• I’m Dan Quint, this is Econ 805, Micro Theory.

• Who are you? (Name, program, year)

• Office hours: by appointment

• Website: http://www.ssc.wisc.edu/~dquint/econ805/
  – Syllabus is online, with links to papers
  – I’ll post my lecture notes after each class

• Grading: occasional problem sets, student presentations at end of semester
  – Point of the presentation will be to focus on one interesting paper, but also put
    it in context, explain how it relates to the literature, and judge whether it’s a
    good paper
  – I’ll circulate a list of suggestions early in the semester, but you can pick any
    paper you like

• Outline of the semester
  – First half will be auction theory
  – Second half will likely be on two-sided matching markets
  – But if you all are more interested in other topics, we could do something else –
    game theory models of bargaining; screening models; ?

• Readings: Milgrom book recommended for first half, but not required; Klemperer
  book available online; papers are all available online

• Today:
  – Why study auctions?
  – Review of Bayesian games/equilibrium
Why Study Auctions?

Since we’ll be spending half the semester on auction theory, I thought I’d start by addressing the question, why study auctions? I’ll give several reasons.

• First answer is captured in the title of a working paper Paul Milgrom and others are writing: “How we saved our client $1.2 Billion.”
  - Lots of recent work on FCC spectrum auctions – auctions for a license to use a particular range of frequencies in a particular area to transmit data wirelessly
  - SpectrumCo was a participant in a recent spectrum auction
  - Milgrom and several others worked for them as advisors, and are documenting that, following their advice, SpectrumCo paid almost $1.2 Bn less than their competitors were paying for comparable bandwidth.

• The point: there are auctions going on in the world, and the amount of money at stake is sometimes huge
  - Christy’s and Sotheby’s art auctions – billions annually
  - Auctions for rights to natural resources (timber, oil, natural gas), government procurement, electricity markets
  - eBay: $52 Bn worth of goods traded in 2006; eBay itself had $6 Bn in revenue, current market cap around $30 Bn
  - European 3G spectrum auctions raised over $100 Bn in 2000-2001; US spectrum auctions have raised tens of billions
  - U.S. treasury holds auctions for trillions of dollars of securities annually

• And equally importantly, design matters
  - Yahoo! and Google both used auctions to place ads next to search results
  - But Google’s were better designed and raised more revenue, to the point where I believe Yahoo! at one point was using Google’s services to serve ads on their own search page
  - 3G spectrum auctions in UK and Germany raised over 600 euro per capita!
  - Later the same year, auction in Switzerland raised less than 20
  - Rules in the Swiss auction discouraged participation by marginal bidders and new entrants, and allowed for easy collusion among the primary competitors
  - So based on having worse design, the Swiss auction raised $1\text{,}30\text{,}000$ the revenue of comparable auctions in other places

So the first answer is, there’s lots of money at stake, and results can be very sensitive to auction design.
• The second reason is that auctions can be seen as a useful microcosm/laboratory for markets in general

  – As economists, one of the great mysteries we face is where do prices come from
  – We have a few silly models – Walrasian auctioneer, etc.
  – Auctions give us a setting where price formation is explicit
  – Auctions tend to generate very extensive data, lending itself to empirical work
  – And auctions lend themselves naturally to experiments
  – So seeing what affects price realizations in auctions – information, asymmetries, etc – may tell us something about what happens in larger, unstructured markets

• And even if we’re not trying to explain the whole world, techniques/insights from auction theory are useful in other areas

• Paul Klemperer, in his book chapter “Why Every Economist Should Learn Some Auction Theory,” shows insights from auction theory applying to...

  – Comparison of different litigation systems
  – “All-pay” tournaments such as lobbying, political campaigns, patent races, and some oligopoly situations
  – Market frenzies and crashes
  – Online auto sales versus dealerships
  – Monopoly pricing and price discrimination
  – Rationing of output
  – Patent races
  – Value of new customers under oligopoly

• And finally, auction theory turns out to be a good way to introduce a number of useful/interesting/elegant mathematical tools, some of which will also come in handy in other areas

So that’s the basic motivation for studying auctions.

For the rest of today, a quick review of some game theory, and in particular, Bayesian games, since that will be our primary tool for modeling auctions.