CS 103: Lecture 4 Game Theory

Dan Sheldon

September 22, 2015

Announcements

- HW 1 due Thursday. Should be partially completed.
- Office Hours
  - Dan Tuesday 4-5pm
  - Areeba Tuesday 7–8pm
  - Tiffany Wednesday 8–9pm
- Blog posts announced Thursday

Plan for today

- Structural balance in general networks
- Intro to game theory (board work)

Game Theory

Networks: how people are connected structurally

Game theory: how people's behavior depends on one another (*strategically*)

- Traffic
- Pollution
- Choice of technology
- Pricing / design of products
- Auctions

Plan

- **Now**: Intro to Game Theory
- **Later**: Game Theory + Networks

Board Work

- Prisoner's Dilemma
- Definition of a game
  - Players
  - Srategies
  - Outcomes
  - Payoff matrix
- Assumptions
  - Players maximize payoff
  - Rational players
  - Full knowledge of game
  - No communication

Board Work

- Predicting outcomes of games
  - Best response (BR)
  - Dominant Strategy (DS)
  - Nash equilibrium (NE)
- Examples of games
  - No DS for one player
  - No DS for either player (coordination)
  - Battle of sexes
  - Hawk-dove