

CS344M
Autonomous Multiagent Systems
Spring 2008

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Good Afternoon, Colleagues

Are there any questions?

Logistics

- Next week's readings up

Class Discussion

Brandon Blakely on Mechanism Design

Bidding for Multiple Items

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

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- What's the value of the flash?

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 - Auctions are simultaneous
 - Auctions are independent (no combinatorial bids)

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- What's the value of the flash?
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- $\in [10, 50]$ — **Depends on the price of the camera**

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- Let current camera price = \$80
 - $score(G_f^*) = \max\{100 - 80, 10 - 0\} = 20$
 - $score(G_{no-f}^*) = \max\{50 - 80, 0 - 0\} = 0$
 - So $value(flash) = 20 - 0 = \20

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- Already bought camera \Rightarrow price = \$0

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 - $score(G_{no-f}^*) = \max\{50 - 80, 0 - 0\} = 0$
 - So $value(flash) = 20 - 0 = \20
- Already bought camera \Rightarrow price = \$0 \Rightarrow
 $value(flash) = 100 - 50 = \50

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 - value(flash) would be

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 - $\text{value}(\text{flash})$ would be $80 - 30 = \$50$
 - $\text{value}(\text{camera})$ would be

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- Let current camera price = \$20, flash = \$10
 - $\text{value}(\text{flash})$ would be $80 - 30 = \$50$
 - $\text{value}(\text{camera})$ 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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 - Let average past camera price = \$80, flash = \$30
 - $\text{value}(\text{flash}) = \20
 - $\text{value}(\text{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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- 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
- 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)
- Get some licenses to designated companies
- No political embarrassments

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Revenue an afterthought (but important in end)

Choices

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- How to encourage designated companies?
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- Reserve prices?
- How much information public?

Problems from New Zealand and Australia

Second price, sealed bid

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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.

License interactions

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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

Open vs. Sealed Bid

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Went with activity rules

Combinatorial Bids

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- Nationwide bidding could decrease efficiency and revenue
- Full combinatorial bidding too complex
 - Winner determination problem
 - Active research area

Aiding Designated Bidders

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Royalties vs. Up-front Payments

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- Decided against

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