CS 103: Lecture 7 Auctions

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Announcements

- HW 2 due now
- HW 1 back next Tuesday
- Check schedule for blog posts. . . first ones due in 6 days.

Plan for today

- Finish traffic model / Braess's paradox

- Auctions!

Auctions

Selling items (our focus):
- eBay
- Art
- US treasury bills, oil leases, wireless spectrum
- Google ad keywords

Buying items:
- Finding a contractor/architect for building project
- Procurement at UMass

Why do we care about auctions? Foundations for later topics:
- Power and bargaining in networks
- Selling ads on the internet

Auction!

I am auctioning off a very special opportunity: the ability to choose when Mountain Day will be.

How much is this worth to you?

Write down your value: a number between $50 and $100

Explain rules and hold auction. Discuss.

Auction Setup

- n bidders
- Every bidder has (private) value v_i

Is this a game?

- Players: bidders
- Strategies: highest bid / how long to stay in
- Payoff: we'll talk about this later

Auction Formats

There are different types of auctions:

- Ascending bid (English)
- Descending bid (Dutch)
- First price, sealed bid
- Second price, sealed bid

But we will show that two are equivalent to others:

- Second price = Ascending (English)
- First price = Descending (Dutch)

Descending bid (Dutch) = First price

Hold descending bid auction.

Claim: outcome of descending bid auction is same as sealed bid, first price auction

- Each player chooses bid b_i
- Highest bid wins and gets payoff $v_i - b_i$

How should you choose b_i? Complex issue.

Ascending bid (English) = Second price

Analyze ascending bid auction **on board**

Claim: outcome of ascending bid auction is same as sealed bid, second price auction

- Each player chooses maximum bid b_i
- Player with highest bid wins and gets payoff $v_i - b_j$, where b_j is the *second-highest maximum bid*.

Second Price Auctions

Second price auctions are very important (e.g. Google keywords)

Claim: bidding your true value is a dominant strategy in second price auctions.

Analyze / prove on board

Summary

- Auction formats
- Second price = Ascending (English)
- First price = Descending (Dutch)
- Second price auctions: bidding true value is dominant strategy