

# Econ 110/PoliSci 135

## Section 1 Notes

Anne Meng

September 3, 2013

### 1 Assignment: Introduction Letter

Please write a one page-ish letter to me introducing yourselves. I would like you to include the following information:

- Year and major
- A bit of info about yourself such as where you're from, what campus activities you're involved with, etc.
- Your math background
- A current picture of yourself

I will collect your introduction letters in section next week.

### 2 Strategic Form Games

#### 2.1 Concepts

A **strategic form game** (sometimes also called the **normal form game**) is one where all players make their decisions in ignorance. This can be because a.) all the players must move simultaneously, or b.) they do not know what action the other player(s) took.

Strategic form games are composed of the following:

1. The list of players in the game.
2. The set of strategies (aka alternatives) available to each player.
3. The payoffs associated with any strategy combination. These payoffs allow us to derive each player's preferences over all the ways the game can be played. Note that these preferences are over *outcomes*, not *actions*.

A **strictly dominated** strategy is a strategy in which a player can always do *strictly better* (so indifference is not allowed here) by choosing a different strategy, regardless what all the other players are doing. Note that a strictly *dominated* strategy and a strictly *dominant* strategy are opposites.

The process in which we eliminate strictly dominated strategies is called **Iterated Deletion of Strictly Dominated Strategies**. If IDSDS produces a unique solution, then we call the game **Dominant Solvable**.

## 2.2 An Example

Solve the following normal form game using IDSDS:

	W	X	Y	Z
A	-5, 1	0, 5	1, 1	-4, 1
B	2, 2	4, -1	2, 3	-1, 4
C	1, 4	1, -1	3, 2	7, 3
D	3, 5	2, -1	5, 1	2, 3

A note on how to read strategic form games: Unless otherwise specified, Player 1 is the row player and Player 2 is the column player. Payoffs are written in the following order: (row, column), so in our game above, the payoffs are written as (Player 1, Player 2).

## 2.3 Applying the concepts

The game above is a strategic form game because the players are acting simultaneously.

1. Players 1 and 2 are the players in the game
2. Player 1's strategies = {A,B,C,D} and Player 2's strategies = {W,X,Y,Z}
3. Each player has 16 payoffs, which informs us of each player's preferences over all the ways in which the game can be played.

There is one unique solution of the game, in which Player 1 plays D and Player 2 plays W.

D strictly dominates A because  $3 > -5$ ,  $2 > 0$ ,  $5 > 1$  and  $2 > -4$ . Given that A is eliminated, Z strictly dominates X and Y. Given these eliminations, D strictly dominates B, then W strictly dominates Z, then D strictly dominates C.

We were able to solve the game using IDSDS, which means that the game is Dominant Solvable.