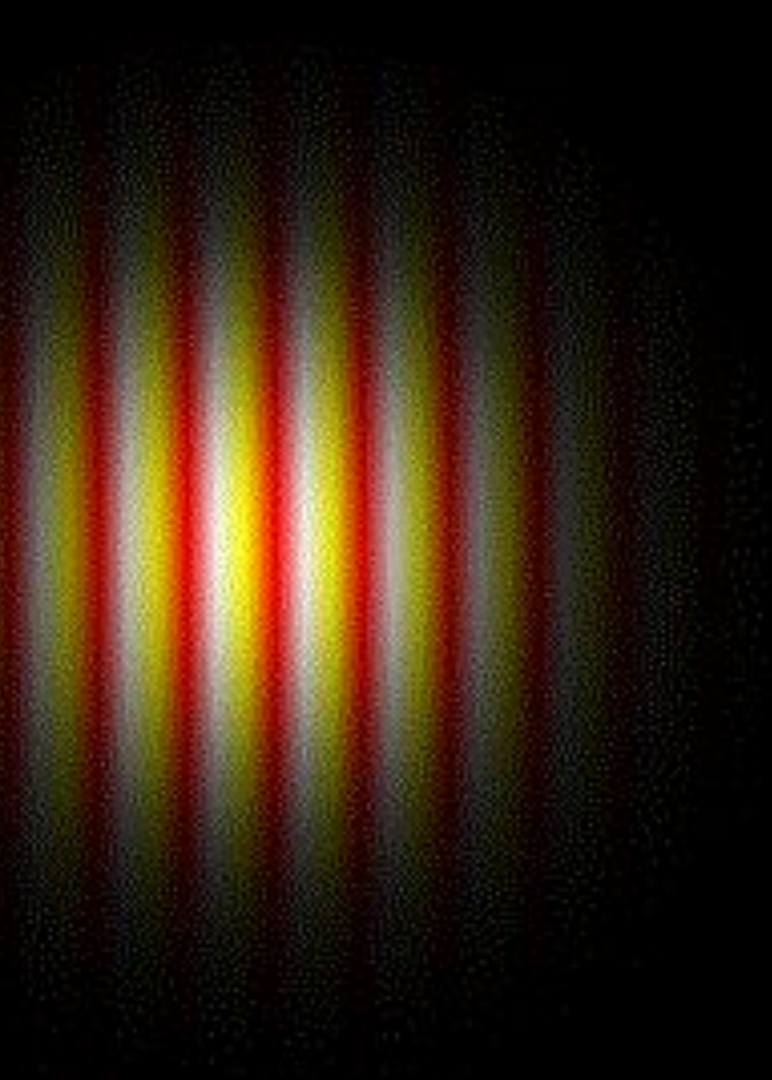
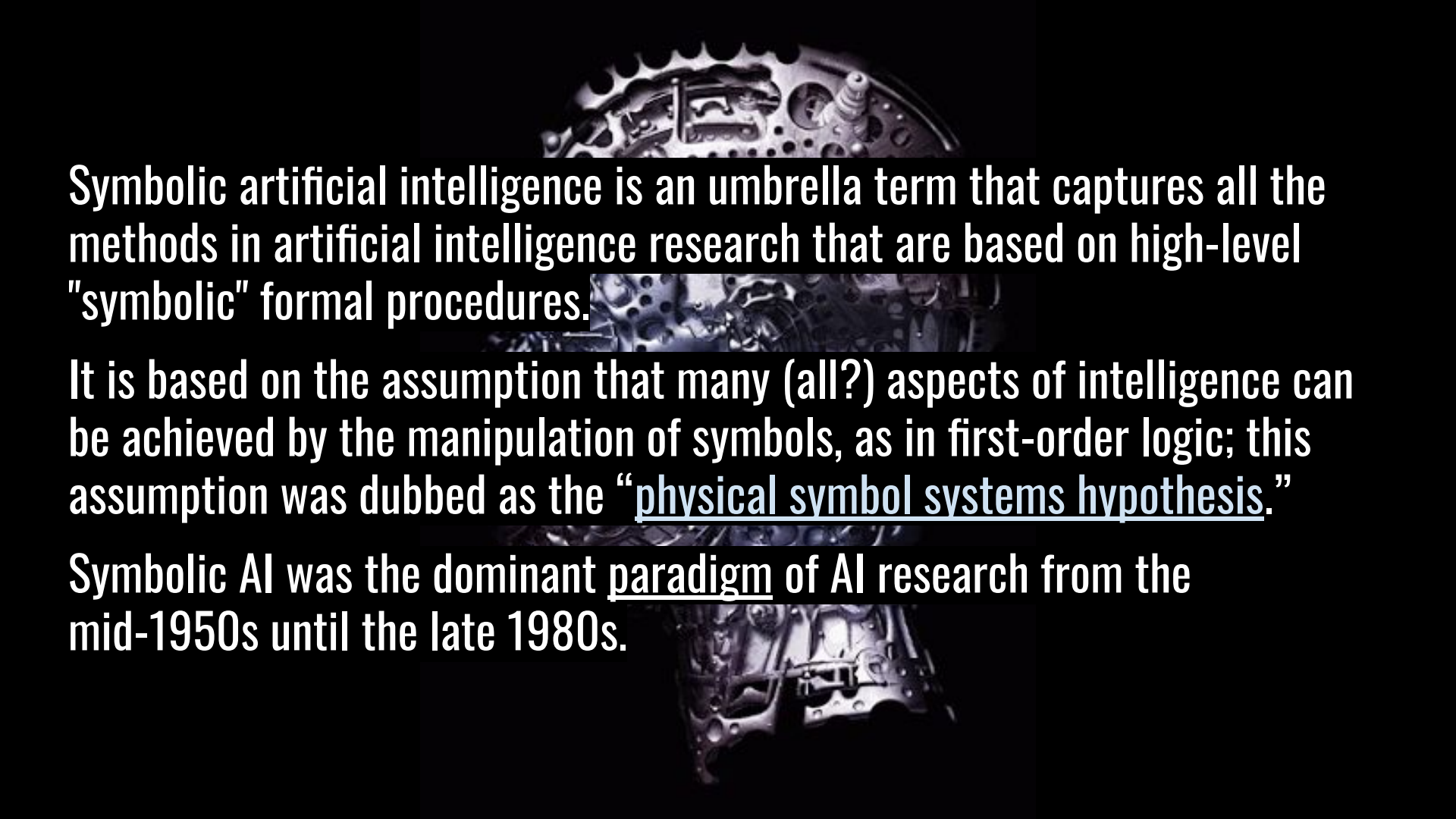


On Searle

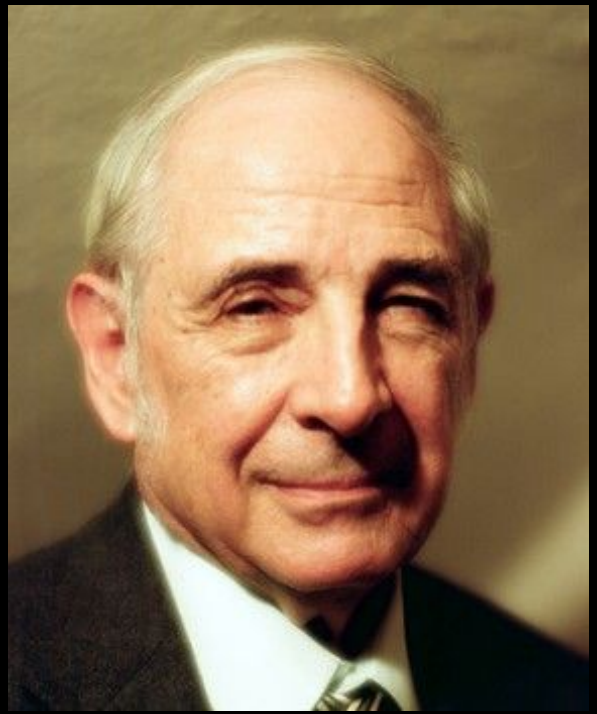


Symbolic artificial intelligence is an umbrella term that captures all the methods in artificial intelligence research that are based on high-level "symbolic" formal procedures.

It is based on the assumption that many (all?) aspects of intelligence can be achieved by the manipulation of symbols, as in first-order logic; this assumption was dubbed as the “physical symbol systems hypothesis.”

Symbolic AI was the dominant paradigm of AI research from the mid-1950s until the late 1980s.

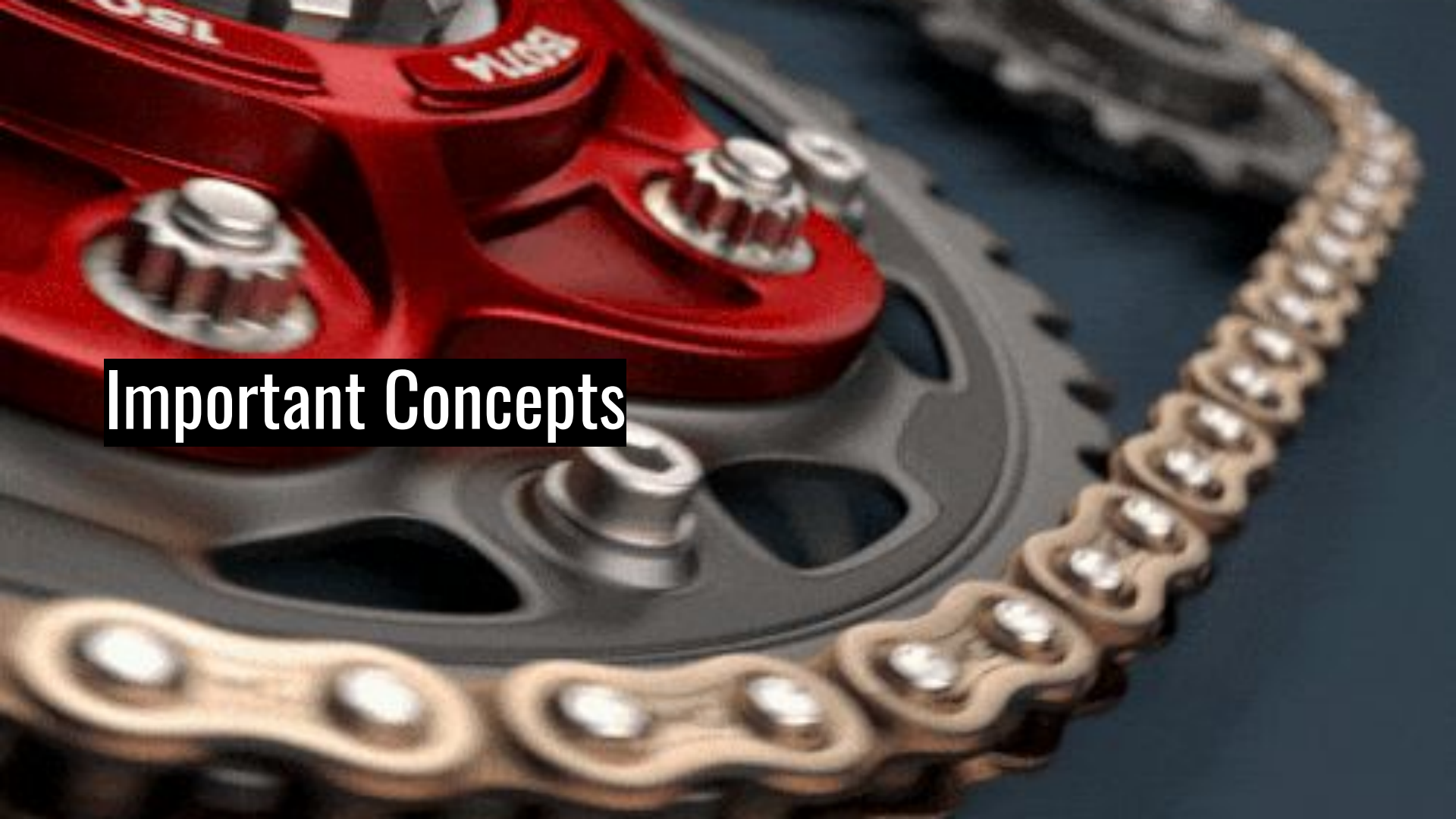
Person of Interest: John Searle



Occupation:
Philosopher

Notable Contributions to:
Philosophy of Mind, Philosophy of Language, and Social Philosophy

Notable Work:
Minds, Brains, and Programs (1980)

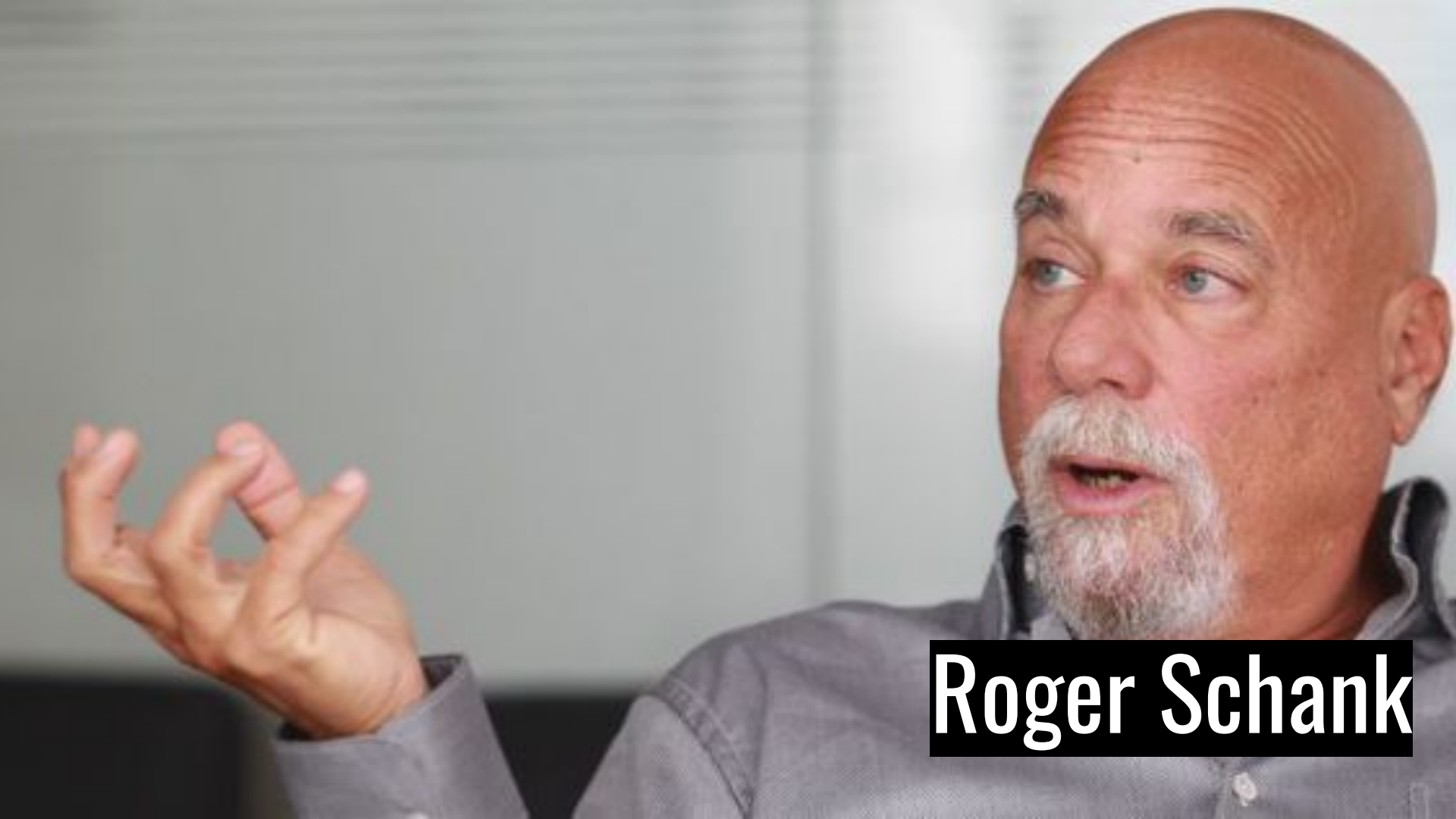


Important Concepts

Weak AI is the thesis that, with regards to the study of the mind, computers are tools that enable us to formulate and test our hypotheses in a rigorous and precise fashion.

Strong AI is the thesis that the computer is not merely a tool in the study of the mind, but that, if properly programmed, really **is** a mind.

According to strong AI, because the programmed computer has cognitive states, the programs are not mere tools that enable us to test psychological explanations; rather, the programs are themselves the explanations.


Roger Schank

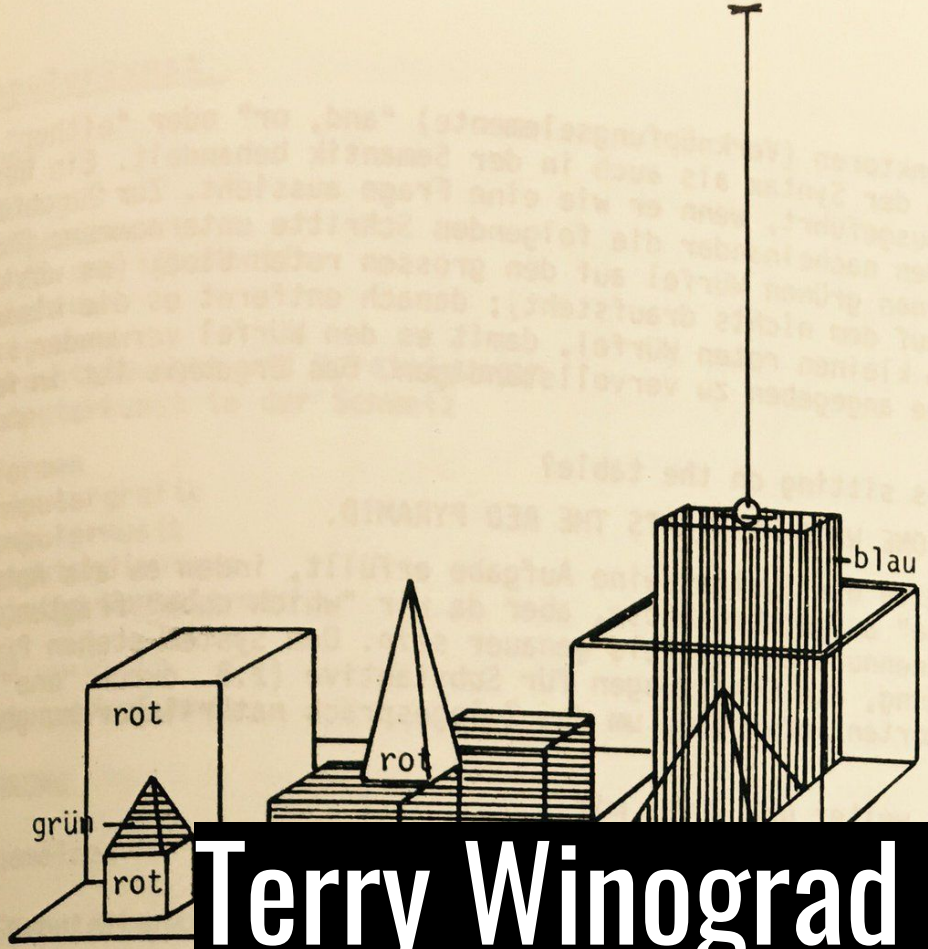
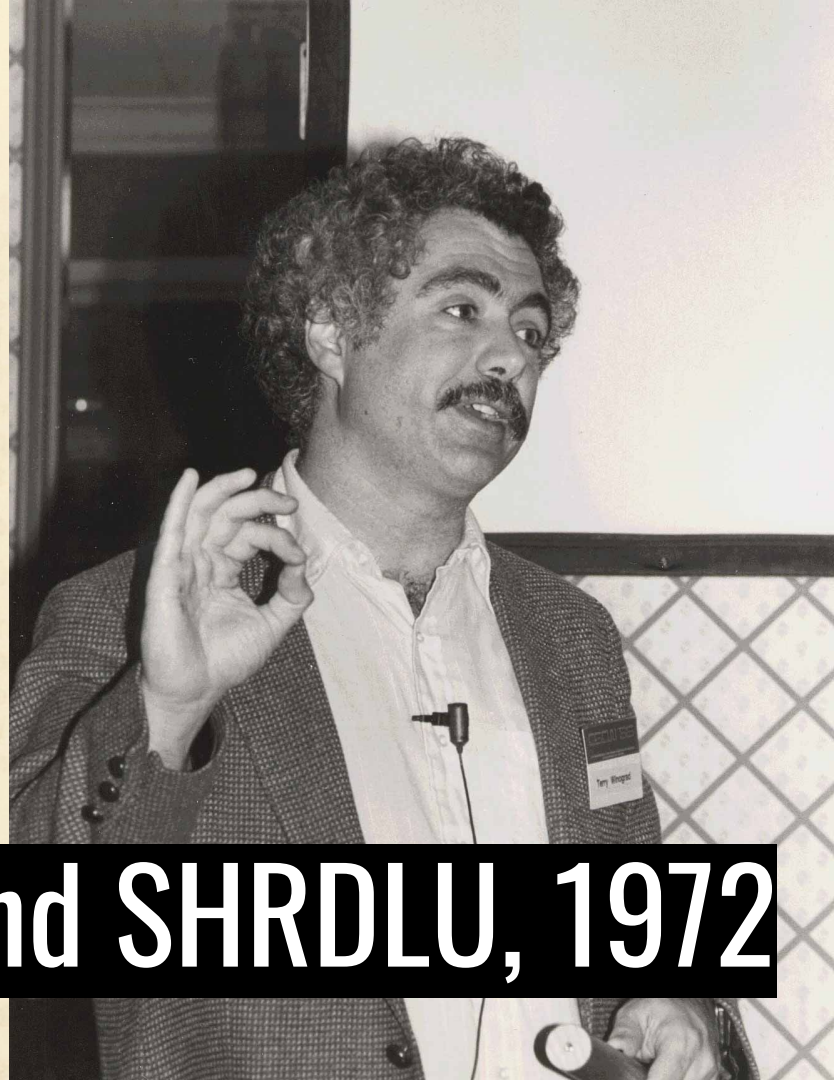


Abbildung 3: "Find a block which is taller than the one you are holding and put it into the box".



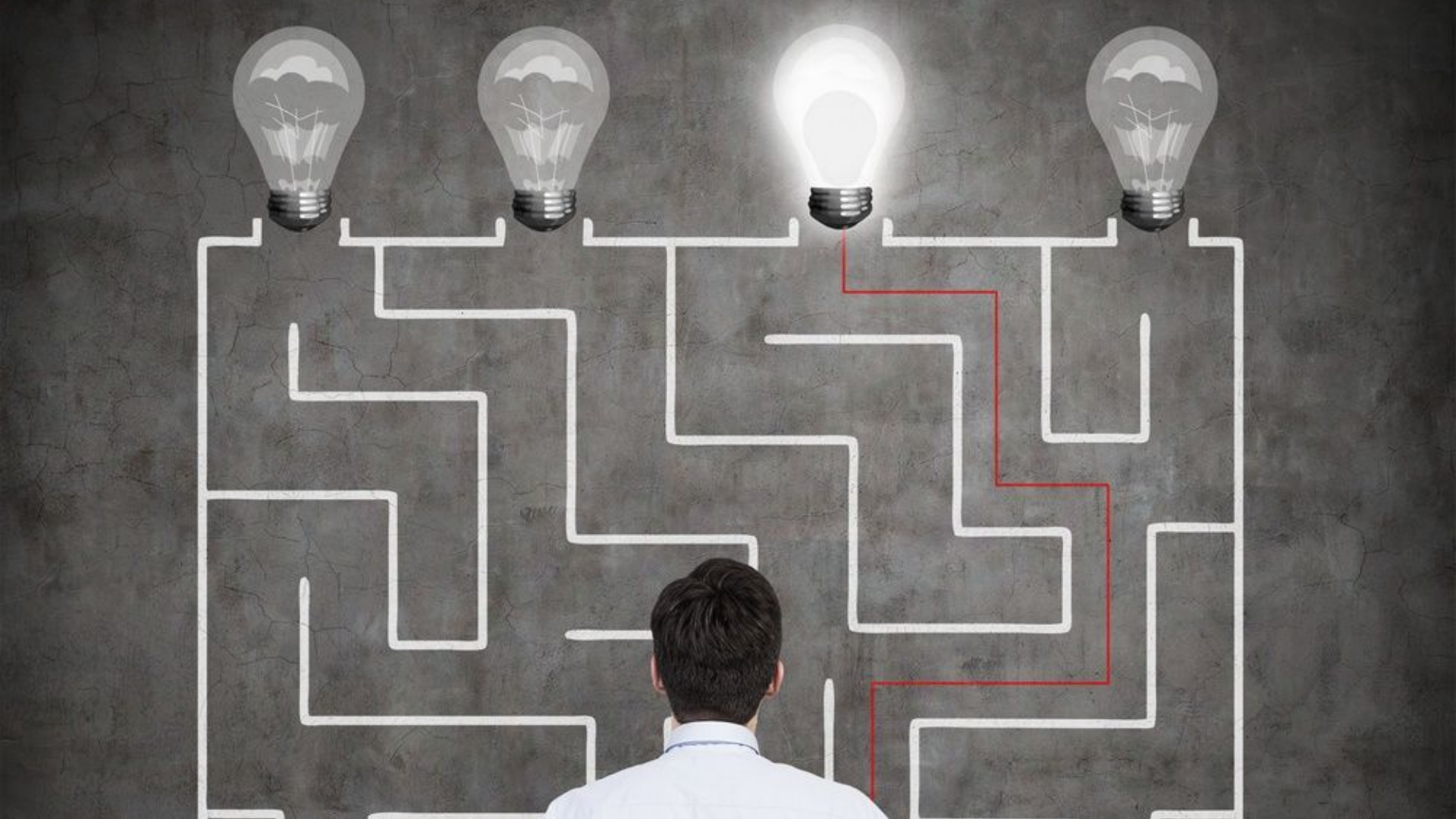
Terry Winograd and SHRDLU, 1972

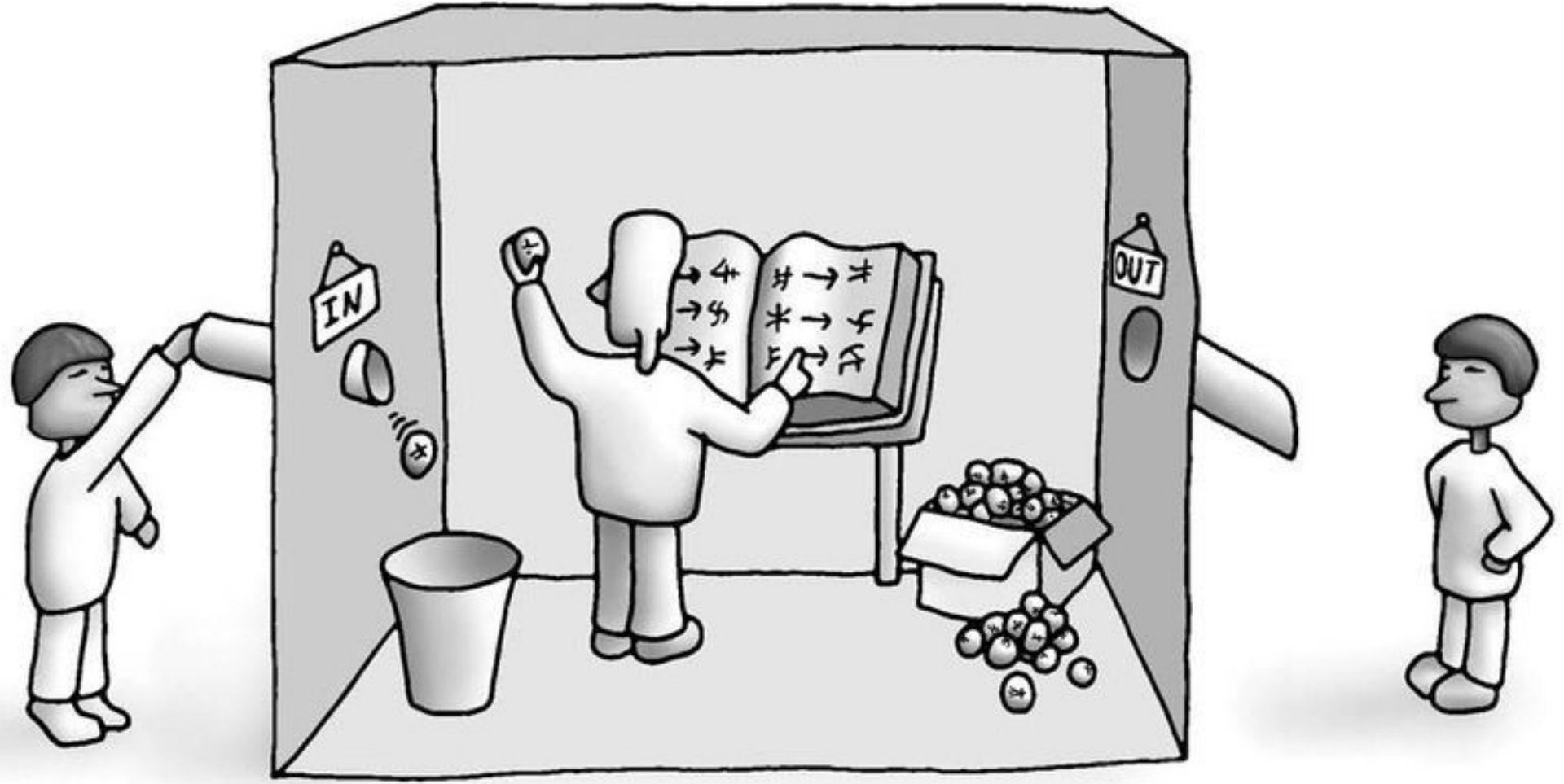
```
EEEEEE  LL      IIII  ZZZZZZZ   AAAAA
EE      LL       II       ZZ   AA   AA
EEEEE   LL       II     ZZZ    AAAAAAA
EE      LL       II    ZZ      AA   AA
EEEEEE  LLLLLL  IIII  ZZZZZZZ  AA   AA

  Eliza is a mock Rogerian psychotherapist.
  The original program was described by Joseph Weizenbaum in 1966.
  This implementation by Norbert Landsteiner 2005.


ELIZA: Please tell me what's been bothering you.
YOU:   The weather is awful.
ELIZA: I'm not sure I understand you fully.
YOU:   I hate the current weather.
ELIZA: You say you hate the current weather ?
YOU:   Yes, that's what I said.
ELIZA: I understand.
YOU:   Great.
ELIZA: Please go on.
YOU:   I would say it's your turn now!
ELIZA: Why are you concerned over my turn now ?
```

Joseph Weizenbaum and ELIZA, 1965

Searle is exclusively concerned with the claims of strong AI...

Question:
Is passing the Turing Test sufficient evidence that the machine has **cognitive states**?



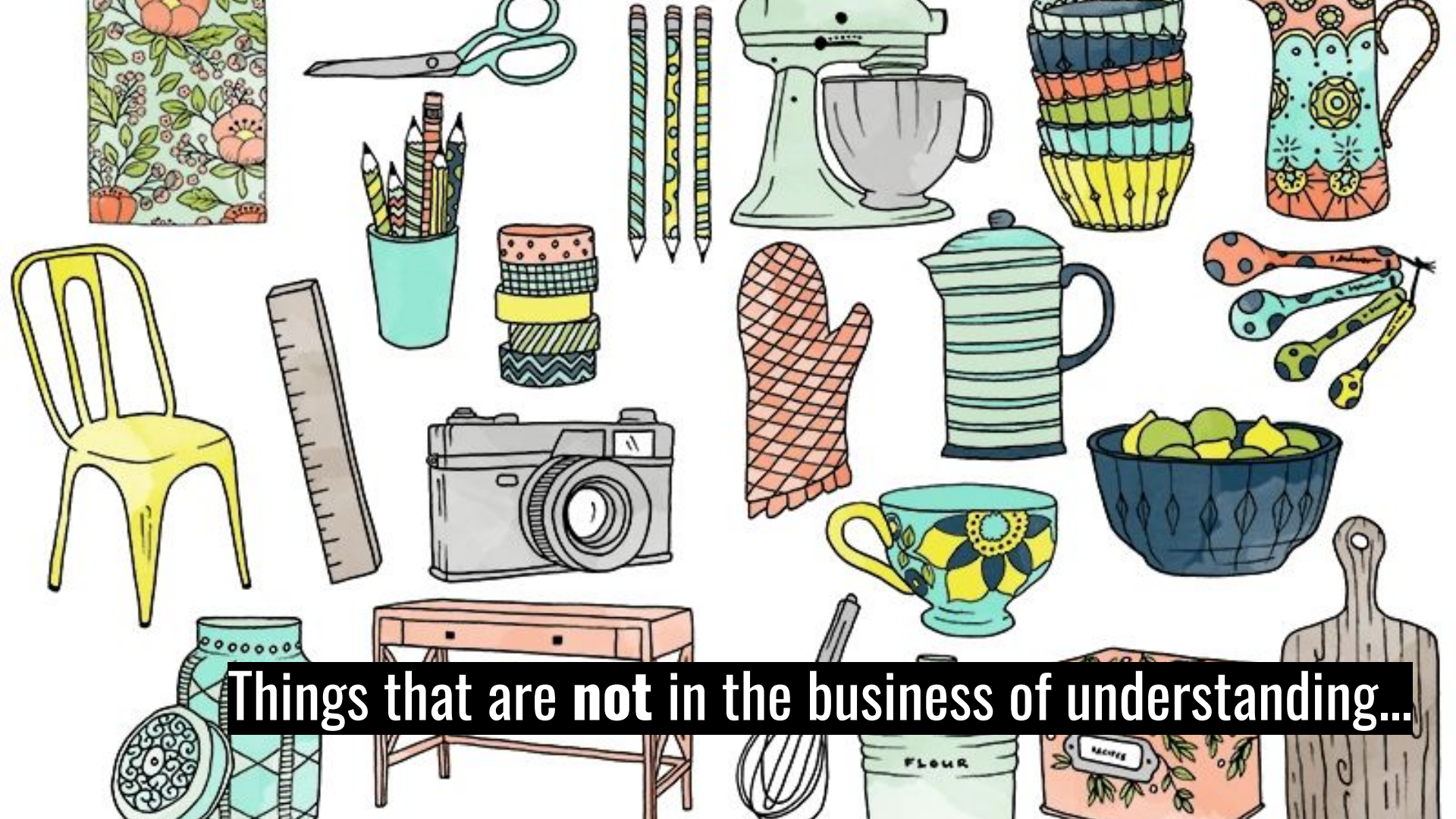

IN
OUT

“It seems to me obvious in the example that I do not understand a word of Chinese stories. I have inputs and outputs that are indistinguishable from those of the native Chinese speaker, and I can have any formal program you like, but I still understand nothing.

Schank’s computer, for the same reasons, understands nothing of any stories, whether in Chinese, English, or whatever…” (Searle 1980: 186).

“Whatever purely formal principles you put into the computer will not be sufficient for understanding, since a human will be able to follow the formal principles without understanding anything, and no reason has been offered to suppose that they are necessary or even contributory, since no reason has been given to suppose that when I understand English, I am operating with any formal program at all” (Searle 1980: 187).

Things that are in the business of understanding...


Things that are **not** in the business of understanding...
FLOUR

Objection

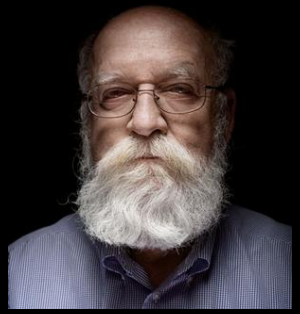
The Systems Reply

The analogy is off.

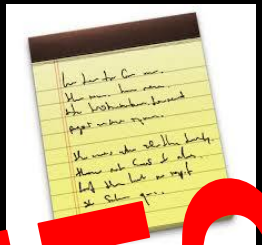
Searle can’t see the cognition because he is focusing only on the man in the room.

The intelligence is actually in the man, the little notes, and the rule ledger with all the syntax.

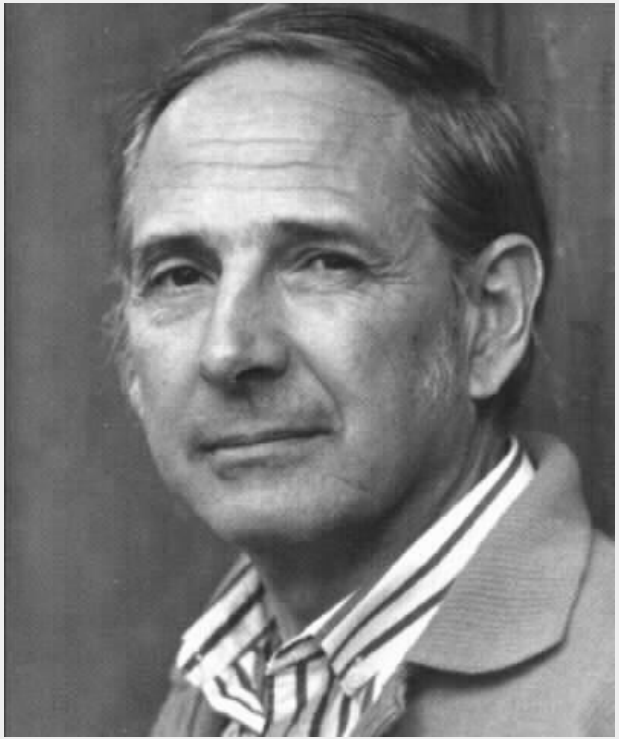
Consciousness requires all the elements of the entire room put together!



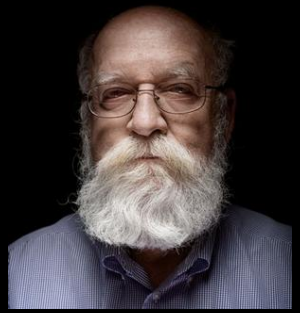
Searle's analogy is off!



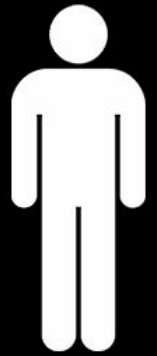
CONSCIOUSNESS

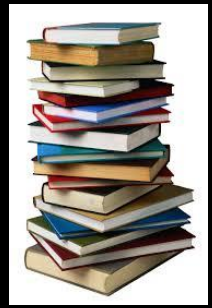


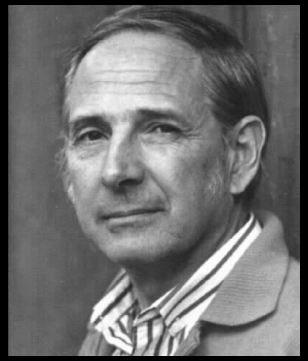
“My response to the systems theory is simple. Let the individual internalize all of these elements of the system. He memorizes the rules in the ledger and the data banks of Chinese symbols, and he does all the calculations in his head... All the same he understands nothing of the Chinese” (Searle 1980: 189).



Searle's analogy is off!







nope.com

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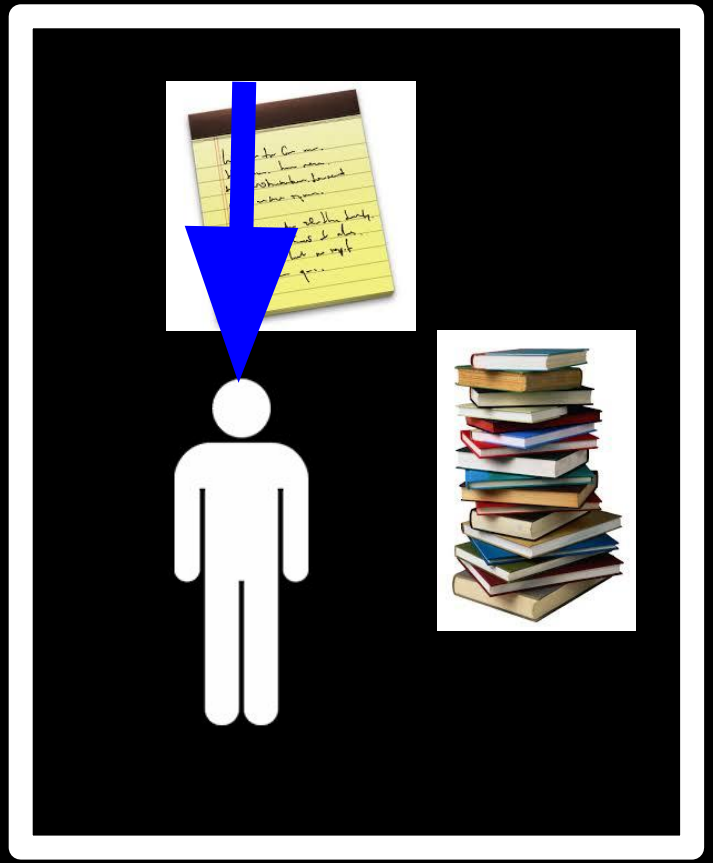


Importantly, integrating everything in the man's mind is not the equivalent of learning Chinese

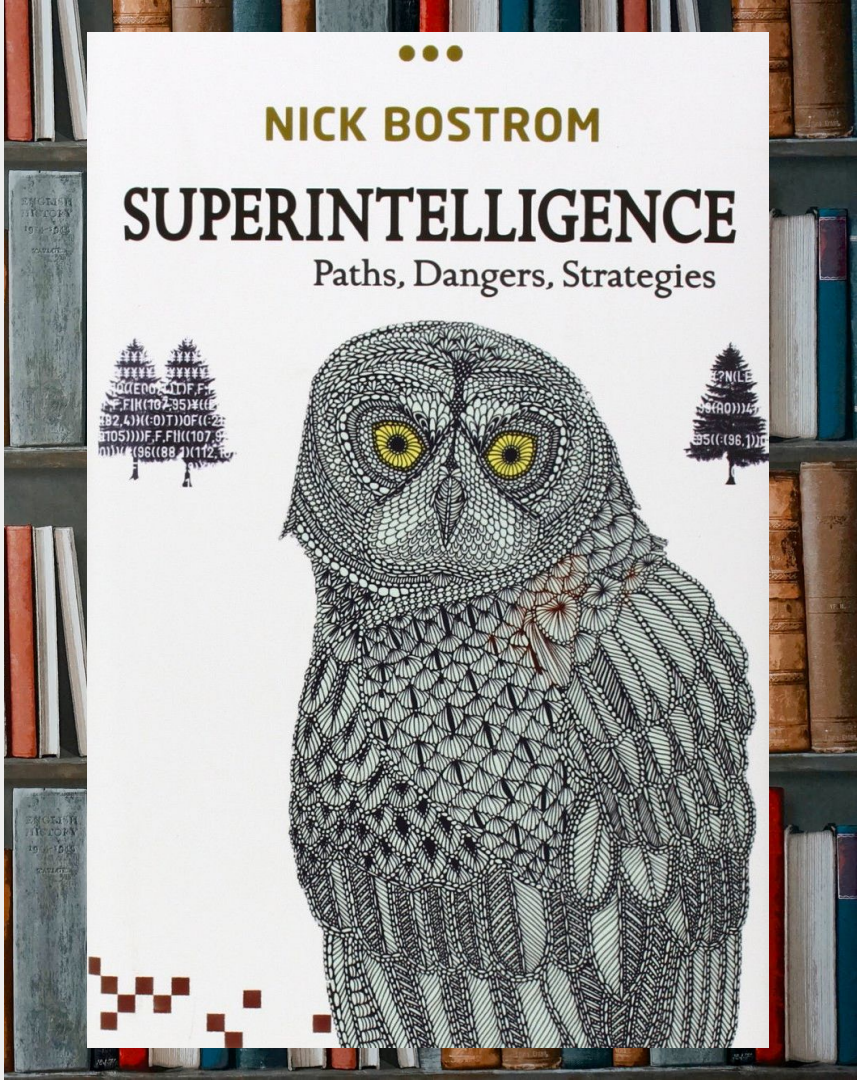
"Whereas the English subsystem knows that 'hamburgers' refers to hamburgers, the Chinese subsystem knows only that 'squiggle-squiggle' is followed by 'squoggle-squoggle'" (Searle 1980: 189).

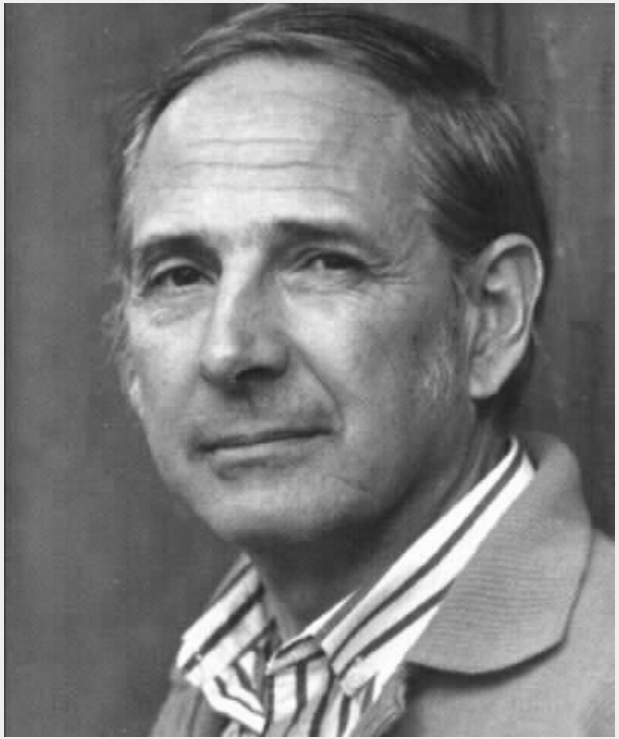
“The main point of the present argument is that no purely formal model will ever be by itself sufficient for intentionality [the ‘aboutness’ of our mental states], because the formal properties are not by themselves constitutive of intentionality” (Searle 1980: 198).

The equation “Mind is to brain as program is to behavior” broke down...

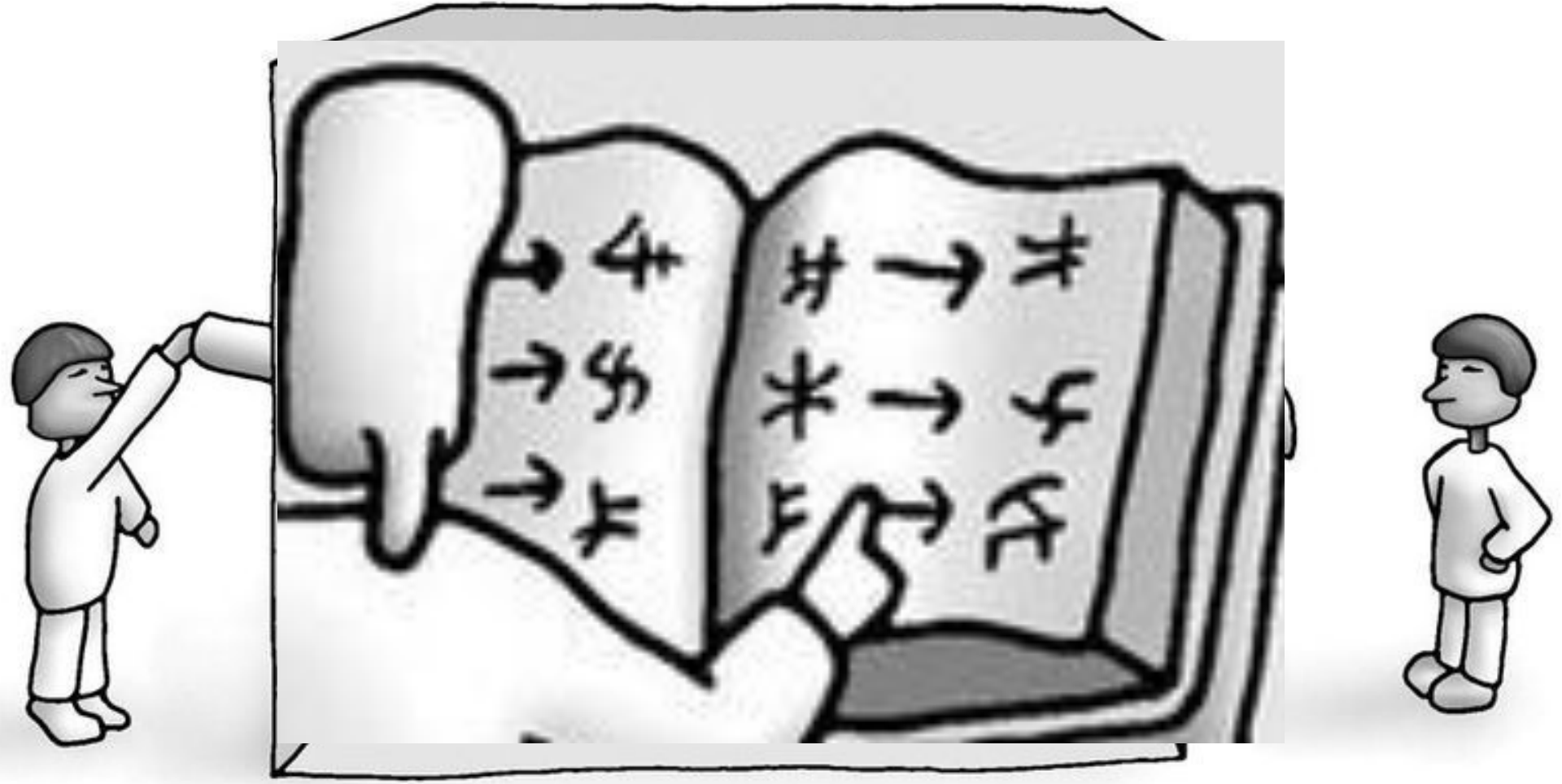
yAy!!!!!!

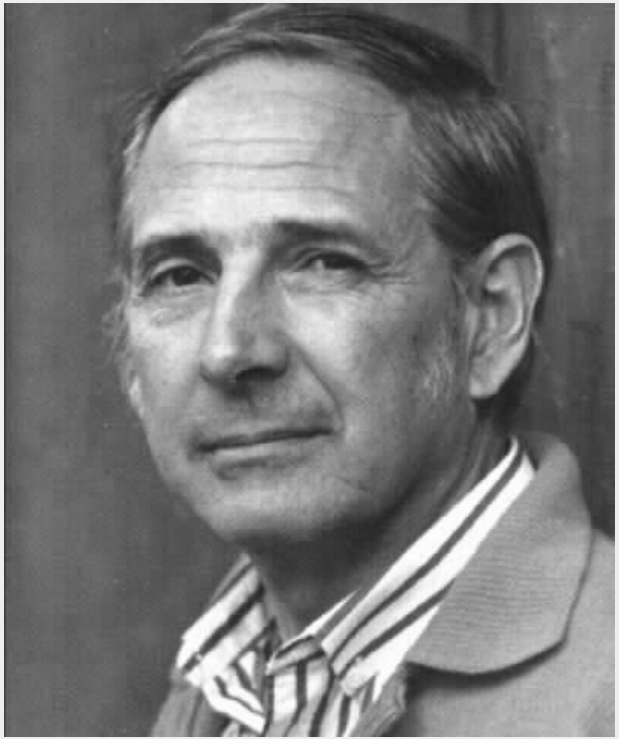
The most alarming hypotheses, however, might be like those of philosopher Nick Bostrom (2014) who thinks that general-domain artificial intelligence will lead to an intelligence explosion that could spell the end of the human species.





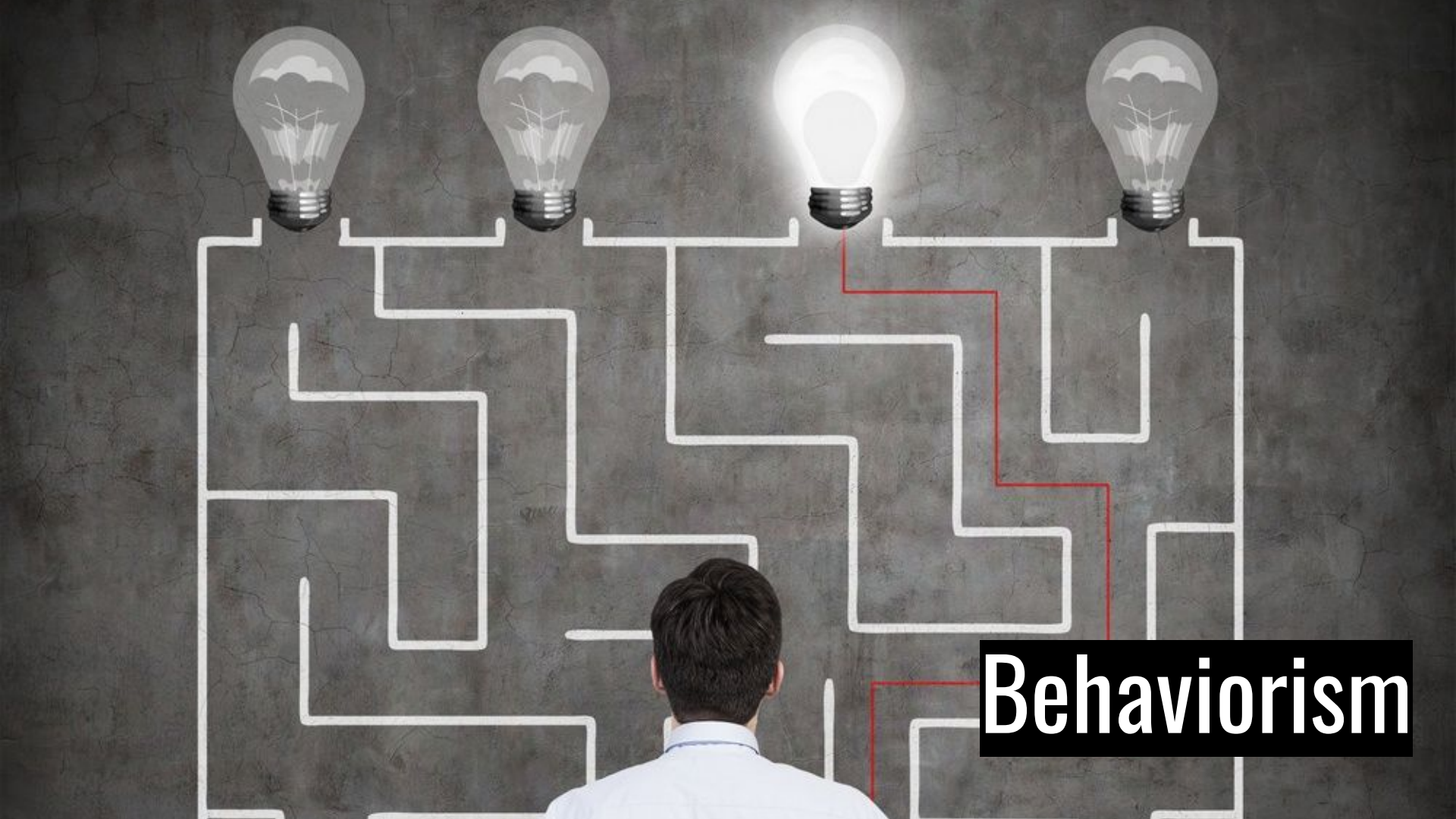
“Program is purely formal,
but the intentional states [in our minds]
are not in that way formal” (Searle
1980: 200).





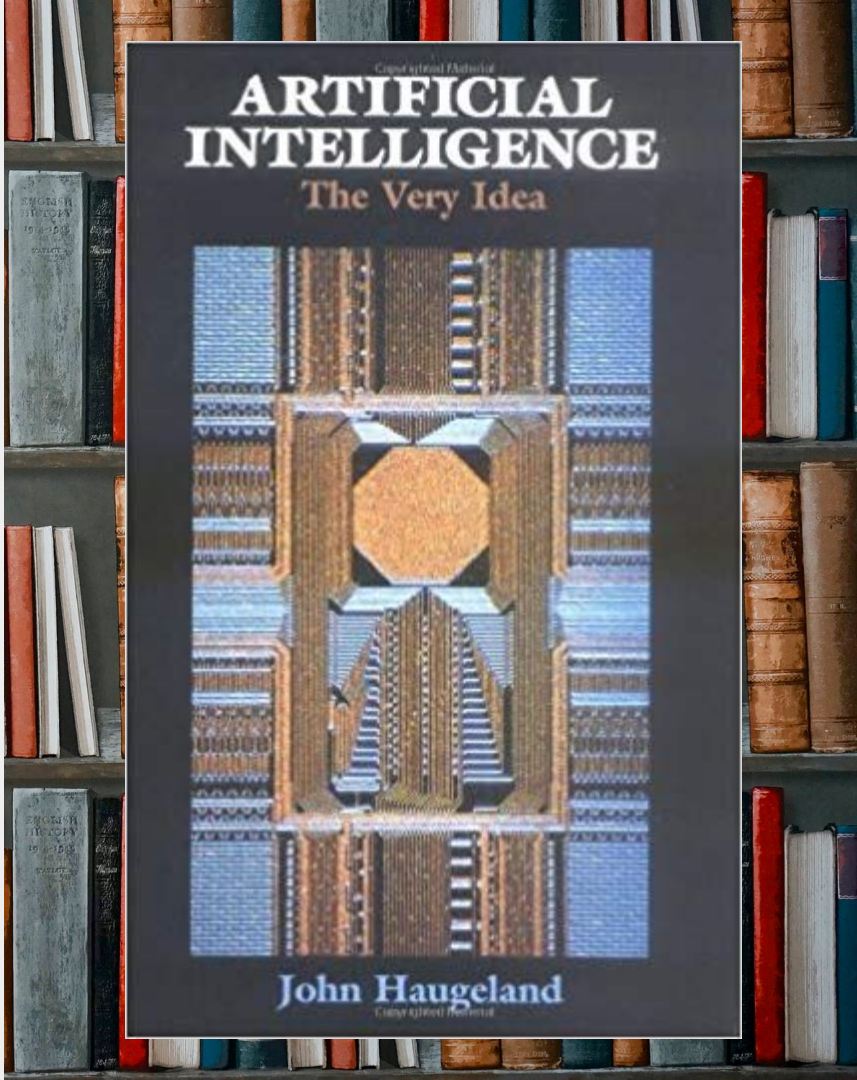
In a nutshell, [physical symbol system] computer programs do not do “information processing” in the way that humans do.

Searle advocated that AI researchers relinquish their belief in...

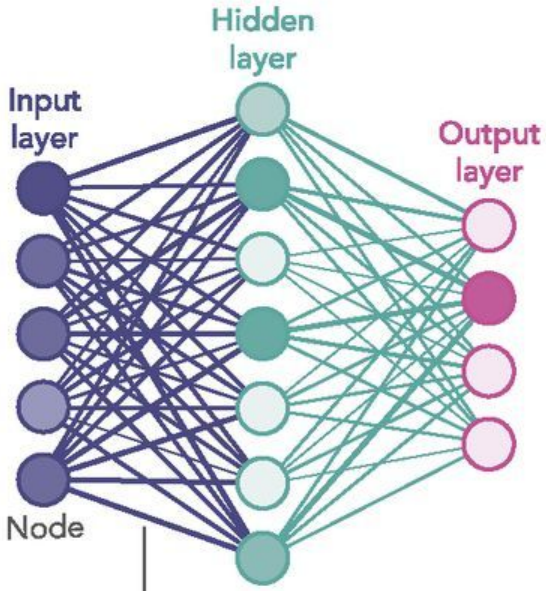

Behaviorism

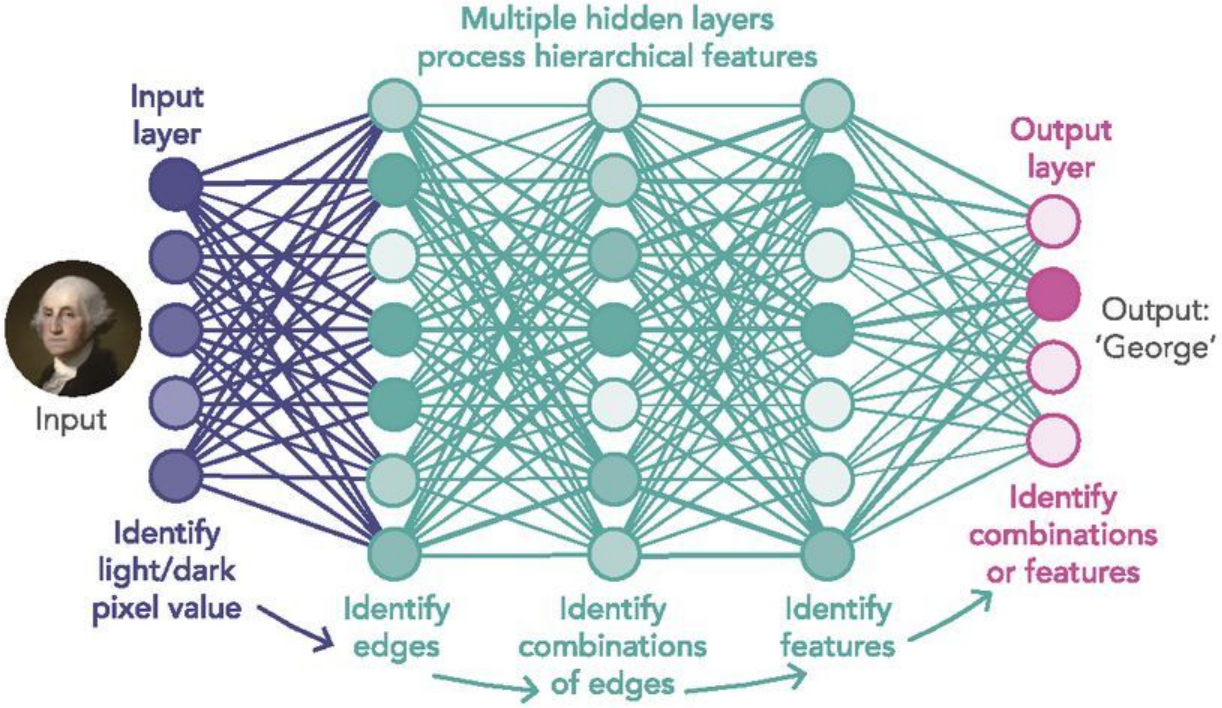
Dualism

Soon after Searle's paper, the symbolic approach to artificial intelligence (which John Hagueland dubbed 'good old-fashioned AI') receded.



1980S-ERA NEURAL NETWORK



Links carry signals from one node to another, boosting or damping them according to each link's 'weight'.

DEEP LEARNING NEURAL NETWORK