CS395T
Agent-Based Electronic Commerce
Fall 2006

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Week 3b

Good Afternoon, Colleagues

Are there any questions?

Correlated Equilibria

Sometimes mixing isn't enough: Bach/Stravinsky

		Wife	
		S	B
Me	S	2,1	0,0
	B	0,0	1,2

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Want only S,S or B,B - 50% each

Focal points

- We will both be in Paris for some time in June.

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- What are the Nash equilibria?

Mechanism Design

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- 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

		Player 2	
		Action 1	Action 2
Player 1	Action 1	4,8	2,0
	Action 2	6,2	0,8

- What's the mechanism in this game?

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- What's an alternative mechanism?

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- Allows for uncertainty about opponent **type**

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  – Is there a dominant strategy equilibrium?

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  – 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?

Incomplete Information Games

- We each get one of 3 cards: 1,2,3
- If we both fold, we both lose nothing
- If one raises and one folds, the raiser gets 1
- If both raise, the one with the higher card gets 5
- Zero sum

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		Card ?	
		R	F
Card 3	R	5,-5	1,-1
	F	-1,1	0,0

Incomplete Information Games

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	R	5,-5	1,-1
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Incomplete Information Games

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Card 1			
	F	-1,1	0,0

Bayes-Nash Equilibrium

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  > With more numbers and/or different payoffs, bluffing can be a part of the Nash Equilibrium

Ex ante vs. ex post

- Mechanism: each of you give me $1, one gets $100 back

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- Ex ante, yes

- Ex post, no

Vickrey-Clarke-Groves

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- Pivotal: individually-rational

	utility
camera alone	$50
flash alone	10
both	100
tripod	20

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– Groves: efficient, stategy-proof
– Pivotal: individually-rational

	utility
camera alone	$50
flash alone	10
both	100
tripod	20

	utility
camera	$60
flash	20
tripod	30

questions

- Assume quasi-linear values, etc.

- What is the allocation?

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- 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, inifividually rational, and (strong) budget-balanced impossible

Axelrod's tournament

- Iterated prisoner's dilemma with identity

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- What if you play infinitely?

- What if you play for a known finite amount of time?

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- Some strategies:

  – hawk (always Fink)
  – Grim trigger (cooperate until the other defects)
  – tit-for-tat
  – Joss (tit-for-tat with periodic defection)

Stochastic Games

- Bowling's tutorial slides