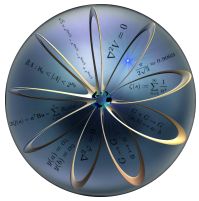

planetmath.org

Math for the people, by the people.

strategy

Canonical name	Strategy
Date of creation	2013-03-22 12:52:02
Last modified on	2013-03-22 12:52:02
Owner	Henry (455)
Last modified by	Henry (455)
Numerical id	7
Author	Henry (455)
Entry type	Definition
Classification	msc 91A99
Related topic	Game
Defines	strategy
Defines	pure strategy
Defines	mixed strategy
Defines	strategy space

A *pure strategy* provides a definition for a way a player can play a game. In particular, it defines, for every possible choice a player might have to make, which option the player picks. A player's strategy space is the set of pure strategies available to that player.

A *mixed strategy* is an assignment of a probability to each pure strategy. It defines a probability over the strategies, and reflect that, rather than choosing a particular pure strategy, the player will randomly select a pure strategy based on the distribution given by their mixed strategy. Of course, every pure strategy is a mixed strategy (the function which takes that strategy to 1 and every other one to 0).

The following notation is often used:

- S_i for the strategy space of the i-th player
- s_i for a particular element of S_i; that is, a particular pure strategy
- σ_i for a mixed strategy. Note that $\sigma_i \in S_i \to [0,1]$ and $\sum_{s_i \in S_i} \sigma_i(s_i) = 1$.
- Σ_i for the set of all possible mixed strategies for the i-th player
- S for $\prod_i S_i$, the set of all possible of pure strategies (essentially the possible outcomes of the game)
- Σ for $\prod_i \Sigma_i$
- σ for a *strategy profile*, a single element of Σ
- S_{-i} for $\prod_{j \neq i} S_j$ and Σ_{-i} for $\prod_{j \neq i} \Sigma_j$, the sets of possible pure and mixed strategies for all players other than i.
- s_{-i} for an element of S_{-i} and σ_{-i} for an element of Σ_{-i}.