

Introduction to Artificial Intelligence

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What is Intelligence?

Exercise:

What is Intelligence?



What is Artificial Intelligence?

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Some definitions of Artificial Intelligence

Thinking Humanly

- "The exciting new effort to make computers think...machines with minds, in the full and literal sense." (Haugheland, 1985)
- "[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning,..." (Bellman, 1978)

Acting Humanly

- "The art of creating machines that perform functions that require intelligence when performed by people." (Kurzweil, 1990)
- "The study of how to make computers do things at which, at the moment, people are better." (Rich/Knight, 1991)

Thinking Rationally

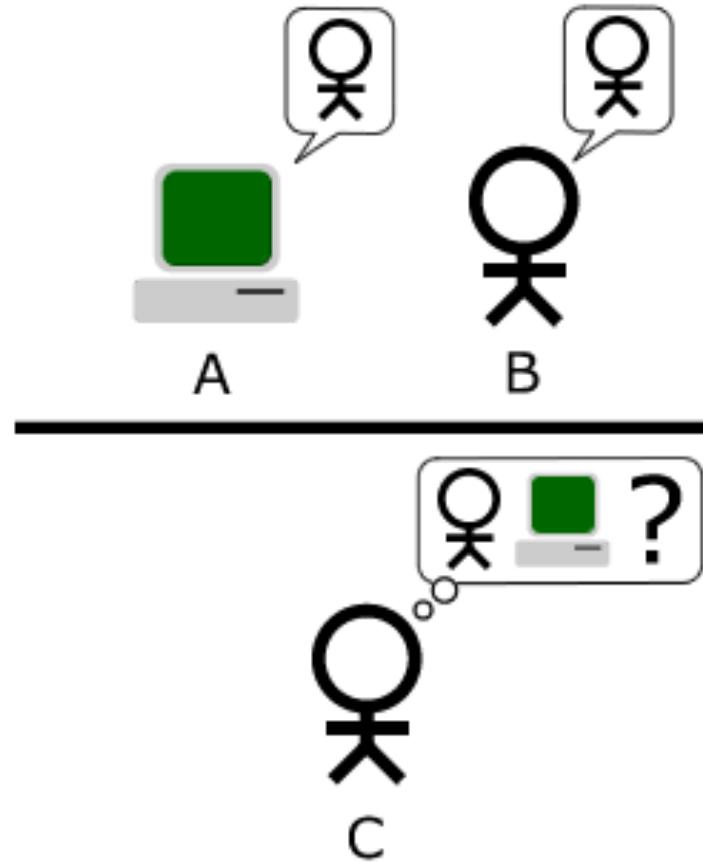
- "The study of mental faculties through the use of computational models."(Charniak/McDermott, 1985)
- "The study of the computations that make it possible to perceive, reason and act." (Winston, 1992)

Acting Rationally

- "Computational Intelligence is the study of the design of intelligent agents." (Poole et al, 1998)
- "AI...is concerned with intelligent behavior in artifacts." (Nilsson, 1998)

Acting Humanly

The Turing test



Source: wikipedia Commons, Bilby

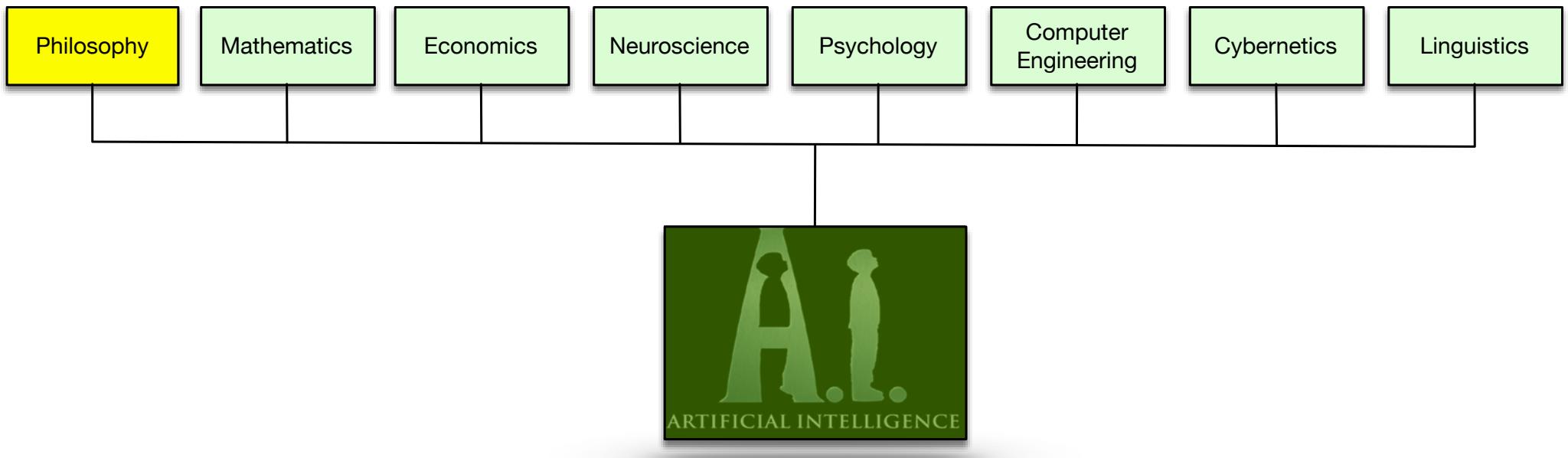
Alternative definition: "artificial intelligence is equivalent to pass the Turing test".

Acting humanly



Source: getdigital.de

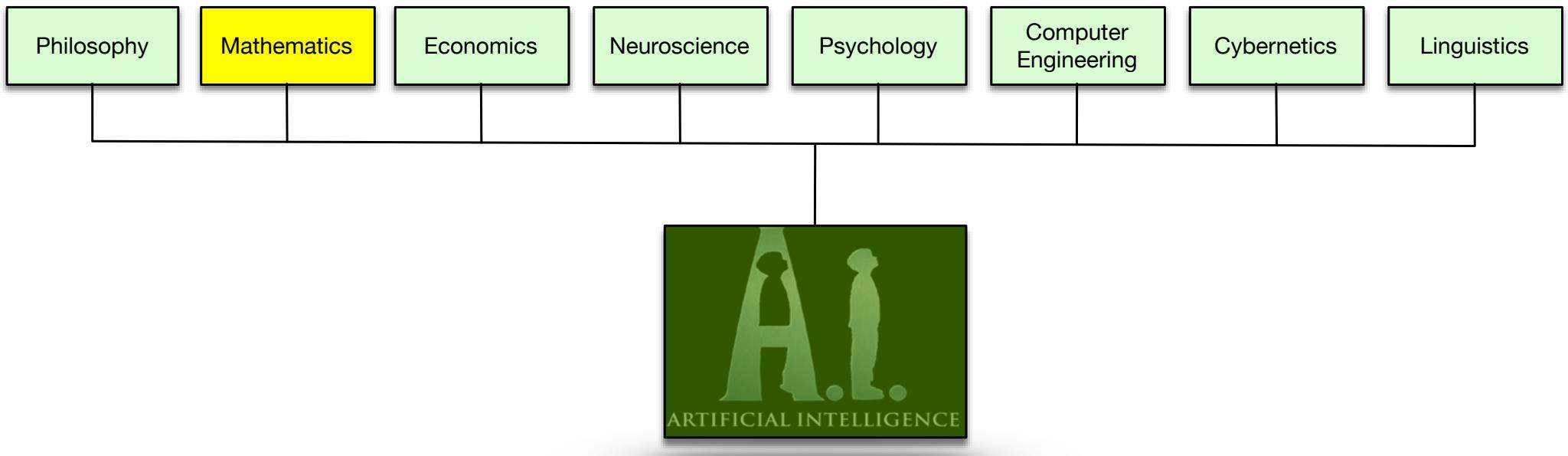
Roots of AI



Philosophy:

- Can formal rules be used to draw valid conclusions?
- How does the mind arise from a physical brain?
- Where does the knowledge come from?
- How does knowledge lead to action?

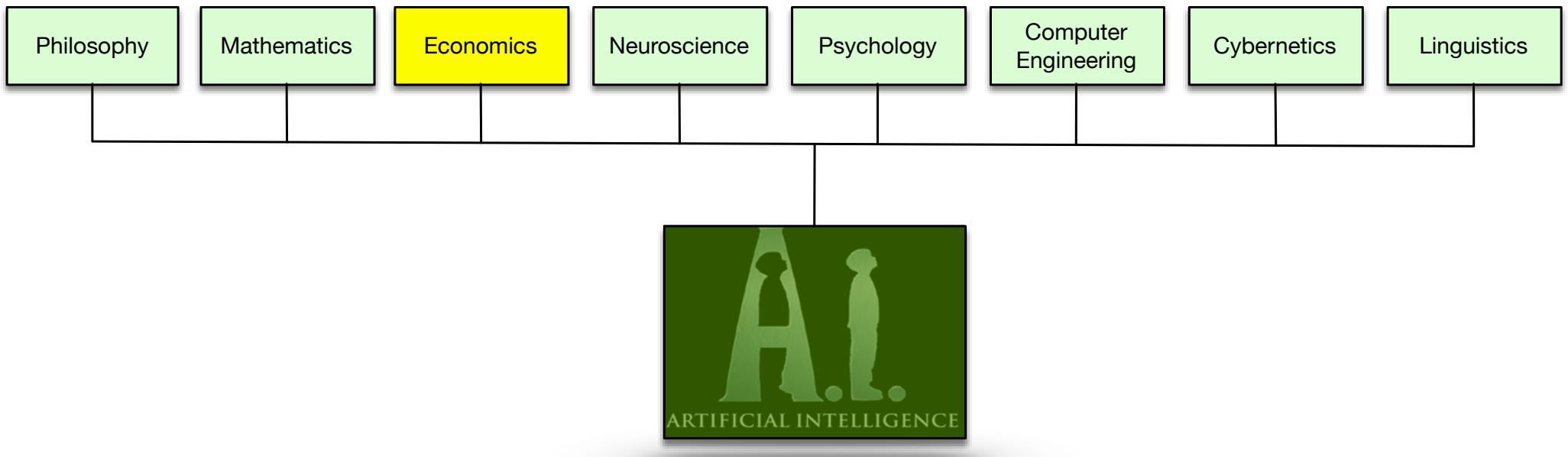
Roots of AI



Mathematics:

- What are the formal rules to draw valid conclusions?
- What can be computed?
- How do we reason with uncertain information?

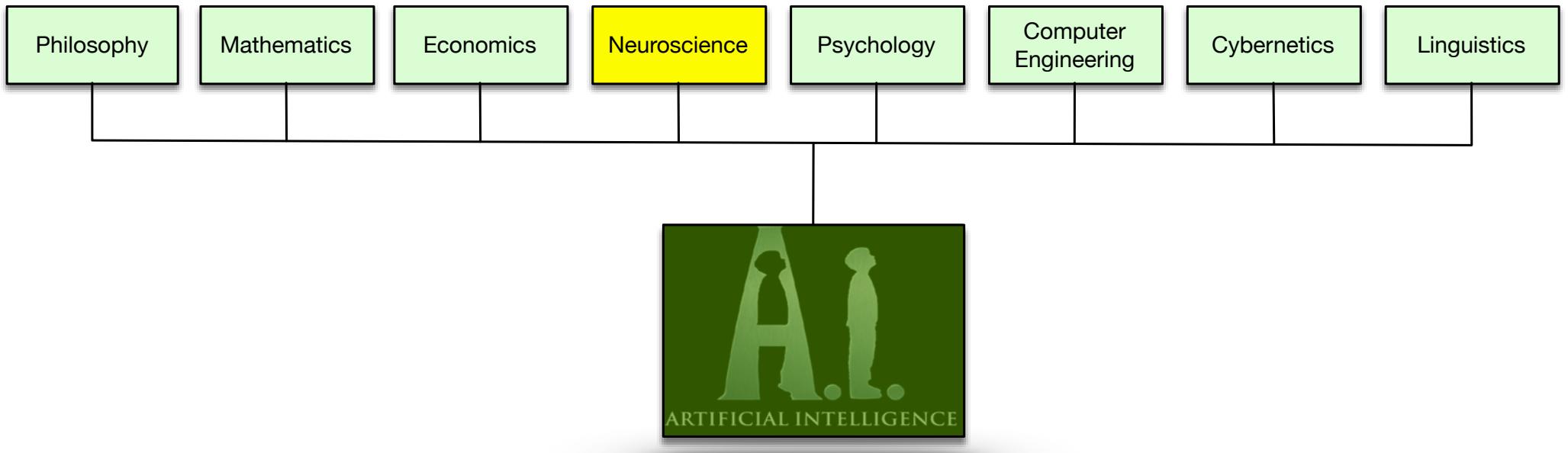
Roots of AI



Economics:

- How should we make decisions to maximize payoff?
- How should we do this when others may not go along?
- How should we do this when the payoff may be far in the future?

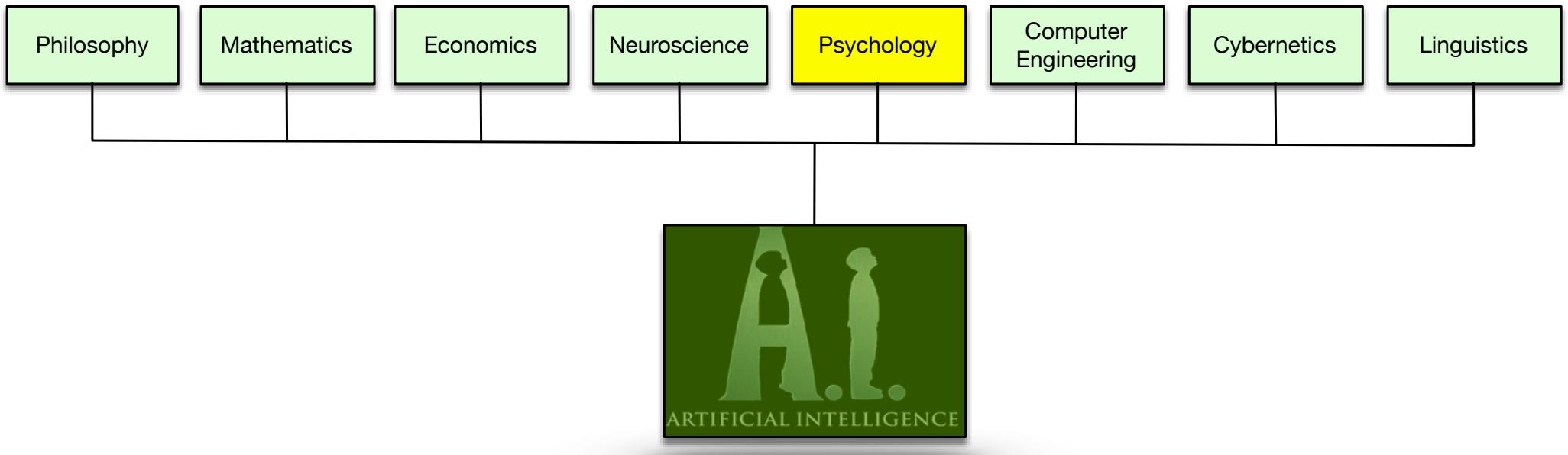
Roots of AI



Neuroscience:

- How do brains process information?

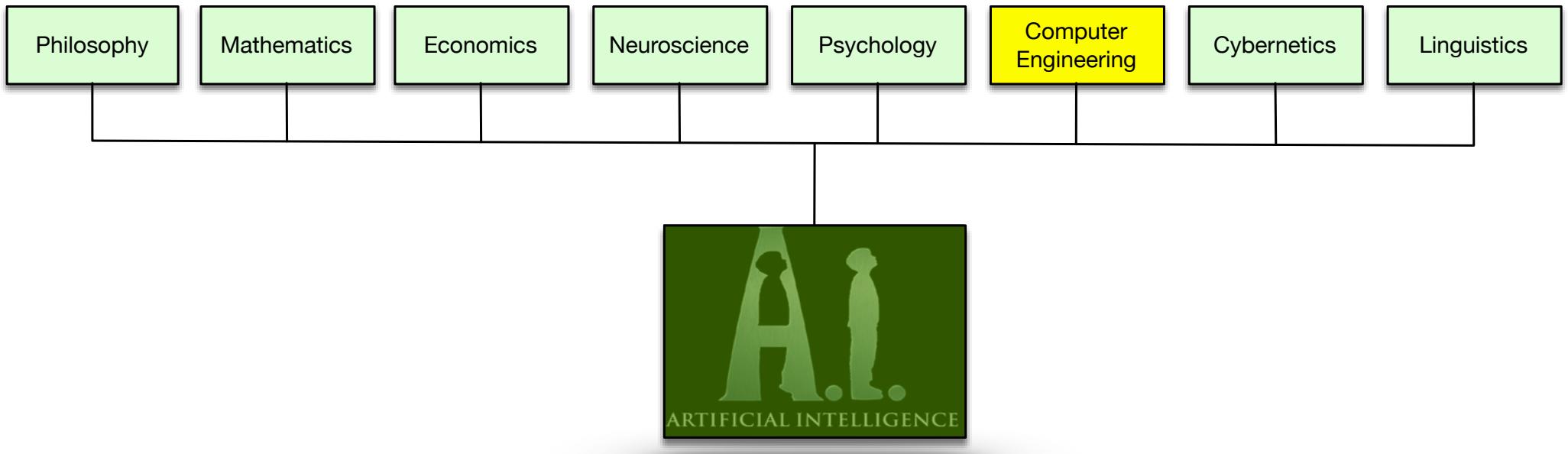
Roots of AI



Psychology:

- How do humans and animals think and act?

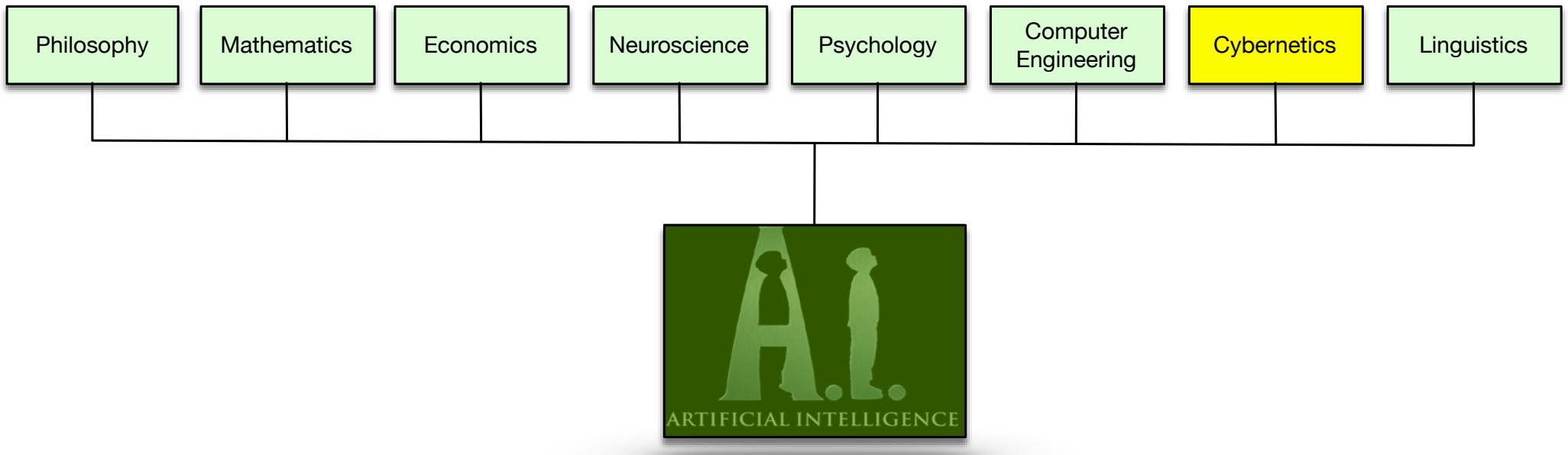
Roots of AI



Computer engineering:

- How can we build an efficient computer?

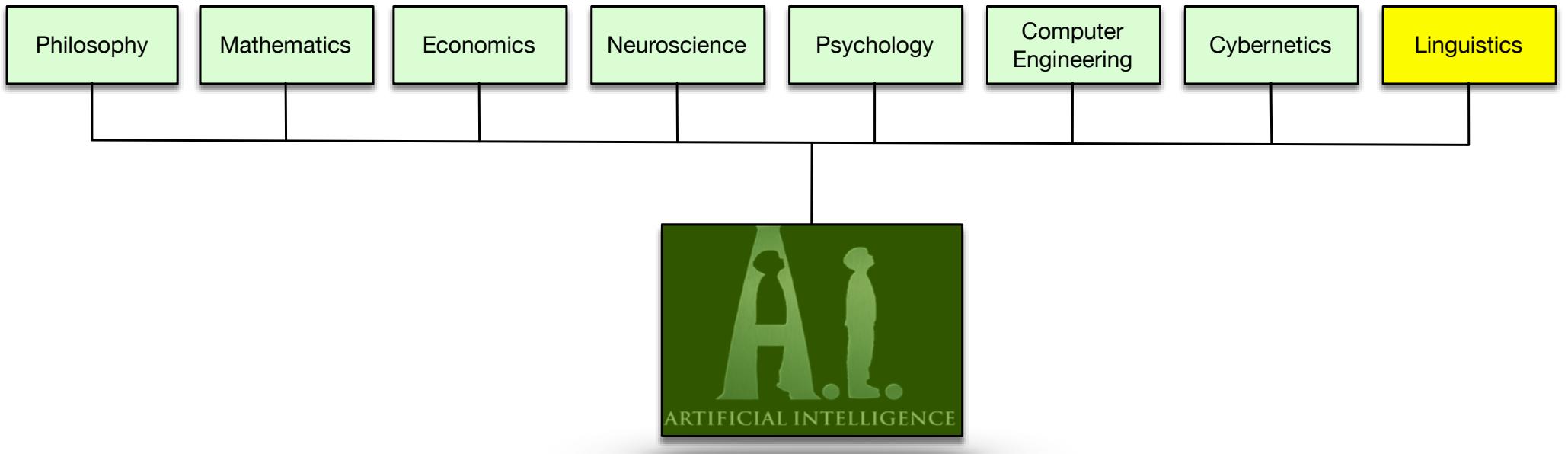
Roots of AI



Cybernetics:

- How can artifacts operate under their own control?

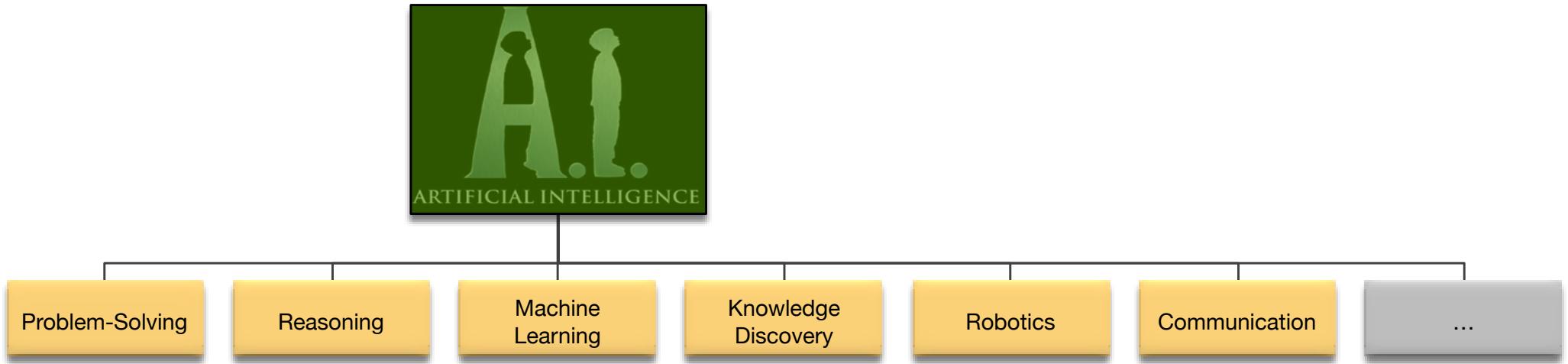
Roots of AI



Linguistics:

- How does language relate to thought?

Fields in AI

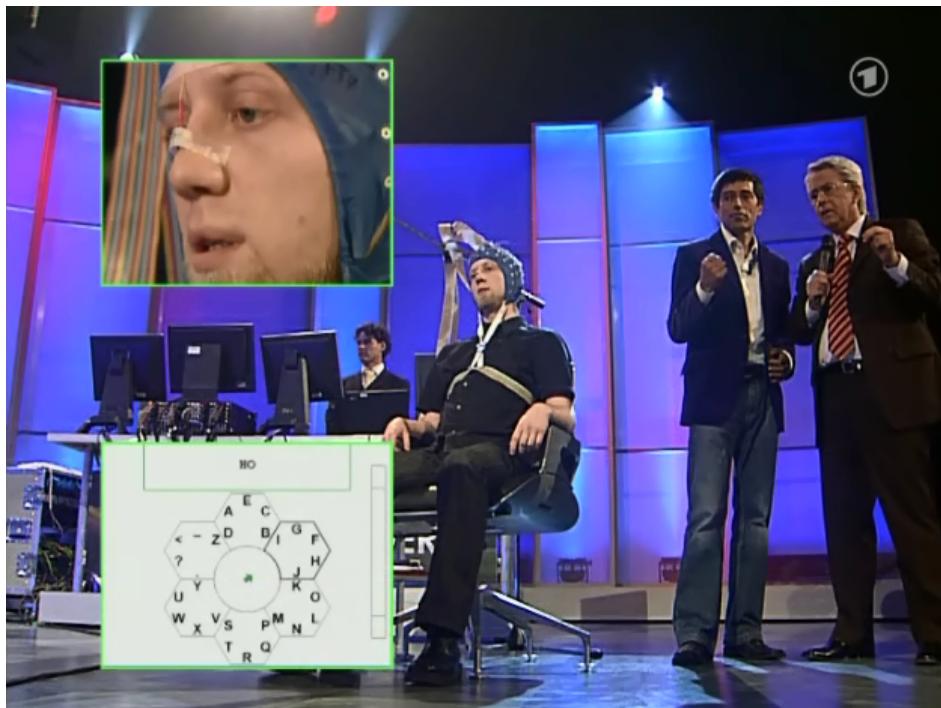


Application of Machine Learning

- Spam filters
- Recommendations (Amazon, Netflix, Google)
- Data Mining
- Intrusion detection
- Image recognition
- Speaker detection
- Voice recognition (Siri, Cortana)
- Internet Search
- ...

Application of Machine Learning

Brain-Computer Interfacing



Autonomous Driving

(Source: Thrun)

Fields in AI

