



# 1-2 SelfInterest-2

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1-2  
SelfInter...



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Self-Interested Agents and Utility Theory

Game Theory Course:  
Jackson, Leyton-Brown & Shoham

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Self-interested agents

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- What does it mean to say that an agent is **self-interested**?
  - not that they want to harm others or only care about themselves
  - only that the agent has its own description of states of the world that it likes, and acts based on this description

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- What does it mean to say that an agent is **self-interested**?
  - not that they want to harm others or only care about themselves
  - only that the agent has its own description of states of the world that it likes, and acts based on this description
- Each such agent has a **utility function**
  - quantifies** degree of preference across alternatives
  - explains the impact of **uncertainty**
  - Decision-theoretic rationality**: act to maximize expected utility.

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Why Utility?

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- It might seem obvious that preferences can be described by utility functions. But:
  - Why is a **single-dimensional** function enough?
  - Why should an agent's response to uncertainty be captured purely by an **expected value**?
- Thus, our claim is substantive.
- There's a famous theorem (von Neumann & Morgenstern, 1944) that derives the existence of a utility function from a more basic preference ordering and axioms on such orderings.

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