Oyun: Prisoner's Dilemma Tournaments in the Philosophy of Science

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Important Acknowledgments

- Development: Charles Pence
- Initial idea, first classroom use: Adam Elga, Princeton
- Classroom development: Lara Buchak, UC Berkeley

Thanks *especially* to Lara, who couldn't make it here today!
Examples here come from her courses.

Two Preliminaries

- Double-check that Oyun will start on your lab computer. If it's missing, I've got everything you need on a USB key!

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- Ask me for a preprint: Pence, Charles H. and Buchak, Lara. Forthcoming. "Oyun: A New, Free Program for Iterated Prisoner's Dilemma Tournaments in the Classroom." *Evolution: Education and Outreach.*

Teaching Philosophy of Science

- Most philosophy of science work: philosophy of particular sciences (physics, biology, social sciences, medicine, etc.)
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Goal: Present a small slice of cutting-edge research that we can introduce with 1-2 class periods of background

Cooperation and Free-Loading

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Guppy, *Poecilia reticulata*

Cases Amenable to Cheating

- Food gathering behavior
- Height of tree canopies
- Elephant seal male body size
- Replication of virus populations
- Grooming behavior in primates
- Shooting at enemies during WWI trench warfare
- Evolution of morality

Easley and Kleinberg 2010; Axelrod and Hamilton 1981; Axelrod 1984; Allchin 2009a,b

The Prisoner's Dilemma

The Prisoner's Dilemma

	B: Cooperate	B: Defect
A: Cooperate	3, 3	0, 5
	(mutual cooperation)	("sucker's payoff")
A: Defect	5, 0	1, 1
	(defector's payoff)	(mutual defection)

Payoff matrix (A's payoff, B's payoff)

Iterated PD Strategies
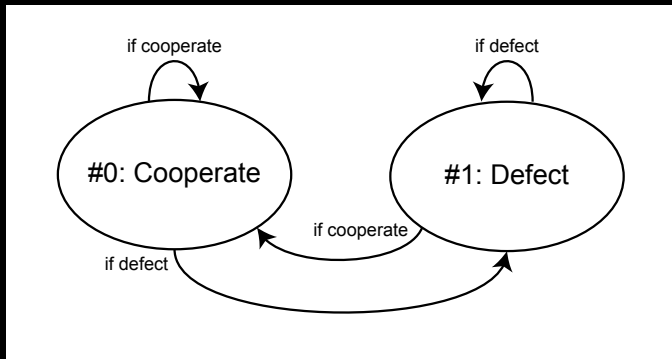
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  - Be nice
  - Be retaliatory
  - Be forgiving

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- Winning characteristics:
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- The optimal strategy: Tit-for-Tat

Finite State Machines

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```
John Doe       Student Name
Tit-For-Tat    Name of Strategy
2              Number of States
C, 0, 1        Action for 0, Transition if cooperate,
               Transition if defect
D, 0, 1        Action for 1, Transition if cooperate,
               Transition if defect
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Questions?

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