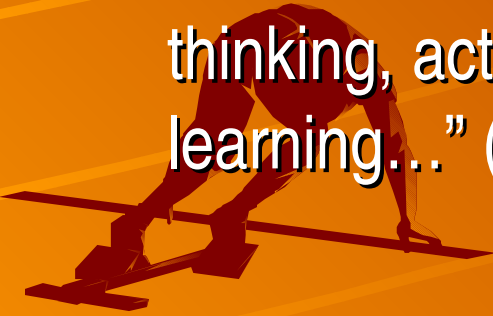


Artificial Intelligence



➤ What is Artificial Intelligence (AI)?

- “the exciting new effort to make computers think ... machines with minds, in the full and literal sense.” (Haugeland, 1985)
- “the automation of activities that we associate with human thinking, activities such as decision making, problem solving, learning...” (Bellman, 1978)
- ✓ Systems that think like humans.



✦ “the study of mental faculties through the use of computational model.” (Charniak and McDermett, 1985)


✦ “the study of the computations that make it possible to perceive, reason and act.” (Winston, 1984)

✓  Systems that think rationally

✦ “the art of creating machines that perform functions that require intelligence when performed by people.”
(Kurzweil, 1990)

✦ “The study of how to make computers think at which, at the moment, people are better.” (Rich and Knight, 1984)

✓ Systems that act like humans.



✦ “a field of study that seeks to explain and emulate intelligent behavior in terms of computational process.” (Schalkoff, 1990)

✦ “the branch of computer science that is concerned with the automation of intelligent behaviour.” (Luger and Stubblefield, 1993)

✓ Systems that act rationally

✦ Systems that think like humans

✦ Systems that act like humans

✦ Systems that think rationally

✦ Systems that act rationally

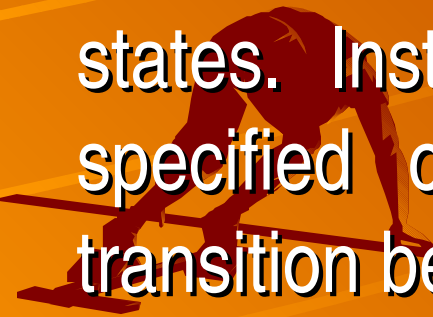


- Acting Humanly: Turing Machine Approach
- Thinking Humanly: The Cognitive Modeling Approach
- Thinking Rationally: The Laws of Thought Approach
- Acting Rationally: The Rational Agent Approach

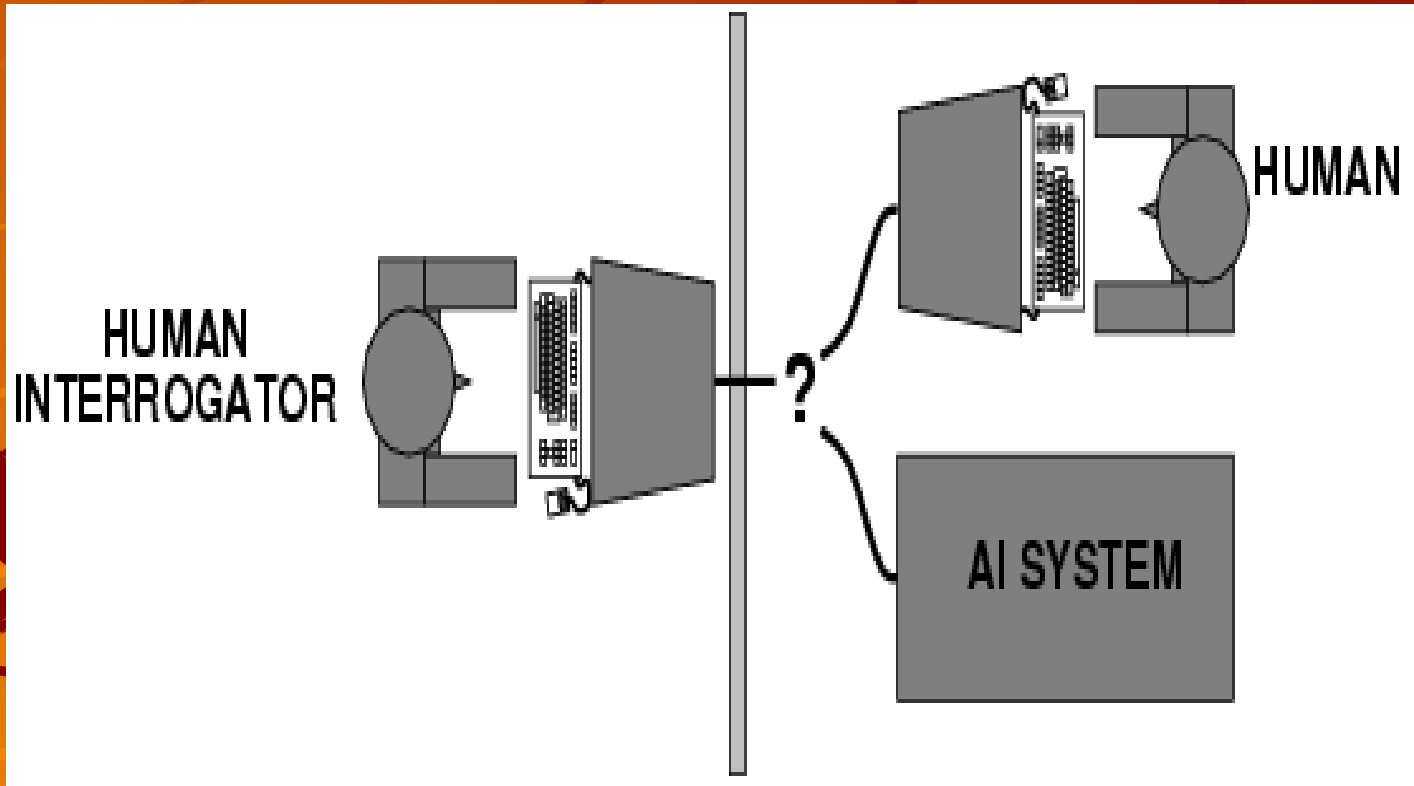


➤ Acting Humanly: Turing Machine Approach

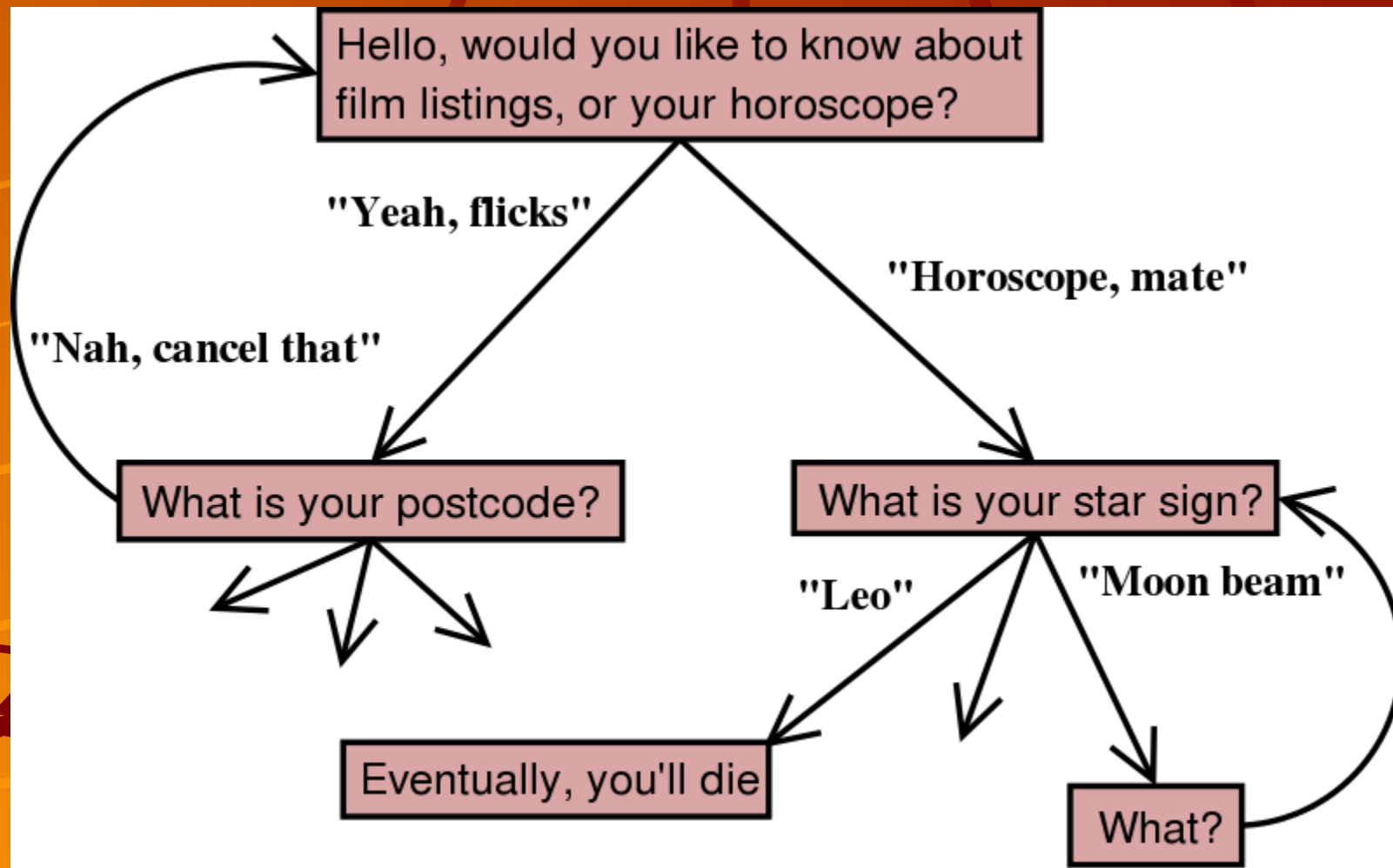
A Definition of Turing Machines

- ✦ A Turing machine is a kind of *state machine*. At any time the machine is in any one of a finite number of states. Instructions for a Turing machine consist in specified conditions under which the machine will transition between one state and another.
- 

Turing Test

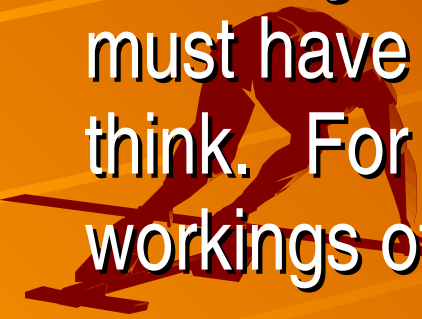


Turing Test / Finite State Automata



➤ Thinking Humanly: The Cognitive Modeling Approach

- The interdisciplinary field of cognitive science brings together computer models from Artificial Intelligence and experimental techniques from cognitive psychology to try to construct precise and testable theories of the workings of the human mind. And if we are going to say that a given program thinks like a human being, we must have some way of determining how human beings think. For that, we need to get inside the actual workings of the human mind.



✦ What is Cognitive Science?

- ✦ Cognitive science is the interdisciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology.



✦ What is Physical Symbol Systems?

- ✦ a physical symbol system has the necessary and sufficient means for general intelligent action.

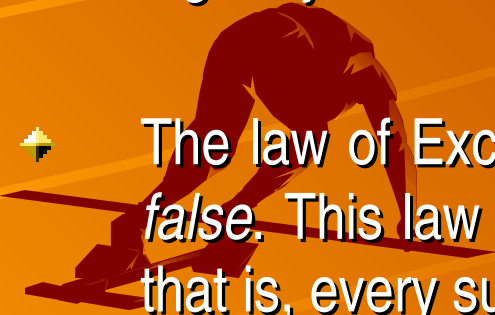


➤ Thinking Rationally: The Laws of Thought Approach

✦ The law of Identity asserts that *if any statement is true, then it is true*. This law asserts that every statement of the form $P \supset P$ is true, and that every such statement is a tautology.

✦ The law of Contradiction asserts that *no statement can be both true and false*. This law asserts that every statement of the form $P \cdot \sim P$ is false, that is, every such statement is self-contradictory, and its negation is logically true.

✦ The law of Excluded-Middle asserts that *any statement is either true or false*. This law asserts that every statement of the form $P \vee \sim P$ is true, that is, every such statement is a tautology.



➤ Acting Rationally: The Rational Agent Approach

- Agent = Architecture + Program

