

Fundamentals of
**Computer
Networks**



I. Chandra Mohan



FUNDAMENTALS OF COMPUTER NETWORKS

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(For B.Tech. (CSE, IT, ECE), M.C.A. and M.Sc. (C.S.) Courses)

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Dedicated to the ever loving memory of my parents
Late Sri Inampudi Gurunadha Rao
&
Late Smt. Rukminamma

FOREWORD

Professor I. Chandra Mohan, scion of a reputed family of scholars, poets and writers, has presented yet another important book to the students of Computer Science and Engineering, with the title “Fundamentals of Computer Networks”. He has already established himself as a good writer by his book “Design and Analysis of Algorithms”.

As a teacher of both engineering as well as masters’ degree level students in Mathematics, Operations Research and Computer Science of our universities, Prof. I. Chandra Mohan carried out a niche for himself for quality instruction. His classroom performance has endeared him to thousands of students, now spread over the globe in coveted positions and these students cherish fond memories of his profound scholarship in the subjects he taught, his style of presentation of tough concepts in an exceptionally interesting and effective manner and above all the work emulating human relationships he has been maintaining uniformly.

Any book that is penned by such a professor will be welcomed by the university students and teachers as well.

Computer Network is a collection of computer devices connected by communication channels that facilitates exchange of information among users. Computer Network allows one “to share files with friends, family, co-workers and customers”.

Computer networks may be classified according to a wide variety of characteristics. Today computer networks constitute the core of modern communication systems. The scope of communications has increased multifold during the past decade and this awe inspiring boom would not have been possible without progressively advancing computer network.

This book provides a general overview of types and categories besides presenting fundamental concepts of Computer Networks. It is true that there are plenty of books on this subject. Most of these, though contain exhaustive, extensive and authentic stuff on the subject, somehow students are often perplexed while reading them, in view of their vastness. As the author of this book rightly says, “the main intention in bringing out this book is to make available what a student specifically wants”. In brief, this is a student friendly book.

Prof. I. Chandra Mohan has presented his version of the Computer Networks in eight chapters. They are: Basics of Computer Networks, Signals and the Physical Layer, The Data Link Layer, The Medium Access Sub-layer, The

Network Layer, Congestion Control Algorithms and Internetworking, The Transport Layer, The Upper OSI Layers. Each chapter is divided in various sections, subsections and sub-subsections wherever necessary, and this division is done thoughtfully keeping the interest and aptitude of the students. Every chapter ends with a set of questions for students to answer. Pedagogically this method makes teaching-learning process a pleasant exercise. We perceive all through the write-up the instructional skills of the author in making the subject matter for programmed learning.

I am sure that students and teachers in the universities and colleges welcome the book. A general reader also will be attracted towards the book for it is highly informative and readable.

I am very much delighted to write these few lines outlining the factual features of a scholarly and significant work like this ‘small book which is beautiful’.

TIRUPATI

P. V. Arunachalam
Founder Vice-Chancellor,
Dravidian University, A. P.
Former President, Indian Mathematical Society

PREFACE

The subject matter of networks comprises the study of the different aspects of communication. The study of networks is very interesting and is important not only from the subject point, but also from its practical and real-life applications. Right from the ages, human beings tried to communicate with each other for their mutual needs and support. To begin with, they used to communicate with each other or with a group of people through mime, then through pictures and finally through a language. They used to employ messengers to communicate with people located at far away places. If necessary, they used a chain of messengers stationed at different intermediate places to communicate with people located at far off places. Later, the postal department monopolized the communication field. Then computers entered the field of communication and brought in many revolutionary changes in this field. Nowadays people depend more and more on computer networks for their communication needs and for a fast and safe transmission of their data/information. In no time a research scholar of a university in one country can know what work is going on in the related field in other countries and have access to the latest developments in that field. Results of a particular examination are being put on the net and the interested persons can browse the net and can know their results in no time. A doctor who wants to perform an operation on his/her patient can consult, online, the specialist counterpart anywhere in the globe and get the benefit of the expertise of the later. Digital communications is the fast growing technology at present. It is interesting to see, today, that the general public, besides a number of individuals with academic, professional backgrounds use networks for their varied needs. At present, it is possible for the two people to see each other through web cameras and communicate with each other. The most important characteristic feature of today's communication system is the 'Mobile User'. A large number of persons use mobile computers, cell phones.

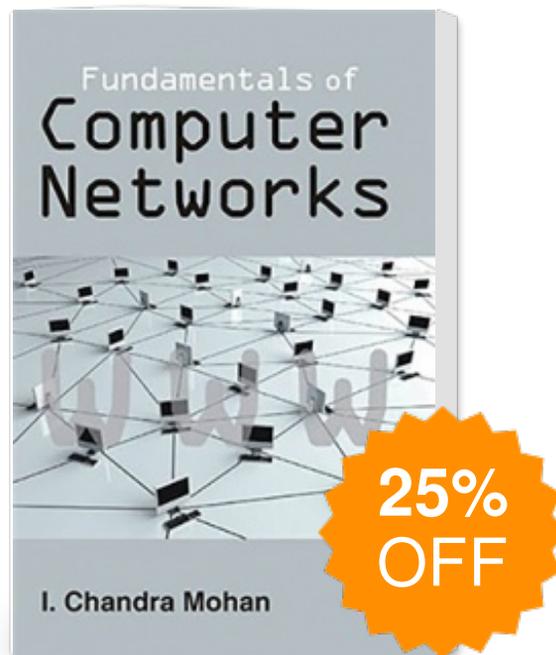
This subject is being offered as a core subject for B.Tech, M.C.A., M.Sc. (Computer Science) and other related courses. There are a number of good books that contain full, authentic and complete information on this subject. It is the experience of most of the teachers that students fail to adopt them in their preparation in view of their vastness. The main intention in bringing this book is to make available what the student specifically wants. If necessary, they can consult standard books for more information.

Any suggestions for improvement of this book are welcome.

I. Chandra Mohan



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