


Algorithms have been around for 4000 years

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Publication date:

2018-07-13

Permanent link:

<https://doi.org/10.3929/ethz-b-000281647>

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Originally published in:

Communications of the ACM

Algorithms have been around for 4000 years

For some years now, the terms "algorithms", "digitization" and "artificial intelligence" have become commonplace. However, the fashionable terms are rarely explained. One has the impression that these achievements are new, which is by no means true. This also applies, for example, to neural networks, machine learning and big data. The boom is not least due to the sharp increase in computing power of stationary and portable computers.

Herbert Bruderer

A basic concept of computer science is the algorithm. An algorithm can be described as such:

- instructions for solving a task; method for solving a problem; calculation rule or more precisely
- finite sequence of generally (valid), unique, executable instructions (steps).

The technical term is named after the Persian mathematician Muhammad Ibn Musa Al Chwarismi, author of a work on calculation rules (about 780 to 850 AD). Examples from everyday life are recipes, handicraft instructions, rules of the game, instructions for use, score, pattern.

Babylonian and Greek algorithms

The first known written algorithms were created around 2000 BC in Mesopotamia (see Donald E. Knuth; Luis Trabb Pardo: The early development of programming languages, in: Donald E. Knuth (ed.): Selected papers on computer languages, Center for the study of language and information, Stanford 2003, page 4, and Donald E. Knuth: Ancient Babylonian algorithms, in: Communications of the ACM, vol. 15, 1972, issue 7, pages 671-677, and vol. 19, 1976, issue 2, page 108).

The classical algorithms include

- Sumerian-Babylonian root extraction (method of solving quadratic equations, Codex Hammurapi (legal collection), c. 1700 BC),
- the Euclidean algorithm (method of determining the largest common divisor, Euclid of Alexandria, 4th century B.C.),
- the sieve of Eratosthenes (method for the determination of prime numbers, Eratosthenes of Cyrene, 3rd century BC),
- the approximation of the circle number π (Archimedes of Syracuse, 3rd century B.C.), and
- the Heron procedure (Heron of Alexandria, 1st century AD).

A widespread calculation method is already recorded in the Papyrus Rhind (around 1550 B.C.): Egyptian multiplication. It corresponds to Ethiopian and Russian multiplication.

It was not until 2013 that Menso Folkerts found Jost Bürgi's "Kunstweg" (1592). For more than 400 years Bürgi's method for calculating sine values has been a mysterious secret.

Digitization and artificial intelligence are nothing new

Artificial intelligence is over 100 years old. Around 1912 the Spanish engineer Leonardo Torres Quevedo built an operational chess machine, which has been preserved to this day. For a long time chess programs were an embodiment of machine intelligence. Alan Turing and Konrad Zuse should also be mentioned in this context.

Even the ancient abacus was digital. This also applies to the tally stick and the widespread finger calculation (Latin digitus = finger). Several stages of digitization can be distinguished. In the 17th century Wilhelm Schickard, Blaise Pascal and Gottfried Wilhelm Leibniz invented (digital) mechanical calculating machines. Since about 1850 the Thomas arithmometer, which is able to perform all four basic arithmetic operations, was manufactured in large quantities, and at the end of the

19th century the punched card machines appeared. In the 1940s and 1950s, relay and tube machines were introduced to the market, later transistor computers. For a long time there was competition between electronic analog and digital computers. A new wave of digitization began in the 1970s, when mechanical and electromechanical calculating machines and (analog) slide rules were replaced by (portable) electronic computers. It expanded thanks to microelectronics (from about 1970), the Internet (from about 1970) and the World Wide Web (from 1990). By the way, the boundary between analog and digital is blurred, there are mixed forms. In the case of a digital watch, the time is represented by digits, in the case of an analog watch, by hands. The hour and minute hands move continuously, but the second hand moves gradually, jumping.

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First published in: Communications of the ACM, <https://cacm.acm.org/blogs/blog-cacm/229543-algorithms-have-been-around-for-4000-years/fulltext> (13 July 2018)

Translated with www.DeepL.com/Translator (revised)



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August 2018

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