera price = $\$80$, flash = $\$30$

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- But what if prices jump at the end?
  - Let average past camera price = $\$80$, flash = $\$30$
  - value(flash) $= \$20$
  - value(camera) $= \$70$

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- What's the value of the flash?
  - Camera price = $\$70 \Rightarrow$ value(flash) = $\$30$
  - Camera price = $\$20 \Rightarrow$ value(flash) = $\$50$
  - Camera price = $\$40 \Rightarrow$ value(flash) = $\$50$

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  - Camera price = $\$20 \Rightarrow$ value(flash) = $\$50$
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- Expected value: resample camera price, take avg.

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So decided to auction

Goals of mechanism

- Efficient allocation (assign to whom it's worth the most)
- Promote deployment of new technologies
- Prevent monopoly (or close)
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Revenue an afterthought (but important in end)

Choices

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- How much information public?

Problems from New Zealand and Australia

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Any oversight in auction design can have harmful repercussions, as bidders can be counted on to seek ways to outfox the mechanism.

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- Need to be flexible to allow bidders to create aggregations
- Secondary market might allow for *some* corrections
  - Likely to be thin
  - High transaction costs

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Used laboratory experiments too

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Went with activity rules

Combinatorial Bids

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- Full combinatorial bidding too complex
  - Winner determination problem
  - Active research area

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Reserve Prices

- Not necessary in such a competitive market
- Did include withdrawal penalties

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  - Bidders indeed find ways to circumvent mechanisms
- Lessons to be learned via agent-based experiments

FCC Spectrum Auction #35

- 422 licences in 195 markets (cities)
  - 80 bidders spent $8 billion
  - ran Dec 12 - Jan 26 2001
  - licence is a 10 or 15 mhz spectrum chunk
- Run in rounds
  - bid on each licence you want each round
  - simultaneous; break ties by arrival time
  - current winner and all bids are known
- Allowable bids: 1 to 9 bid increments
  - 1 bid incr is 10% – 20% of current price
- Other complex rules