

Computation: finite and infinite machinesAuthor: [Marvin L. Minsky](#) [Massachusetts Institute of Technology](#)

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Computation: finite and infinite machines

Prentice-Hall, Inc. Upper Saddle River, NJ, USA ©1967
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Man has within a single generation found himself sharing the world with a strange new species: the computers and computer-like machines. Neither history, nor philosophy, nor common sense will tell us how these machines will affect us, for they do not do "work" as did machines of the Industrial Revolution. Instead of dealing with materials or energy, we are told that they handle "control" and "information" and even "intellectual processes." There are very few individuals today who doubt that the computer and its relatives are developing rapidly in capability and complexity, and that these machines are destined to play important (though not as yet fully understood) roles in society's future. Though only some of us deal directly with computers, all of us are falling under the shadow of their ever-growing sphere of influence, and thus we all need to understand their capabilities and their limitations.

It would indeed be reassuring to have a book that categorically and systematically described what all these machines can do and what they cannot do, giving sound theoretical or practical grounds for each judgment. However, although some books have purported to do this, it cannot be done for the following reasons: a) Computer-like devices are utterly unlike anything which science has ever considered---we still lack the tools necessary to fully analyze, synthesize, or even think about them; and b) The methods discovered so far are effective in certain areas, but are developing much too rapidly to allow a useful interpretation and interpolation of results. The abstract theory---as described in this book---tells us in no uncertain terms that the machines' potential range is enormous, and that its theoretical limitations are of the subtlest and most elusive sort. There is no reason to suppose machines have any limitations not shared by man.

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