CS395T
Agent-Based Electronic Commerce
Fall 2003

Peter Stone

Department or Computer Sciences
The University of Texas at Austin

A Bidding Game

- Bid for my pen

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First-price sealed bid auction

Let's Try Again

- Same thing

- New values

Now Change the Rules

- The highest bidder still wins

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Now Change the Rules

- The highest bidder still wins

- But only pay as much as the 2nd highest bidder

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Second-price sealed bid auction

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This Course

- Auctions, including some auction theory

- Game theory and mechanism design

- Autonomous bidding agents

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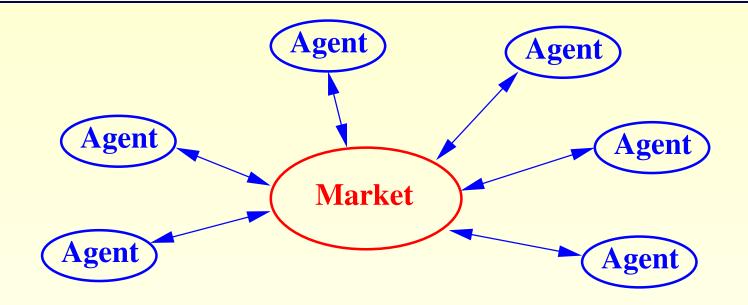- Other topics according to your interests

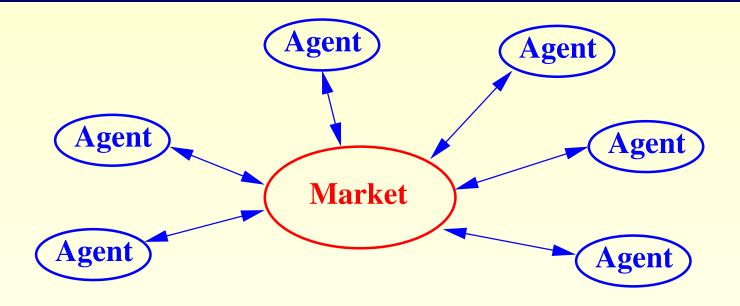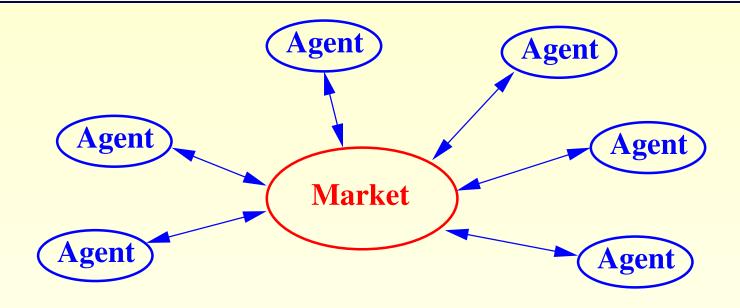 – What do you want to learn?

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Syllabus on-line
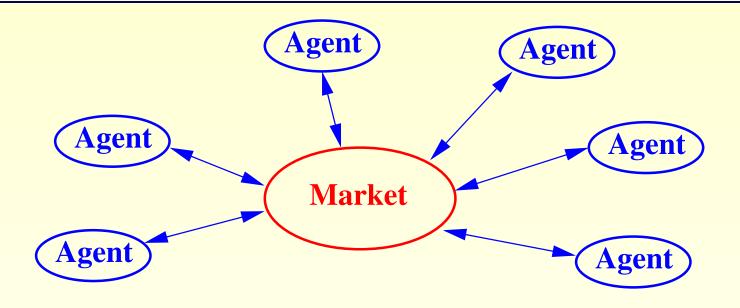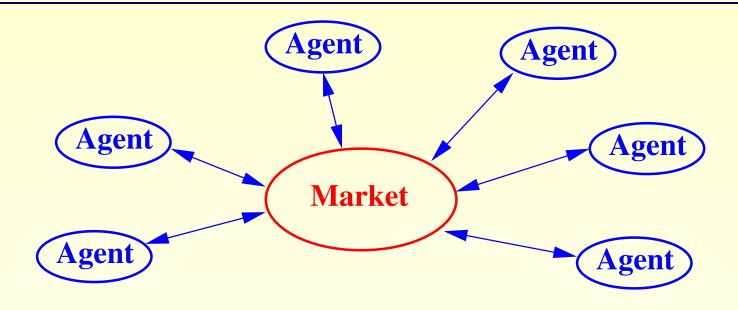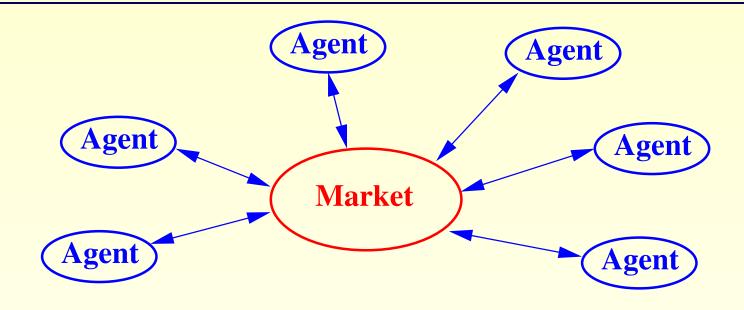
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Market Mechanisms

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- eBay

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- Telecommunications spectrum

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- Telecommunications spectrum
- Electricity
- Takeoff/landing slots at airports

Market Mechanisms

- eBay
- Telecommunications spectrum
- Electricity
- Takeoff/landing slots at airports
- Building temperature

Some Bidding Agent Domains

- Simulated travel agent

- FCC spectrum auctions

- Stock market trading

- Supply chain management

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Simulated Travel Agent

Trading Agent Competition

Simulated Travel Agent

Trading Agent Competition

- Bid for flights, hotel rooms, entertainment tix

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Simulated Travel Agent

Trading Agent Competition

- Bid for flights, hotel rooms, entertainment tix

- Simultaneous auctions of different types

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- Represent customers with different preferences

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Simulated Travel Agent

Trading Agent Competition

- Bid for flights, hotel rooms, entertainment tix

- Simultaneous auctions of different types

- Values of goods interact

- Represent customers with different preferences

- Bid against other travel agents, created by others

FCC Spectrum Auctions

- Model of auction #35

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- 422 licenses; 80+ bidders; $\approx$$8 billion spent

- Ran Dec 12 – Jan 26, 2001

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FCC Spectrum Auctions

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- FauCS — a realistic simulator based on information from AT&T's real bidders

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Stock Market Trading

Penn-Lehman Automated Trading Project

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- Real market data

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- Based on Electronic Crossing Network (ECN) data

- Not just stock price, but complete order books
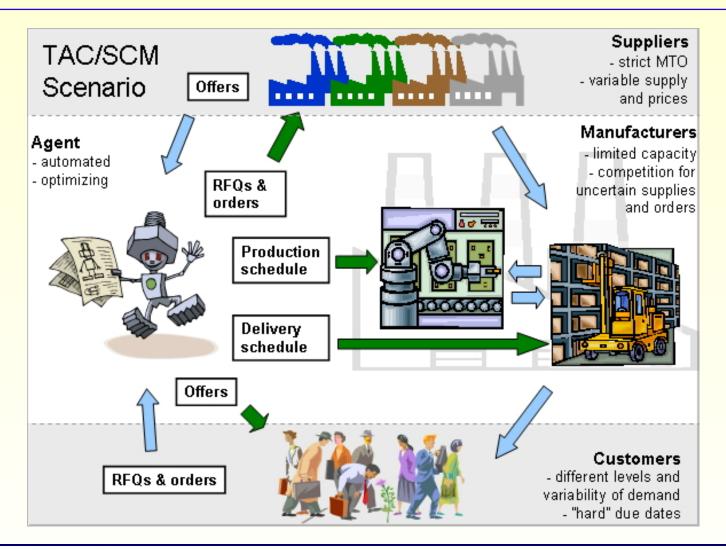
Stock Market Trading

Penn-Lehman Automated Trading Project

- Real market data

- Based on Electronic Crossing Network (ECN) data

- Not just stock price, but complete order books

- Agent bids can be matched with real-world orders

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Supply Chain Management

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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Research Challenges

- Autonomous bidding — no human input   **(agents)**

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- Predict future market characteristics **(machine learning)**

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> **Indifferent to other agents' goals**

Beauty Contest

- Everyone submit a number $\in [0, 100]$

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- I'll compute the mean

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- Whoever's number is closest to $2/3$ of the mean wins $?

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- http://www.cs.rutgers.edu/~mlittman/topics/nips.html

  – Camerer

- http://www.geocities.com/SiliconValley/Byte/5215/Economics/
  BeautyContest.html

Assignments for Tuesday

- Join the mailing list!

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- Read Klemperer

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- Send a question or comment by midnight Monday