Game Theory
to the Rescue When Hard Decisions Are to Be Made

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EuroPython 2016, Bilbao
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Speaker, Trainer...
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Game Theory
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If game theory is about anything, it’s about anticipating how others will act.

About Strategy.
1713  First known mention in "Waldegrave" letter

1838  Antoine Augustin Cournot
       "Recherches sur les principes mathématiques de la théorie des richesses"

1913  Ernst Zermelo
       "Über eine Anwendung der Mengenlehre auf die Theorie des Schachspiels"

1928  John von Neumann
       "Zur Theorie der Gesellschaftsspiele" paper

1944  "Theory of Games and Economic Behavior" book
       co-authored with Oskar Morgenstern

1950  Prisoner's dilemma - Merrill Flood & Melvin Drescher
       John Nash - Nash equilibrium
If game theory is about anything, it’s about anticipating how others will act.

About Strategy.
Zero Sum Games

Winner and loser
Zero Sum Games

Winner and loser

B wins if count of fingers is odd

A wins if count of fingers is Even

strategic form
Zero Sum Games

Winner and loser
Zero Sum Games

- Winner and loser

Nonzero Sum Games

- Synergy - everyone gains
Nonzero Sum Games

Synergy - everyone gains
Nonzero Sum Games

Synergy - everyone gains

A and B gain if count of fingers is equal
Games with Perfect Information

Chess, Go, Tic Tac Toe

Games with Incomplete Information

Life
Prisoners' Dilemma
Prisoners' Dilemma
Prisoners' Dilemma

<table>
<thead>
<tr>
<th></th>
<th>Confess</th>
<th>Keep quiet</th>
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<td>Confess</td>
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<td>0, -20</td>
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Prisoners' Dilemma
## Prisoners' Dilemma

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Gambit

http://gambit.sourceforge.net/gambit15/index.html

Evolving strategies for an Iterated Prisoner's Dilemma tournament
Martin Jones


Game Theory - Stanford / Coursera
Matthew O. Jackson, Kevin Leyton-Brown, Yoav Shoham

https://www.coursera.org/learn/game-theory-1
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