

Computer Arithmetic in Practice

Exercises and Programming

Computer Arithmetic in Practice: Exercises and Programming is a simple, brief introductory volume for undergraduate and graduate students at university courses interested in understanding the foundation of computers. It is focused on numeric data formats and capabilities of computers to perform basic arithmetic operations. It discusses mainly such topics as: - Basic concepts of computer architecture - Assembly language programming skills - Data formats used to express integer and real numbers - Algorithms of basic arithmetic operations - Short overview of nonlinear functions evaluation - Discussion on limited number representation and computer arithmetic - Exercises and programming tasks This book provides an accessible overview of common data formats used to write numbers in programming languages and how the computer performs four basic arithmetic operations from the point of view of the processor instruction set. The book is primarily didactic in nature, therefore the theoretical information is enriched with many numerical examples and exercises to be solved using a 'sheet of paper and a pencil'. Answers are provided for most of the tasks. The theoretical discussed issues are illustrated by listings of algorithms presenting the way to implement arithmetic operations in low-level language. It allows development of the skills of optimal programming, taking into consideration the computer architecture and limitations. Creating software using low-level language programming, despite the initial difficulties, gives the ability to control the code and create efficient applications. This allows for effective consolidation of knowledge and acquisition of practical skills required at this stage of education, mainly a specialist in the field of information technology, electronics, telecommunications, other related disciplines, or at the level of general education with introduction to information technology. It may be also useful for engineers interested in their own professional development and teachers as well.

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