



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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Chennai



DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

19AMB303-FULL STACK AI

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Introduction to AI



- **Intelligence:**

The ability to acquire and apply knowledge and skills.

- **Knowledge:**

The facts, information, and skills acquired through experience or education

Awareness or familiarity gained by experience of a fact or situation.



Introduction



- **Wisdom:**

The quality of having experience, knowledge, and good judgment; the quality of being wise.

The body of knowledge and experience that develops within a specified society or period.

The fact of being based on sensible or wise thinking.

What is AI?

- Build intelligent artifacts vs. understanding human behavior.
- Does it matter how I built it as long as it does the job well?
- Should the system behave like a human or behave *intelligently*?





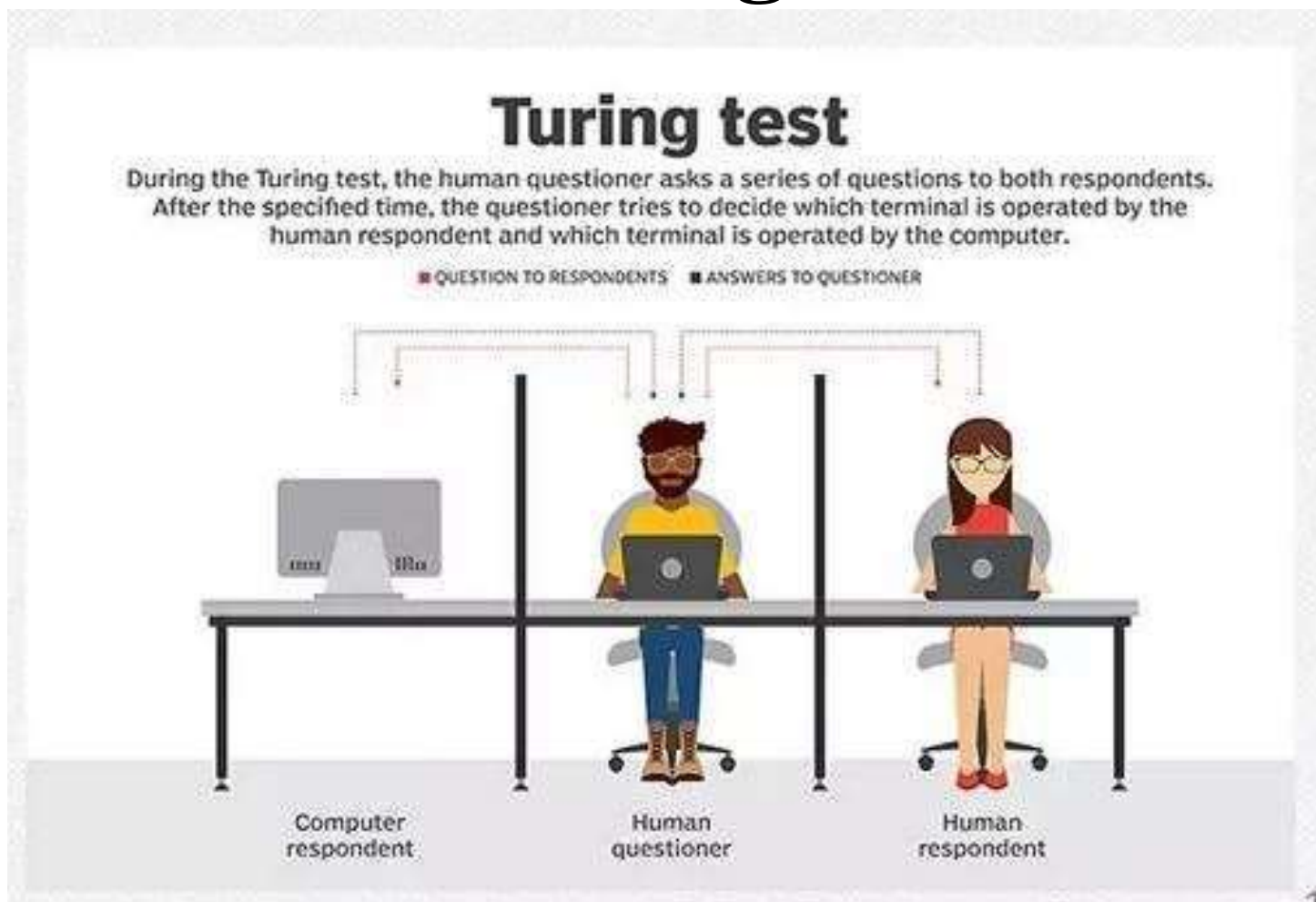
Definitions of AI

<p>Systems that think like humans</p> <p>Decision making system, Problem solving , learning (Bellman,1978)</p>	<p>Systems that think rationally</p> <p>Study of the computations that make it possible to perceive, reason and act (Winston, 1992)</p>
<p>Systems that act like humans</p> <p>Study of how to make computers do things at the moment people are better (Rich and Knight,1991)</p>	<p>Systems that act rationally</p> <p>AI is concerned with intelligent behaviour in artifacts. (Nilson,1998)</p>



Acting humanly

Turing Test





Acting humanly: Turing Test

- Natural language processing
- Knowledge Representation
- Automated reasoning.
- Machine Learning
- Computer vision, speech recognition, finding data on the web, robotics, and much more.



Thinking humanly: cognitive modeling

- 1960s "cognitive revolution": information-processing psychology
 - Requires scientific theories of internal activities of the brain
 - -- How to validate? Requires
 - 1) Predicting and testing behavior of human subjects (top- down)
 - or 2) Direct identification from neurological data (bottom- up)
- Both approaches (roughly, Cognitive Science and Cognitive Neuroscience) are now distinct from AI



Thinking rationally: "laws of thought"

- Aristotle: what are correct arguments/thought processes?
- Several Greek schools developed various forms of *logic*: *notation* and *rules of derivation* for thoughts; may or may not have proceeded to the idea of mechanization
- Direct line through mathematics and philosophy to modern AI
- Problems:
 1. Not all intelligent behavior is mediated by logical deliberation
 2. What is the purpose of thinking? What thoughts should I have?



Acting rationally: rational agent

- **Rational** behavior: doing the right thing.
- An **agent** is an entity that perceives and acts.
- Abstractly, an agent is a function from percept histories to actions:

$$[f: P^* \rightarrow A]$$

- For any given class of environments and tasks, we seek the agent (or class of agents) with the best performance.
 - design best **program** for given machine resources
- The right thing: that which is expected to maximize goal achievement, given the available information
- Doesn't necessarily involve thinking – e.g., blinking reflex – but thinking should be in the service of rational action



Acting rationally: rational agent

- **Rational** behavior: Doing that was is expected to maximize
one's “utility function” in this world.
- An **agent** is an entity that perceives and acts.
- A **rational agent** acts rationally.