CS395T
Agent-Based Electronic Commerce
Fall 2003

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The University of Texas at Austin

Week 3b, 9/11/03
Logistics

• Submitting responses to readings
  – Prefer non-just-summary ones
  – Show me you’ve thought about the readings
  – If it helps to summarize in addition, that’s fine
Logistics

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• Presentation dates: announced soon
Logistics

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- Any questions?
Mechanism Design

• The rules of the game (what strategies are possible)
Mechanism Design

- The rules of the game (what strategies are possible)
- Defines a mapping from strategy to outcome
Mechanism Design

- The rules of the game (what strategies are possible)
- Defines a mapping from strategy to outcome

- Terms:
  - Efficient
  - (Weak) Budget balanced
  - Individual rationality

- “An ideal mechanism provides agents with a dominant strategy and also implements a solution to the multiagent distributed optimization problem” (p. 29, last paragraph of the section)
Relation to game theory

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<tr>
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<th>Player 1</th>
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<tbody>
<tr>
<td>Action 1</td>
<td>4,8</td>
<td>2,0</td>
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<tr>
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<td>6,2</td>
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- What’s the mechanism in this game?
Relation to game theory

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- What’s the mechanism in this game?
- What’s an alternative mechanism?
Bayes Nash Equilibrium

- Allows for uncertainty about opponent type
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- Consider 1st price auction for my pen
Bayes Nash Equilibrium

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• Consider 1st price auction for my pen
  – Define a Nash equilibrium (what do you need to know)?
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  – Is there a dominant strategy equilibrium?
Bayes Nash Equilibrium

- Allows for uncertainty about opponent type

- Consider 1st price auction for my pen
  - Define a Nash equilibrium (what do you need to know)?
  - Define a Bayes-Nash equilibrium (what do you need to know)?
  - Is there a dominant strategy equilibrium?
  - What if I tell you, I’ll take what you tell me as your value and compute for you the correct thing to do given what other people bid?
Ex ante vs. ex post

- Mechanism: each of you give me $1, one gets $100 back
Ex ante vs. ex post

- Mechanism: each of you give me $1, one gets $100 back
- Individually rational?
Ex ante vs. ex post

- Mechanism: each of you give me $1, one gets $100 back
- Individually rational?
  - Ex ante, yes
  - Ex post, no
Vickrey-Clarke-Groves

- Groves: efficient, strategy-proof
- Pivotal: individually-rational

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questions

- Assume quasi-linear values, etc.
- What is the allocation?
questions

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- What is the allocation?
- What are the payments?
questions

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- What are the payments?
- Why is it strategy proof?
questions

• Assume quasi-linear values, etc.

• What is the allocation?

• What are the payments?

• Why is it strategy proof?

• What are choice set monotonic, negative externality, single-agent effects?
Computational considerations

• Why is this mechanism a burden on the bidders?
Impossibility/possibility results

- e.g. strategy-proof, efficient, individually rational, and (strong) budget-balanced impossible