Donald E. Knuth

THE ART OF COMPUTER PROGRAMMING

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The first two volumes in a series of seven make up a unitary and easy-to-scour presentation. They are thoroughly substantiated from the theoretical viewpoint, and take into account the existing knowledge in the field of computer-programming techniques and of the historical development of these techniques.

The author starts from the presentation of some notions, necessary to the study and writing down of algorithms, i.e. the notion of mathematical induction algorithm, the theory of numbers, function generation, asymptotic representations, a.s.o.

With a view to exemplifying the different results upon a computer, the author "builds" an "ideal" computer, called MIX, provided with very simple operating rules, and which can be simulated on several machines, or adapted to most of the existing computers.

While dealing with the information structures (linear lists, arbors, multiple-links structures, dynamic allocation), a series of exercises is proposed for being solved, and answers are presented at the end of the work.

The problems connected with the theory of numbers and the theory of probability (random numbers, statistical tests for studying random data, a.s.o.), as well as the notions of numerical analysis (numbering system, arithmetic study of numbers written with decimal point with multiple accuracy, rational numbers and polynomials), are handled with a great discernment.

The used notations are given next to the Tables with numerical constants (basic constants in the decimal and octal systems, harmonic numbers, Bernoulli and Fibonnacci's constants).

The treating manner and the selection of notions make that these first two volumes be of great use, both for the computer programmers, and for those who are interested in finding a well-synthetized mathematical apparatus.

R. M.