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Breaking the Code: The Enigma of Alan Turing
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Can Machines Think? Philosophical and Scientific Responses to Turing’s *Computing Machinery and Intelligence* paper in the 1960s

Artificial Intelligence is advancing at an astonishing rate. Just a few years ago, AI’s ability to solve problems and mimic human thinking would have been unbelievable. As machines act increasingly like intelligent beings, many have begun to wonder about the nature of intelligence. Can a machine be truly intelligent? Can it have consciousness? Does acting intelligently make something conscious, or is there something more undefinable about consciousness that is impossible to replicate? While these questions are especially relevant in the modern day, philosophers and mathematicians have been pondering them for decades.

One of the most foundational works discussing these questions is Alan Turing’s 1950 paper *Computing Machinery and Intelligence*. In it, Turing argues that a machine should be considered “intelligent” if it can successfully deceive a human judge in a conversation. He reframes the question “Can machines think?” to “Can a machine play the Imitation Game (Turing Test)?” He suggests that, if a machine succeeds at the Turing Test, humans should be willing to say it can think, as there is no logical reason to deny it. Turing then responds to counterarguments, including philosophical, theological, mathematical, and emotional objections. He argues that none of these counterarguments effectively counter his claim that machines can think. He then predicts that these thinking machines are coming sooner than most people think, suggesting that by the end of the 20th Century, machines will be able to pass the Turing test 30% of the time.

By the 1960s, Turing's paper was already sparking discussion. Turing was virtually unknown to the general public, but his mathematical and computational achievements made him an important figure in certain academic circles. A split emerged among academics responding to *Computing Machinery and Intelligence* from 1960 to 1969, with some praising it, while others challenged it. Philosophers generally disagreed with Turing, stating that machines could duplicate human behavior but lacked intelligence. Scientists, meanwhile, tended more towards agreeing with Turing, seeing merit in both the philosophical and scientific aspects of his paper.

The 1960s were a time of significant social and scientific upheaval, and the monumental events of the time had a significant impact on how scientists and philosophers alike viewed Turing's paper. These influential events included the Civil Rights Movement, the escalation of the Vietnam War, and the Space Race. The Civil Rights Movement was a struggle by African Americans and allies to end racial segregation and discrimination in the United States. This led to landmark legislation through the mass protests, legal challenges, and acts of civil disobedience.[1] The Civil Rights movement led philosophers, such as Dreyfus, to begin to question what defines a "thinking being," especially with the CRM's emphasis on equality and personhood. They challenged Turing's behavioral definition of intelligence, which ignored emotion and moral agency. The Vietnam War (1955-75) was a conflict between communist-led North Vietnam, which was supported by the Soviet Union and China, and non-communist South

[1] "Civil Rights Movement." Wikipedia: The Free Encyclopedia, Wikimedia Foundation, 6 Nov. 2025, https://en.wikipedia.org/w/index.php?title=Civil_rights_movement&oldid=1320130113.

Vietnam, backed by the United States and its allies. The war escalated during the 60s as the US increased its involvement through troop deployments and reliance on advanced military technology, and bombing campaigns to prevent the spread of communism in Southeast Asia. Surveillance and reconnaissance technologies, like aerial photography and electronic sensors, were used to track enemy movements.[2] Because computers were tied to military technology and surveillance, especially throughout this war, people began to fear machines' power. Because of this, reactions to Turing's concepts about intelligent machines are more divided between fascination and fear. The Space Race, a competition during the Cold War between the US and the Soviet Union, was to reach greater spaceflight proficiency than the enemy. Machine intelligence seemed achievable due to the rapid technological progress of the Space Race, which fueled enthusiasm for Turing's vision. Because of this, at the time, his question, "Can machines think?" gained new relevance with the advances in computing.

One philosopher who disagreed with Turing's assertions was Hubert Dreyfus, a professor at MIT who worked at the college's AI Laboratory. Dryfus believed that machines could duplicate human intelligence, but not the true human experience. In his work, *Alchemy and AI*, in 1965, he doubted that machines could replace what humans do. As Dreyfus wrote, "The attempt to analyze intelligent behaviour in digital-computer language systematically excludes three fundamental human forms of information processing (fringe consciousness, essence/accident

[2]Col. Greenwood, "Technology and the Nature of War: Four Vignettes," Marine Corps Gazette, Feb. 2024, Marine Corps Association, www.mca-marines.org/gazette/technology-and-the-nature-of-war/.

discrimination, and ambiguity tolerance)."[3] (page iii) Dreyfus's argument described that even if a machine could mimic human output, it would miss the underlying human mode of being. This is versus Turing's argument, "Can machines think?", replacing that with the imitation game and envisioning a machine that would eventually pass the human-machine test. Like the imitation game, Dreyfus's argument encourages the reader to think about the question of what mask one might wear to show something externally, but doesn't reflect the deeper authenticity.

Dreyfus also wrote "Why Computers Must Have Bodies in Order to Be Intelligent," in The Review of Metaphysics, where he criticized the assumptions of AI fundamentally. He describes his argument in twofold. First, that intelligent behavior can be stimulated by a "detached, disembodied, objective observer." Secondly, that intelligence can be understood through a set of determinative independent elements, also known as formalism. As Dreyfus wrote, "The human world… is organized by human beings using their embodied capacities, to satisfy their embodied needs. There is no reason to suppose that a world organized in terms of the body should be accessible by other means."[4] He concludes that a digital machine may never achieve truly intelligent behavior, since human life is shaped by embodied experiences and needs that a computer (disembodied) cannot share or access.

John R. Lucas (1929-2020) was a mathematical philosopher who was best known for his work on the philosophy of Gödel's Incompleteness Theorem, *Minds, Machines and Gödel* from 1961. Throughout his life, Lucas was an outspoken critic of Mechanism, and in his paper, he argues that machines are limited by a fixed set of rules; however, humans are not. Lucas

[3]Hubert L. Dreyfus. "Why Computers Must Have Bodies in Order to Be Intelligent." Review of Metaphysics, vol. 21, no. 1, Sept. 1967, pp. iii. Accessed at: https://courses.csail.mit.edu/6.803/pdf/dreyfus.pdf

[4]Dreyfus, "Why Computers Must Have Bodies in Order to Be Intelligent," 31-32.

describes that Gödel's Incompleteness Theorem demonstrates the falsity of mechanism in relation to the human mind, that humans and machines have fundamentally different thinking processes. Lucas says that while a machine can't prove certain truths about itself, a human mind can see that those truths are valid, so that no matter how advanced a machine is, it will always miss some truths the mind can understand. As Lucas wrote, "Gödel's theorem seems to me to prove that Mechanism is false — that minds cannot be explained as machines." This paper directly challenges Turing's *Computing Machinery and Intelligence* paper, arguing that machines could think or behave intelligently. As Turing proposed that if a machine could beat the Turing Test, it should be considered intelligent, Lucas responds that Gödel's Incompleteness Theorem shows a fundamental limit to what any formal, rule-based system, like a computer, can do. This highlights Lucas's argument that Turing's idea of machine intelligence fails at a logical level because the mind can understand truths that no mechanical process or algorithm can.[5]

While philosophers in the 1960s largely disagreed with Turing's assertions about machine intelligence, computer and cognitive scientists frequently had a different approach. Though opinions differed, scientists were generally much more receptive to Turing's assertions that machines can think and that the human brain functions fundamentally like a machine. And, regardless of their stance on Turing's philosophical beliefs, they generally all agreed that his insights into computing were valuable and worth exploring. One computer scientist who saw the merit of Turing's 1950 paper was Marvin Minsky, an Artificial Intelligence researcher at the Massachusetts Institute of Technology. Minsky was a major figure in computing during the 1950s and 1960s, when he founded the MIT Artificial Intelligence Lab. At this lab, he made several advancements in computing, including the first head-mounted graphical display, now often referred to as a virtual reality headset, and the first randomly wired neural network

[5] J. R. Lucas, "Minds, Machines and Gödel," *Philosophy* 36, no. 137 (Apr.–Jul. 1961): 112-27.

machine. Turing was a major inspiration to Minsky, who frequently referenced Turing in his papers and lectures. Minsky was a strong supporter of Turing's proposition that machines could think and that the human brain essentially functioned like a machine.

In his 1961 essay, *Steps Toward Artificial Intelligence*, Minsky discussed the fundamental components needed to build artificial intelligence while responding to arguments that intelligent machines were impossible. He quickly establishes his disagreement with these arguments, stating not only that "intelligent, problem-solving machines" can exist but that the near future "will be strongly influenced, quite possibly dominated" by them.[6] Throughout his paper, Minsky responded to many of the same points Turing responded to, including the idea that machines are limited by their instructions, that machines cannot be conscious, and that extremely advanced machines are impossible. In a few cases, he referenced Turing's responses to strengthen his own. The arguments Minsky countered mostly came from philosophers because, as he points out, most programmers agreed with him. According to Minsky, "Among all the active leaders in modern heuristic programming, perhaps only [Arthur] Samuel has taken a strong position against the idea of machines thinking."[7] This suggests that in computing circles during the 1960s, Turing's opinions were widely accepted and generally agreed upon, standing in contrast to the highly skeptical views of figures like Dreyfus and Lucas.

While each of the responses to Turing's paper from 1960 to '69 was different, there were a few overarching themes. Firstly, the scientists, for the most part, agreed with Turing's assessment in his paper. However, the philosophers disagreed, mostly with Turing's assessment of the emotional intelligence of machines. Philosophers agreed that machines can duplicate

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[6] Marvin Minsky. Steps Toward Artificial Intelligence. Massachusetts Institute of Technology, https://courses.csail.mit.edu/6.803/pdf/steps.pdf. Accessed 18 Nov. 2025.

[7] Minsky, "Steps Toward Artificial Intelligence," 20.

human behavior, but lack intelligence. They agreed with the methods in his paper, but not his conclusions. Scientists were more receptive to Turing's beliefs and were impressed with his computational insights.

Throughout the 1960s, Alan Turing's *Computing Machinery and Intelligence* catalyzed scientific and philosophical debates. Mechanical advances throughout this politically and culturally turbulent time period prompted scientists and philosophers to reconsider what "intelligence" meant and if it could come from machines. Scientists embraced Turing's optimism as they were inspired by the rapid advances in computing and energized by the ambitions of the Space Race. They viewed intelligent machines as true possibilities created from engineering and research, not just hypothetical discussion. However, philosophers pushed back, and while they agreed with Turing's methodology, they fundamentally disagreed that machines could have consciousness and that Turing's behavioral test failed to capture the deeper structures of intelligence. This included emotional experience and the ability to grasp meaning beyond just following rules. Philosophers argued that simply following or passing the Turing Test did not mean it meant intelligence. For scientists like Minsky, Turing's work provided a blueprint for constructing intelligent systems, while philosophers like Lucas and Dreyfus used logic and phenomenology to expose the limitations of computational accounts of thinking.

Turing could never have imagined the world of AI that exists today. Today's AI systems possess nearly endless capabilities. The arguments of Minsky, Dreyfus, and Lucas, along with so many others, remind one of the tension between imitation and consciousness, and computation and cognition are not easily resolved and may in fact have many answers. Their responses illustrate that the search to define intelligence is ongoing and that the philosophical challenges posed in the 1960s remain central to debates about AI in the twenty-first century.

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