

# Game Theory

Instructor: Patroklos Benatos

## What is Game Theory?

Game theory is a young and fascinating interdisciplinary science. It can be used to gain insight into an incredibly diverse range of phenomena happening around us,

- from why people dump their trash on empty lots or sneak excess hand luggage onto flights to the measure of voting power of nations in the United Nations Security Council
- from how to design an algorithm for selling positions for ad placement on Google search results to how a tax authority might design its auditing strategy
- from how companies might design their product development strategy to how military commanders might split their forces between installations that need to be protected in case of terrorist threats or guerilla warfare
- from the ratio of the three different types of males in the Californian side-blotched lizard population to how to design peer-to-peer torrent downloading applications... and the list could go on and on.

Amazingly, all these situations share a common set of notions and relationships that form a theory called “game theory”. Areas of study where familiarity with this theory is useful include **Economics and Business, Political Science, Sociology, Psychology, Philosophy, Biology, Physics, Engineering, Computer Science and Mathematics** – but we can leave the naming of formal academic subjects behind and simply say that it contributes to your overall intelligence about life in general.

The good news is that a reasonably serious introduction to the field can be given to undergraduate students with some initial exposure to simple set theory and the style of rigorous/mathematical thinking; the lack of familiarity with advanced mathematical tools does not hinder the understanding of the basics of the theory. Those who plan to continue their education in one of the areas mentioned or are simply interested in incorporating such a way of thinking in their overall outlook are encouraged to check out this course.

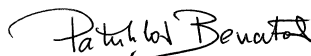
A bishop in the 16<sup>th</sup> century wrote:

*“Marriage has less beauty, but more safety than the single life. It is full of sorrows and full of joys. It lies under more burdens, but it's supported by all the strengths of love and those burdens are delightful.”*

... and never would have thought that people in the 21<sup>st</sup> century would be able to give a game-theoretic interpretation to his words. Of course, not *all* people – *only* people who have a little familiarity with game theory!

So come on in – where else would you study game theory but at the birthplace of one of its very founders, [John von Neumann](#)?

Let's get your feet wet!



Patroklos Benatos  
Instructor of the course