Introduction

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References

- Tri tue nhan tao = Thong minh + Giai thuat (2008) - Cao Hoang Tru
- Artificial Intelligence: A Modern Approach (2009) - Stuart Russell and Peter Norvig
- Machine Learning (1997) - Tom Mitchell
- Fuzzy Sets and Fuzzy Logic (1995) - George J. Klir and Bo Yuan
- Slides (Sakai)

Outline

Outline

4. Game Playing
   - Minimax procedure
   - Alpha-beta cutoffs
   - Additional refinements
5. Planning
   - Linear Planning
   - Non-linear Planning
6. Knowledge Representation and Reasoning
   - What is knowledge representation?
   - Using propositional logic
   - Using predicate logic

Outline

7. Structured knowledge
   - Semantic networks
   - Frames
   - Conceptual graphs
8. Uncertainty and Imprecision
   - Review of probability theory
   - Bayesian networks
   - Fuzzy sets and fuzzy relations
   - Fuzzy rules and fuzzy control
9. Machine Learning
   - Learning problem
   - Concept learning
   - Candidate-elimination algorithms
   - Decision trees

Assessment

- 20% Assignments
- 80% Final Exam

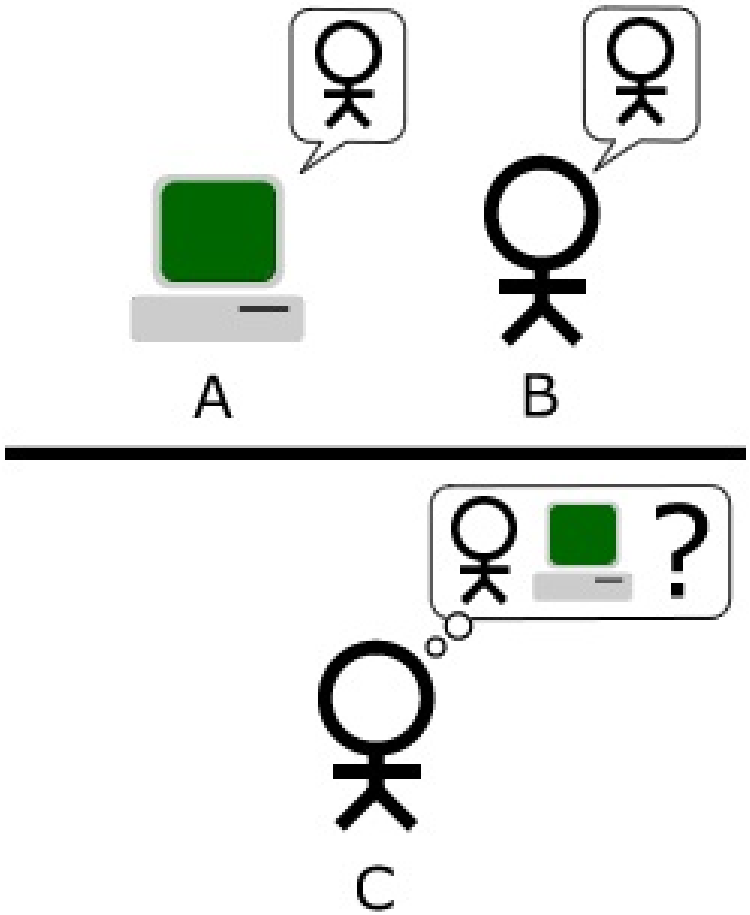
What is AI?

Intelligence: ability to learn, understand and think (Oxford dictionary)

Artificial: made or produced to copy sth natural; not real (Oxford dictionary)

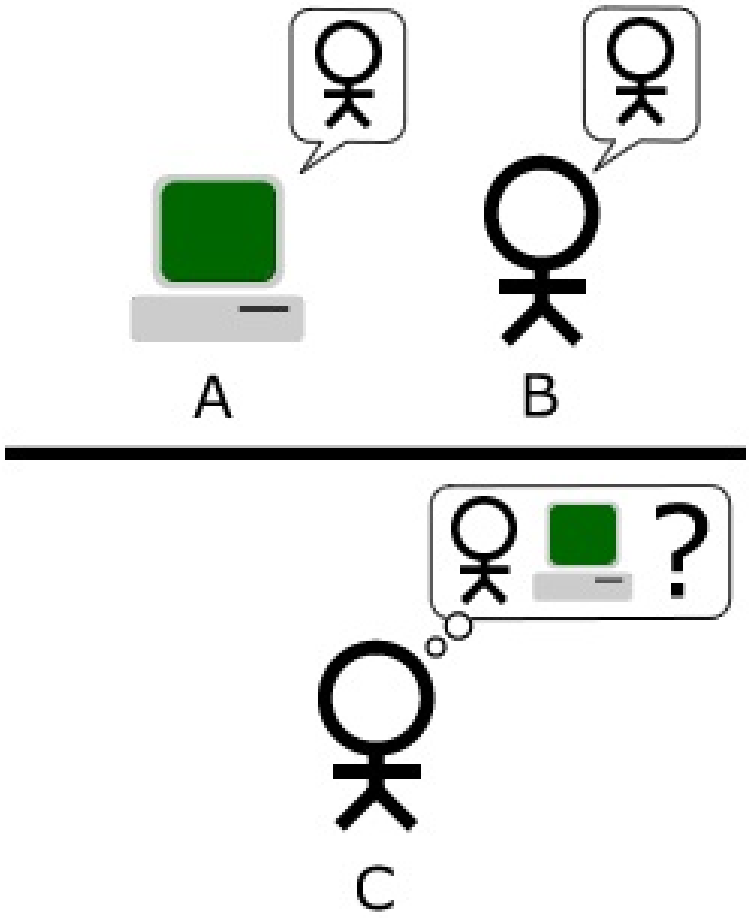
Thinking Humanly	Thinking Rationally
Acting Humanly	Acting Rationally

Acting Humanly: Turing Test



The computer would need to possess the following capabilities...

Acting Humanly: Turing Test



The computer would need to possess the following capabilities:

- natural language processing
- knowledge representation
- automated reasoning
- machine learning
- ???
- ???

Thinking humanly: The cognitive modeling approach

We need to get inside the actual workings of human minds

Thinking rationally: The "laws of thought" approach

Example

"Socrates is a man; all men are mortal; therefore, Socrates is mortal"

Logic

Two main obstacles: ???

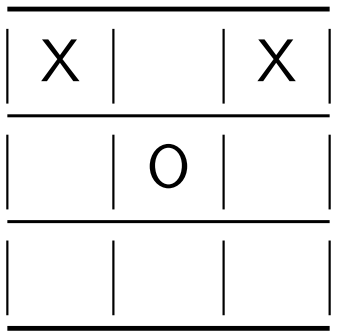
Acting rationally: The rational agent approach

- An agent is just something that acts
- A rational agent is one that acts so as to achieve the best outcome or, when there is uncertainty, the best expected outcome
- Advantages???

The Foundations and History of AI

Reading in "Introduction" in Chapter 1 AIMA Russel & Norvig.

Problem 1: Tic - Tac - Toe



Problem 2: Question Answering

Facts

"Mary went shopping for a new coat. She found a red one she really liked. When she got it home, she discovered that it went perfectly with her favorite dress".

Questions

Q1: What did Mary go shopping for?
Q2: What did Mary find that she liked?
Q3: Did Mary buy anything?

Answers

A1: .....
A2: .....
A3: .....

What is AI?

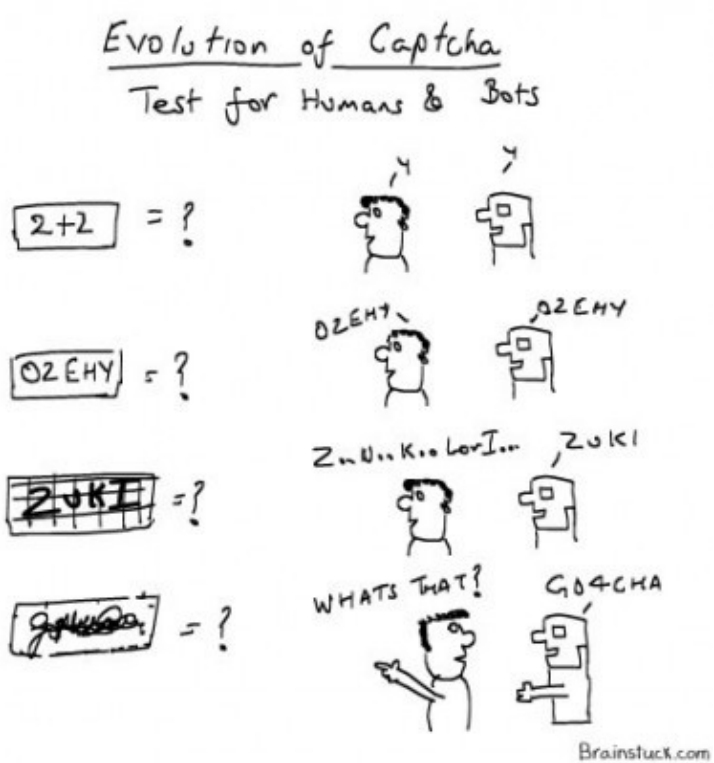
Not about what human beings can do!

About how to instruct a computer to do what human beings can do!

AI = AIgorithm + Intelligence

The state of the art

- Robotic vehicles
- Speech recognition
- Game playing
- Spam fighting
- Logistics planning
- Robotics
- Machine Translation



More Problems

- Missionaries & Cannibals
- 8-queens
- 8-puzzle
- 2048
- UnBlock Me
- The Tower of Hanoi
- Pacman
- Battle City (AKA Tank 1990)
- Chicken Invaders
- Tower Defense