**Artificial intelligence (AI)**, the ability of a digital [computer](https://www.britannica.com/technology/computer) or computer-controlled [robot](https://www.britannica.com/technology/robot-technology) to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the [intellectual](https://www.merriam-webster.com/dictionary/intellectual) processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Since the development of the [digital computer](https://www.britannica.com/technology/digital-computer) in the 1940s, it has been demonstrated that computers can be programmed to carry out very complex tasks—as, for example, discovering proofs for mathematical theorems or playing [chess](https://www.britannica.com/topic/chess)—with great proficiency. Still, despite continuing advances in computer processing speed and memory capacity, there are as yet no programs that can match human flexibility over wider domains or in tasks requiring much everyday knowledge. On the other hand, some programs have attained the performance levels of human experts and professionals in performing certain specific tasks, so that artificial intelligence in this limited sense is found in applications as [diverse](https://www.merriam-webster.com/dictionary/diverse) as medical [diagnosis](https://www.merriam-webster.com/dictionary/diagnosis), computer [search engines](https://www.britannica.com/technology/search-engine), and voice or handwriting recognition. Computer science defines AI research as the study of "[intelligent agents](https://en.wikipedia.org/wiki/Intelligent_agent)": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. A more elaborate definition characterizes AI as "a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.”

A typical AI analyzes its environment and takes actions that maximize its chance of success. An AI's intended [utility function (or goal)](https://en.wikipedia.org/wiki/Utility_function) can be simple ("1 if the AI wins a game of [Go](https://en.wikipedia.org/wiki/Go_(game)), 0 otherwise") or complex ("Perform actions mathematically similar to ones that succeeded in the past"). Goals can be explicitly defined or induced. If the AI is programmed for "[reinforcement learning](https://en.wikipedia.org/wiki/Reinforcement_learning)", goals can be implicitly induced by rewarding some types of behavior or punishing others. Alternatively, an evolutionary system can induce goals by using a "[fitness function](https://en.wikipedia.org/wiki/Fitness_function)" to mutate and preferentially replicate high-scoring AI systems, similar to how animals evolved to innately desire certain goals such as finding food. Some AI systems, such as nearest-neighbour, instead of reason by analogy, these systems are not generally given goals, except to the degree that goals are implicit in their training data. Such systems can still be benchmarked if the non-goal system is framed as a system whose "goal" is to successfully accomplish its narrow classification task.

AI often revolves around the use of [algorithms](https://en.wikipedia.org/wiki/Algorithms). An algorithm is a set of unambiguous instructions that a mechanical computer can execute. A complex algorithm is often built on top of other, simpler, algorithms. A simple example of an algorithm is the following (optimal for first player) recipe for play at [tic-tac-toe](https://en.wikipedia.org/wiki/Tic-tac-toe):

1. If someone has a "threat" (that is, two in a row), take the remaining square. Otherwise,
2. if a move "forks" to create two threats at once, play that move. Otherwise,
3. take the center square if it is free. Otherwise,
4. if your opponent has played in a corner, take the opposite corner. Otherwise,
5. take an empty corner if one exists. Otherwise,
6. take any empty square.