

Remarks on Game Theory and Strategy

presented at National Security and Military Space Workshop

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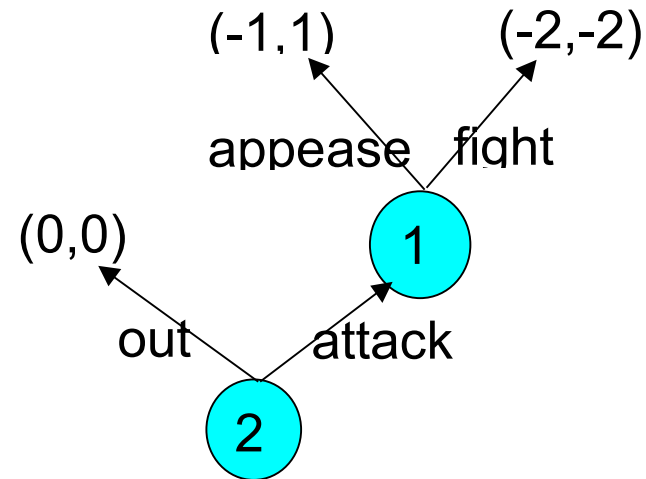
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Introduction

- ◆ focus on illustrative examples showing the type of reasoning used by game theorists and some of the types of problems they study
- ◆ I won't try to talk about issues specific to space and space systems: that is your expertise not mine
- ◆ will focus on simple illustrative examples rather than broad theoretical notions

Reputation and Commitment

- ◆ theory most relevant to broader strategic issues



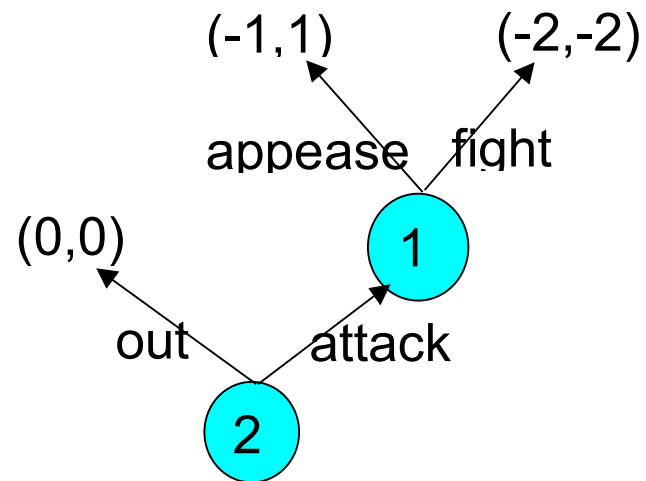
The “Chain Store Game”

Player 1 = US (monopolist)

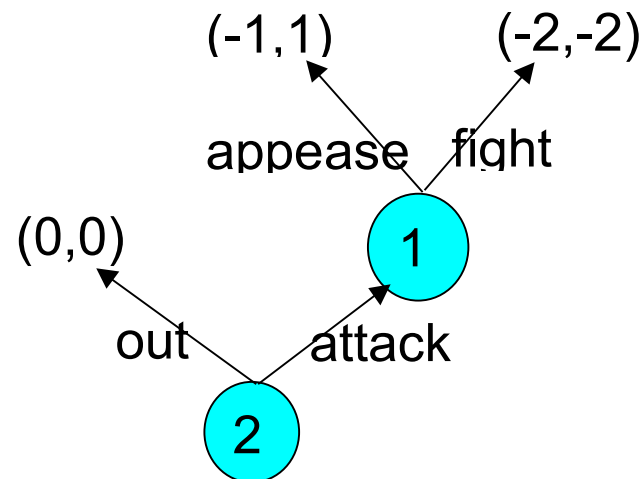
Player 2 = small nasty country (entrant)

strength of game theory: see common element of different situations

explain the “extensive form”



- ◆ analysis of one-time play
- ◆ commitment versus reputation: Dr. Strangelove
- ◆ commitment: credible and public
- ◆ institutions: interest groups; choice of decision makers



- ◆ analysis of T-times play: the paradox
- ◆ analysis of infinite play
- ◆ reputation theory

H.R. Haldeman quoting Nixon: "I want the North Vietnamese to believe I've reached the point where I might do anything to stop the war. We'll just slip the word to them that 'For God's sake, you know, Nixon is obsessed about communism. We can't restrain him when he's angry - and he has his hand on the nuclear button....'"

Strategic Uncertainty & Zero-Sum Games

- ◆ basic assumption of rationality: strategies are known to both players
- ◆ but we allow strategies to be random

Matching pennies

	H	T
H	1,-1	-1,1
T	-1,1	1,-1

No equilibrium; but mixed strategy equilibrium where both randomize 50-50

- ◆ mixed strategies of crucial importance in zero-sum games
- ◆ uncertainty is relevant in most contexts, but not necessarily mixed strategies
- ◆ data from tennis, soccer, baseball
- ◆ the better players get the game theory right in the important matches
- ◆ it is hard to randomize correctly without explicit randomizing devices
 - people tend to under estimate the length of runs

Other Things that are Hard to Do Correctly

- ◆ Bayes law and using new information effectively
- ◆ bidding in auctions: winner's curse