# Modern Computer Arithmetic (Cambridge Monographs On Applied And Computational Mathematics 18)

Computer arithmetic is the study of the algorithms and hardware used to perform arithmetic operations on computers. It is a fundamental topic in computer science, as it underlies all of the computations that computers perform. In recent years, there have been significant advances in computer arithmetic, both in terms of the algorithms used and the hardware implemented. This book provides a comprehensive to modern computer arithmetic, covering the principles, architectures, and implementations of the major arithmetic operations.

## Contents

The book is divided into three parts. The first part introduces the basic principles of computer arithmetic, including the representation of numbers in computers, the different types of arithmetic operations, and the errors that can occur in arithmetic computations. The second part discusses the architectures of computer arithmetic units, including the design of adders, multipliers, and dividers. The third part covers the implementation of computer arithmetic algorithms, including the use of floating-point arithmetic and the design of efficient algorithms for performing arithmetic operations.

## Key Features

- Comprehensive coverage of the principles, architectures, and implementations of modern computer arithmetic

- In-depth treatment of floating-point arithmetic, including the IEEE 754 standard

- Extensive use of examples and exercises to illustrate the concepts discussed

- Ideal for graduate students and researchers in computer science, engineering, and mathematics

## Audience

This book is intended for graduate students and researchers in computer science, engineering, and mathematics. It is also a valuable resource for anyone who wants to learn more about the fundamental principles of computer arithmetic.

### Modern Computer Arithmetic (Cambridge Monographs on Applied and Computational Mathematics Book 18)

by ERIJA JACOBS

★★★★★  5 out of 5

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| Language | : English |
| File size | : 3709 KB |
| Print length | : 236 pages |
| Screen Reader | : Supported |

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## Reviews

"Modern Computer Arithmetic is a comprehensive and up-to-date treatment of the subject. It is an essential resource for anyone who wants to understand the foundations of computer arithmetic." - David Goldberg, University of California, Berkeley

"This book is a valuable contribution to the literature on computer arithmetic. It provides a clear and concise to the subject, and it is packed with useful information." - Michael Cowlishaw, University of Manchester

**About the Authors**

Richard P. Brent is an Australian mathematician and computer scientist. He is a professor emeritus at the Australian National University and a Fellow of the Royal Society of London. He is known for his work on algorithms, number theory, and computer arithmetic.

Paul Zimmermann is a German mathematician and computer scientist. He is a professor at the University of Kaiserslautern and a Fellow of the Association for Computing Machinery. He is known for his work on floating-point arithmetic, computer architecture, and parallel computing.

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## Sample Chapter

**Chapter 1: **

Computer arithmetic is the study of the algorithms and hardware used to perform arithmetic operations on computers. It is a fundamental topic in computer science, as it underlies all of the computations that computers perform. In recent years, there have been significant advances in computer arithmetic, both in terms of the algorithms used and the hardware implemented. This book provides a comprehensive to modern computer arithmetic, covering the principles, architectures, and implementations of the major arithmetic operations.

The basic principles of computer arithmetic are relatively simple. However, the implementation of these principles on a computer can be quite complex. The reason for this is that computers are digital devices, which means that they can only represent numbers in a discrete form. This can lead to errors in arithmetic computations, as the exact values of numbers may not be representable on the computer.

In this chapter, we will introduce the basic principles of computer arithmetic. We will discuss the representation of numbers in computers, the different types of arithmetic operations, and the errors that can occur in arithmetic computations.

## Exercises

1. What is computer arithmetic?

2. Why is computer arithmetic a fundamental topic in computer science?

3. What are the basic principles of computer arithmetic?

4. What is the difference between analog and digital computers?

5. How can errors occur in arithmetic computations?

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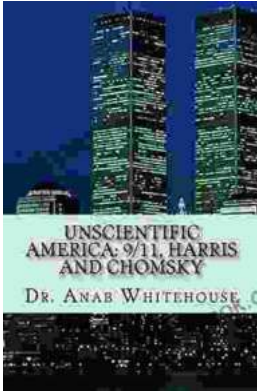
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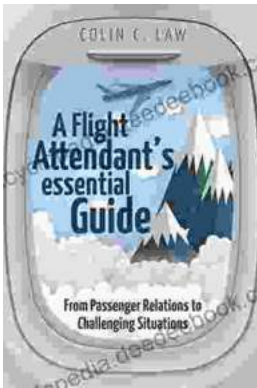| | |
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