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Computer System Architecture

M. Morris Mano

Pearson presents the much-awaited revised edition of its pioneer title on *Computer System Architecture* by Morris Mano.

This revised text is spread across fifteen chapters with substantial updates to include the latest developments in the field. The first eight chapters of the book focuses on the hardware design and computer organization, while the remaining seven chapters introduces the functional units of digital computer. The pedagogy of the book has been enhanced to enable the learners in assessing their understanding of concepts.

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ISBN 978-93-325-8560-7



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M. Morris Mano

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Rajib Mall

 Pearson

COMPUTER SYSTEM ARCHITECTURE

Revised Third Edition

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 **Pearson**

Authorized adaptation from the United States edition, entitled *Computer System Architecture*, 3rd Edition, ISBN 0131755633, by Mano, Morris M. published by Pearson Education, Inc, Copyright © 1993.

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ISBN 978-93-325-8560-7

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Published by Pearson India Education Services Pvt. Ltd, CIN: U72200TN2005PTC057128, formerly known as TutorVista Global Pvt. Ltd, licensee of Pearson Education in South Asia.

Head Office: 15th Floor, Tower-B, World Trade Tower, Plot No. 1, Block-C, Sector 16, Noida 201 301, Uttar Pradesh, India.

Registered Office: 4th Floor, Software Block, Elnet Software City, TS 140, Block 2 & 9, Rajiv Gandhi Salai, Taramani, Chennai 600 113, Tamil Nadu, India.

Fax: 080-30461003, Phone: 080-30461060

www.pearson.co.in, Email: companysecretary.india@pearson.com

Printed and bound in India by Thomson Press India Ltd.

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Preface

This book deals with computer architecture as well as computer organization and design. Computer architecture is concerned with the structure and behavior of the various functional modules of the computer and how they interact to provide the processing needs of the user. Computer organization is concerned with the way the hardware components are connected together to form a computer system. Computer design is concerned with the development of the hardware for the computer taking into consideration a given set of specifications.

The book provides the basic knowledge necessary to understand the hardware operation of digital computers and covers the three subjects associated with computer hardware. Chapters 1 through 5 present the various digital components used in the organization and design of digital computers. Chapters 6 through 8 show the detailed steps that a designer must go through in order to design an elementary basic computer. Chapters 9 through 11 deal with the organization and architecture of the central processing unit. Chapters 12 and 13 present the organization and architecture of input-output and memory. Chapter 14 introduces the concept of multiprocessing. Chapter 15 discusses a few peripheral devices. The plan of the book is to present the simpler material first and introduce the more advanced subjects later. Thus, the first eight chapters cover material needed for the basic understanding of computer organization, design, and programming of a simple digital computer. The last seven chapters present the organization and architecture of the separate functional units of the digital computer with an emphasis on more advanced topics.

The physical organization of a particular computer including its registers, the data flow, the microoperations, and control functions can be described symbolically by means of a hardware description language. In this book we develop a simple register transfer language and use it to specify various computer operations in a concise and precise manner. The relation of the register transfer language to the hardware organization and design of digital computers is fully explained.

The book does not assume prior knowledge of computer hardware and the material can be understood without the need of prerequisites. However, some experience in assembly language programming with a microcomputer will make the material easier to understand. Chapters 1 through 4 can be skipped if the reader is familiar with digital logic design.

New to this Edition

The subject of *Computer System Architecture* is possibly one of the most dynamic subjects. Performances of computers have increased phenomenally over the past few decades, while their sizes have

Chapter 7

i. a ii. c iii. a iv. d v. d

Chapter 8

i. d ii. b iii. a iv. a v. d vi. b

Chapter 9

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The beauty of the book is that it covers difficult topics in a very simplified manner. The proposal for the forthcoming issue is overwhelming as it now comprises the new topics such as Amdahl's law, and Multicore architecture, etc. The inclusion of illustrative examples throughout the chapter will definitely prove helpful.

—Mohd Zeeshan Ansari, New Delhi

This book has been serving as one of the core books in the area of computer architecture for long. The inclusion of more end of chapter examples and objective questions through all chapters in this edition is a remarkable effort. It surely facilitates students and others to grab the concepts and insights of computer architecture more efficiently.

—Musheer Ahmad, New Delhi

This is one of the best books I even been through on computer architecture. The changes made in the current edition, all chapter exercises and objective questions are really an attempt at brain storming.

—Samaresh Mishra, Odisha

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—Namita Gupta, New Delhi

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—Rama Komaragiri, Uttar Pradesh

It takes care of requisite exposure to digital logic concepts desirable for computing undergrads apart from offering a solid foundation for architectural concepts. I am sure the revised edition would continue to meet its responsibility of a foundation course on computing architecture for second year engineering students.

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—Srinivas Prasad, Andhra Pradesh

This book provides the much needed chronology so to serve both as a good self-learning and reference text. It starts with high level understanding with appendices that dive into details of specific instruction sets.

—K. S. Shreedhara, Karnataka

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—Shashidhar, Karnataka

The book covers the contents with proper flow of information from basic computer system architecture programming concepts to high level design language. The content for memory organization and multiprocessor enriches the study of computer design architecture.

—Pooja Tripathi, Uttar Pradesh

It is great to see an excellent book in the domain of computer organization and architecture addressing State of art Technologies.

—B. V. Buddhadev, Gujarat

It provides excellent content of computer hardware at undergraduate level. With all new sections introduced within the various chapters, this book will provide a knowledge base for undergraduate and post graduate students.

—Rajesh K Shukla, Madhya Pradesh

Undoubtedly, the incorporation of new chapters with the concepts, examples, exercises and sample questions will be beneficial for both the instructors as well as for the students.

—Satyananda Champati Rai, Odisha

The modifications done in every chapter is going to help in better grasp of the subject.

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The revision of the book by a very well-known and experienced author makes the coverage up-to-date and comprehensive. Lots of practice questions and examples will definitely help learners to consolidate their knowledge.

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First of all the addition of a new chapter with all the foundational background required for computer architecture is a great thought. I am sure that the readers will be all set for a better learning from this book.

—Ravi Kiran Varma Penmatsa, Andhra Pradesh

The inclusion of illustrative examples throughout all the chapters is a very good attempt and will increase the readership and improve the understanding of the subject.

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It is a great effort by the authors to bring out this new edition by including new advanced latest topics, illustrative examples, new chapters, new sections, and new objective type questions in lucid manner throughout.

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The undergraduate students would also get more benefit from the end-of-chapter exercise solutions provided. I strongly appreciate and recommend this new version of the popular text.

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This is one of the best book for learning & understanding computer architecture & organization.

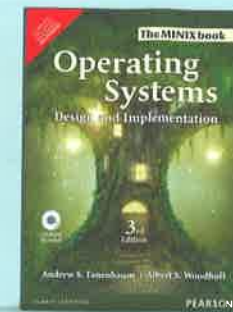
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A larger number of excellent problems in this book is its unique strength. I strongly recommend this book to students who are seeking fundamental understanding of key concepts.

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New introductory first chapter provides strong foundation concepts and new last chapter provides an insight into peripheral devices. Pedagogical aids at the end of chapter will be indeed useful to teachers and students.

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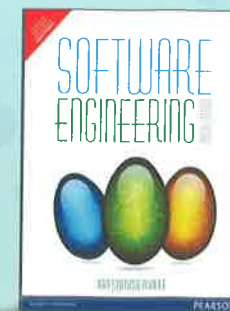
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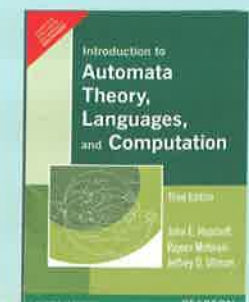
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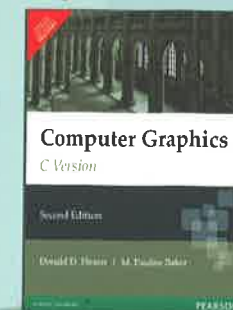
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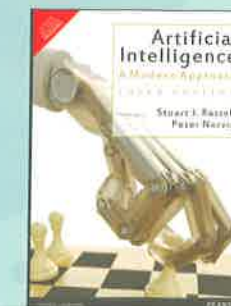
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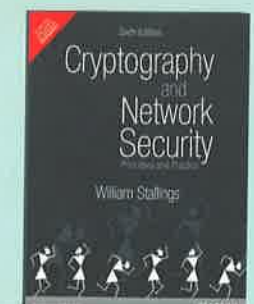
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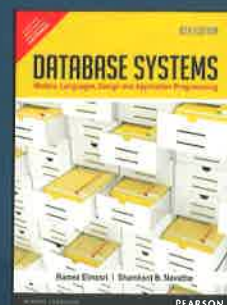
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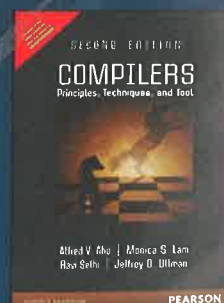
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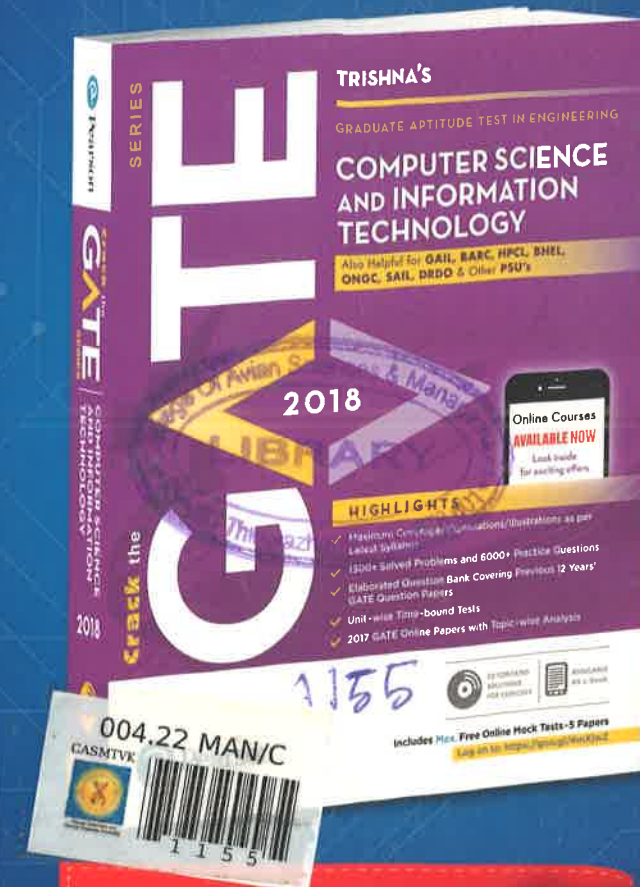
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