

Think Like A Programmer An Introduction To Creative Problem Solving

Problem solving

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Problem solving is the process of achieving a goal by overcoming obstacles, a frequent part of most activities. Problems in need of solutions range from simple personal tasks (e.g. how to turn on an appliance) to complex issues in business and technical fields. The former is an example of simple problem solving (SPS) addressing one issue, whereas the latter is complex problem solving (CPS) with multiple interrelated obstacles. Another classification of problem-solving tasks is into well-defined problems with specific obstacles and goals, and ill-defined problems in which the current situation is troublesome but it is not clear what kind of resolution to aim for. Similarly, one may distinguish formal or fact-based problems requiring psychometric intelligence, versus socio-emotional problems...

Knowledge worker

job is to "think for a living". Knowledge work can be differentiated from other forms of work by its emphasis on "non-routine" problem solving that requires

Knowledge workers are workers whose main capital is knowledge. Examples include ICT professionals, physicians, pharmacists, architects, engineers, mathematicians, scientists, designers, public accountants, lawyers, librarians, archivists, editors, and academics, whose job is to "think for a living".

Hacker culture

referred to creatively tinkering to improve performance as "hacking" already in the 1950s. A large overlaps between hobbyist hackers and the programmer subculture

The hacker culture is a subculture of individuals who enjoy—often in collective effort—the intellectual challenge of creatively overcoming the limitations of software systems or electronic hardware (mostly digital electronics), to achieve novel and clever outcomes. The act of engaging in activities (such as programming or other media) in a spirit of playfulness and exploration is termed hacking. However, the defining characteristic of a hacker is not the activities performed themselves (e.g. programming), but how it is done and whether it is exciting and meaningful. Activities of playful cleverness can be said to have "hack value" and therefore the term "hacks" came about, with early examples including pranks at MIT done by students to demonstrate their technical aptitude and cleverness. The...

Edsger W. Dijkstra

[ˈɛtsxər ˈvɪbə ˈdɛɪkstra:] ; 11 May 1930 – 6 August 2002) was a Dutch computer scientist, programmer, software engineer, mathematician, and science essayist

Edsger Wybe Dijkstra (DYKE-strə; Dutch: [ˈɛtsxər ˈvɪbə ˈdɛɪkstra:] ; 11 May 1930 – 6 August 2002) was a Dutch computer scientist, programmer, software engineer, mathematician, and science essayist.

Born in Rotterdam in the Netherlands, Dijkstra studied mathematics and physics and then theoretical physics at the University of Leiden. Adriaan van Wijngaarden offered him a job as the first computer programmer in the Netherlands at the Mathematical Centre in Amsterdam, where he worked from 1952 until 1962. He formulated and solved the shortest path problem in 1956, and in 1960 developed the first compiler for the programming language ALGOL 60 in conjunction with colleague Jaap A. Zonneveld. In 1962 he moved to Eindhoven, and later to Nuenen, where he became a professor in the Mathematics Department...

Principal-agent problem

The principal-agent problem (often abbreviated agency problem) refers to the conflict in interests and priorities that arises when one person or entity

The principal-agent problem (often abbreviated agency problem) refers to the conflict in interests and priorities that arises when one person or entity (the "agent") takes actions on behalf of another person or entity (the "principal"). The problem worsens when there is a greater discrepancy of interests and information between the principal and agent, as well as when the principal lacks the means to punish the agent. The deviation of the agent's actions from the principal's interest is called "agency cost".

Common examples of this relationship include corporate management (agent) and shareholders (principal), elected officials (agent) and citizens (principal), or brokers (agent) and markets (buyers and sellers, principals). In all these cases, the principal has to be concerned with whether...

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Cognition

considered and manipulated. It includes reasoning, concept formation, problem-solving, and decision-making. Many cognitive activities deal with language

Cognitions are mental activities that deal with knowledge. They encompass psychological processes that acquire, store, retrieve, transform, or otherwise use information. Cognitions are a pervasive part of mental life, helping individuals understand and interact with the world.

Cognitive processes are typically categorized by their function. Perception organizes sensory information about the world, interpreting physical stimuli, such as light and sound, to construct a coherent experience of objects and events. Attention prioritizes specific aspects while filtering out irrelevant information. Memory is the ability to retain, store, and retrieve information, including working memory and long-term memory.

Thinking encompasses psychological activities in which concepts, ideas, and mental representations...

Jonathan Blow

is a creative activity that involves problem solving while FarmVille is about retaining the player's attention for as long as possible. According to Blow

Jonathan Blow (born 1971) is an American video game designer and programmer. He is best known for his work on the independent video games Braid (2008) and The Witness (2016). Blow became interested in game programming while at middle school. He studied computer science and English at the University of California, Berkeley, but dropped out to start a game company. After the company closed following the dot-com crash, Blow worked as a game development contractor. He co-founded the Experimental Gameplay Workshop and wrote a monthly technical column for Game Developer magazine.

Blow gained prominence in 2008 with Braid. He used its financial success to fund his next game, The Witness, and formed a company called Thekla Inc. After a lengthy development period, The Witness was released in 2016, and...

Computing education

seek to improve and guide students problem-solving and creative abilities tend to help them succeed in computer science and other classes. The problem-solving

Computer science education or computing education is the field of teaching and learning the discipline of computer science, and computational thinking. The field of computer science education encompasses a wide range of topics, from basic programming skills to advanced algorithm design and data analysis. It is a rapidly growing field that is essential to preparing students for careers in the technology industry and other fields that require computational skills.

Computer science education is essential to preparing students for the 21st century workforce. As technology becomes increasingly integrated into all aspects of society, the demand for skilled computer scientists is growing. According to the Bureau of Labor Statistics, employment of computer and information technology occupations is...

Philosophy of artificial intelligence

intelligence attempts to answer such questions as follows: Can a machine act intelligently? Can it solve any problem that a person would solve by thinking? Are

The philosophy of artificial intelligence is a branch of the philosophy of mind and the philosophy of computer science that explores artificial intelligence and its implications for knowledge and understanding of intelligence, ethics, consciousness, epistemology, and free will. Furthermore, the technology is concerned with the creation of artificial animals or artificial people (or, at least, artificial creatures; see artificial life) so the discipline is of considerable interest to philosophers. These factors contributed to the emergence of the philosophy of artificial intelligence.

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Can a machine act intelligently? Can it solve any problem that a person would solve by thinking?

Are human intelligence...

Artificial general intelligence

into solving the "control problem" to answer the question: what types of safeguards, algorithms, or architectures can programmers implement to maximise

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Artificial general intelligence (AGI)—sometimes called human-level intelligence AI—is a type of artificial intelligence that would match or surpass human capabilities across virtually all cognitive tasks.

Some researchers argue that state-of-the-art large language models (LLMs) already exhibit signs of AGI-level capability, while others maintain that genuine AGI has not yet been achieved. Beyond AGI, artificial superintelligence (ASI) would outperform the best human abilities across every domain by a wide margin.

Unlike artificial narrow intelligence (ANI), whose competence is confined to well-defined tasks, an AGI system can generalise knowledge, transfer skills between domains, and solve novel problems without task-specific reprogramming. The concept does not, in principle, require the system...

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