

# Essentials of Computer Networks, Internet and Database Technologies

V.S. Dixit • V.B. Singh



Alpha  
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# Essentials of Computer Networks, Internet and Database Technologies

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## Dedicated to

To the loving memory of my mother, Late (Smt.) Sushila Dixit,  
whatever I am today that is just because of her.

V.S. Dixit

In memory of my father, Late Sh.Ramajeet Singh

V.B. Singh

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# Preface

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In view of the widespread applications of computers in diverse areas, Computer Networks, Internet and Database Technologies have been introduced as papers in an assortment of streams of undergraduate education in all the universities of the country. The present book has been written keeping in view the syllabi of various universities. The book has been written in an easy to understand approach and students do not need any prerequisites knowledge about the subject. The book is organized into seven chapters covering different subjects namely Computer Networks, Internet, Database Technologies and Structured Query Language.

First Chapter deals with basic concept of Data Communication. In this chapter, we have discussed the topics like the concepts of Data Communication and their components, Transmission Mode and, Transmission Media (Guided and Unguided Media), Modulation Techniques, Multiplexing and Switching Techniques.

In the Second chapter detailed emphasis is given on Computer Networks and various topics namely Computer Network and their types, description of various networking devices and protocols, OSI and TCP/IP reference model, Network Topology and Types of Network have been discussed.

Third Chapter covers the Internet topic in an elaborative manner. In this chapter, we have discussed various aspects of internet technologies. Topics are presented in a simplified manner for the students.

Fourth Chapter covers the HTML topic in detail. The purpose of this chapter is to provide the knowledge of web designing using Fourth generation programming language HTML. In this chapter, there is a discussion about client-side scripting, server-side scripting, static documents, dynamic documents and active documents. There is an explanation of HTML concepts with the help of simple examples. At the end of chapter, we have demonstrated three major projects by incorporating important tags of the HTML.

In the Fifth Chapter, we have elaborated JAVASCRIPT in detail. JavaScript is used to create Dynamic web pages. Constructs of JavaScript are well described in this chapter. We have explained the basics of JavaScript, ASP with simple examples. Brief explanation about the DHTML has also been given.

In chapters Six and Seven, there is a detailed study on the concept of databases and SQL respectively. In chapter 6, evolution of database, Data models, Three Level Architecture of Database System, File Organizations and their access

methods, ER-Diagrams, Normalization and Relational Algebra has been discussed with suitable examples. Chapter 7 deals with the basics of SQL. In this chapter, we have discussed different DDL, DML, DCL and TCL statements with examples. We have also discussed different clauses used in SQL.

Several illustrative examples have been given in each chapter to clarify the important points. Each chapter also contains a set of questions for practice to enable the students to test the knowledge acquired in the chapter. We have also given four appendices which describe color schemes used in HTML, Open Database Connectivity, E-Commerce and the installation of MySQL.

Keeping in mind the audience of the book, we have given a large set of descriptive and objective sample questions which can help students in various competitive examinations.

It is hoped that the book will meet the needs of the students opting these papers and benefit them immensely.

Suggestions and comments pointed out by students and teachers are welcome and will be appreciatively accredited.

**V.S. Dixit**  
**V.B. Singh**

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**V.S. Dixit**  
**V.B. Singh**



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# Data Communication

Born : 25, April 1874  
Died : 20, July 1937  
Known For : Radio, Wireless Communication  
Notable Awards : Nobel Prize for Physics (1909)



Guglielmo Marconi

## 1.1 WHAT IS DATA COMMUNICATION?

The word Communication has its inception from the beginning of human civilization. During early times, the strength of communication was limited only to face to face communication but later on communication took place between humans across any geographical location (Voice Communication). Over a period of time, communication technology got an edge and now a days in the digital world, the communication takes place between devices to transmit any kind of information like audio, video, images etc. Today any information in any form can be transmitted from one place to another irrespective of any geographical location. Computer technology advancements in the information technology has brought many benefits to the people all around the world.

**Data Communication** means transmission of the digital signals during a communication channel between the Source (Transmitter) and Host (Receiver) devices. These devices may be a computer or any other electronic equipment. The source transmits the data and the receiver receives it. The major issues with Data Communication System is (i) the transfer of data, the method of transfer and presentation of data during the transfer process (ii) to provide the highest transmission rate at the lowest possible power with least possible noise (iii) data communication system should also devise mechanism to reduce distortion and attenuation (attenuation means loss of energy in signals during transmission). Data Communication System also provides rules for Source and Host devices because different devices have different working environment. Different devices



use different Operating Systems, languages and media for communication. The rules that govern the computers/devices for communication is called **Protocol**. Data Communication Systems have different protocol standards.

1.1.1 Basic Components of a Data Communication System

Data Communication System consists of the following basic components:

- 1. Source/Sender/Transmitter
- 2. Host/Receiver
- 3. Medium
- 4. Message
- 5. Protocol.

The following diagram shows the logical diagram of Data Communication System:

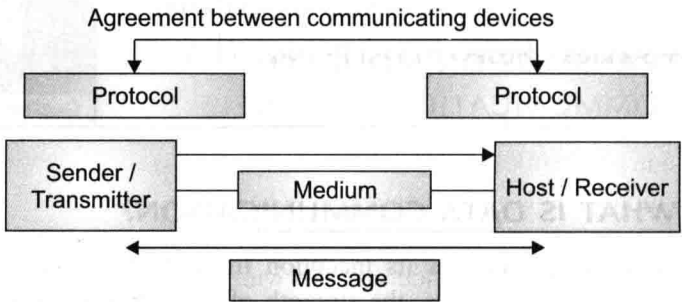


Figure 1.1

Now, we are going to describe the various components of Data Communication System.

(i) The device which sends the data/message is called **Source** or **Sender/Transmitter**. Examples are:

- Terminal
- Computer
- Television broadcast
- Radio broadcast

(ii) The device which receives data/message is called **Receiver/Host**. Examples are:

- Radio
- Printer
- Terminal
- Computer
- Television