

Preface

As we know that Computer Science is broadly divided into two branches, viz, Computer Hardware and Computer Software. This book is completely dedicated to Computer Hardware and Networking. Currently this subject has come up in the form of such a course which has innumerable possibilities of a bright future. In the initial era when the networking work was done using techniques such as Novel Netware, now-a-days, techniques like Wi-Fi and Bluetooth are in use, we can easily imagine that how fast this field is flourishing. Right from the commercial establishments to banks and government organizations, exchange of information is becoming quite common by connecting computers of remote areas using networking techniques. This is the reason that new avenues of employment in this area are growing up. If you are an expert in computer hardware and networking, you can kick start your career as a Hardware Engineer to System Administrator and Network Controller.

In the initial chapters of this book, Computer Hardware, Motherboard Lay-out, Assembling to its setting has been explained in details. Besides this, electric supplies and its connectors are shown in the diagrams before teaching ‘How to assemble a CPU’, so as to avoid mistake while doing power connections. You will find topics such as Fixing Processor and RAM in their sockets, and Over-locking, in this book so that you do not face any problem while assembling a computer. Assembling computer and configuring system has been presented in phased manner, so that you can undertake work of computer assembling without difficulty.

Networking has been presented technique-wise in different chapters of this book. You can easily understand networking hardware and process of its use. Furthermore, Ethernet Networking to Wi-Fi Networking process has been explained in details, so that you can gain expertise in the modern technologies to enter in the field of hardware networking. If we give a deep thought to computer networking, we find that the hardware aspect has not remained as important as configuring networking hardware in various Operating Systems. You only need to know, to fix Networking Card and to connect computers by cable using hub and switches. The main work is to co-ordinate and configure it with Operating Systems. Keeping this in view, all the main Operating Systems currently in use are included in this book. You can easily learn installation to doing networking in these Operating Systems and can build an illustrious career in the field of Hardware and Networking. **On great demand from various Institutes and students at various levels, over 700 MCQs (with Key) and over 150 Short Question-Answers have been given, respectively at the end of each sections of the book.**

- Author

Contents

Computer Hardware

1.	Computer Hardware—An Introduction.....	1-13
2.	Input Devices	14-20
	Keyboard, Keys of Computer Keyboard	14
	Mouse	16
	Optical mouse, Image scanner, Digital camera	17
	Touchscreen	18
	Magnetic ink character recognition (MICR), Optical mark recognition (OMR)	19
	Optical character recognition (OCR), Barcode reader, Graphics tablet	19
	Microphone, Joystick	20
3.	Output Devices	21-43
	Computer Monitor, Cathode ray tube (CRT Monitor)	21
	Liquid crystal display (LCD Monitor)	23
	LED display	26
	AMOLED display, Super AMOLED	27
	Super AMOLED Plus, Video Graphics Array (VGA Technology)	28
	Super Video Graphics Array (SVGA), PCI Express	29
	Accelerated Graphics Port (AGP Display)	30
	Video memory (VRAM), 3D display	30
	Plasma display	31
	Computer printer	32
	Laser printer	33
	Thermal Ink Jet	38
	Dot matrix printer	41
	Dye-sublimation printer	42
	Inkless printers	43
4.	Microprocessor	44-66
	CPU design, Microprocessor	44
	CPU operation	46
	Intel Sockets	50

Pentium III	52
Pentium 4	53
Pentium D, Intel Pentium Dual-Core, Intel Core 2	54
Multi-core (computing), What is Centrino?	55
Intel Core i3 / i5 / i7 CPU	56
Arrandale Micro Processor	59
Nehalem (microarchitecture)	60
Bloomfield (microprocessor)	63
Overclocking, Intel Core i7	65
5. RAM (Memory)	67-74
Principle of operation	68
Common DRAM modules, Asynchronous DRAM	70
Video DRAM (VRAM)	70
Fast Page Mode DRAM (FPM)	70
CAS before RAS refresh, Window RAM (WRAM)	71
Extended Data Out (EDO) DRAM	71
Burst EDO (BEDO) DRAM, Multibank DRAM (MDRAM)	72
Synchronous Graphics RAM (SGRAM), Synchronous Dynamic RAM (SDRAM)	72
Double Data Rate (DDR) SDRAM, Pseudostatic RAM (PSRAM)	73
1T DRAM, RLDRAM, DIMM (Dual in-line memory module)	73
Speeds, Flash memory	74
6. Hard Disk Drive	75-82
Hard Disk Drive, Technology	75
Access and interfaces	77
Integrated Drive Electronics (IDE), Small Computer System Interface (SCSI)	78
Fibre Channel (FC), Serial ATA (SATA)	79
SATA power and data cables, Power connector	80
External SATA, SATA and PATA	81
SATA 1.5Gb/s and SATA 3Gb/s, SATA and SCSI	82
7. CD, DVD and BD.....	83-89
Compact Disc or CD	83
Physical details, Optical disc recording technologies	84
Recording modes, Optical disc drive	85
Laser and optics	86
Rotational mechanism, Loading mechanisms	87
Computer interfaces, DVD	88
Dual layer recording, Blu-ray Disc	89
8. Sound Cards	90-96
Characteristics	90
Sound channels and polyphony	91
Sound Blaster	93
Integrated sound hardware on PC motherboards	95
USB sound "cards", Driver architecture	96

System Software

9. Operating Systems—An Introduction	97-120
Command line interpreter, Graphical user interface	97
Graphical user interfaces vs command line interfaces	97
What is boot disk?, Introduction of Unix Operating System	105
Linux Operating System	108
Microsoft Windows NT	111
Microsoft Windows XP	112
Microsoft Windows Vista	114
Microsoft Windows 7	115
Microsoft Windows 8	117
Interface and desktop, Secure boot	120
10. System Assembling	121-144
Required Environment, Precautions	122
Installing Motherboard, Motherboard Layout	123
CPU Installation, Installation of CPU Fan and Heatsink	125
Installation of Memory Modules (DIMM), Installing a DIMM	125
Serial A ATA A (SA SATA A) Hard Disks Installation	127
Expansion Cards, Floppy Drive (Optional)	128
Installing Hardisk, Installing Optical Drive (DVD/CDROM)	129
Power Supply	130
Configurations, BIOS Setup, BIOS Menu Bar, Main Screen	132
Install Operating System	144
11. MS Windows XP	145-152
Hardware Requirements	145
Running Windows XP Setup, If You're Installing a New Copy (Clean Install)	147
Providing Networking Information	150
Joining a Workgroup, Joining a Domain	150
Customizing Setup Using Unattended Setup Mode	151
Starting Windows XP Professional, Logging on to Windows XP Professional	151
Creating a User Account	152
Windows Boot Configuration	152
12. MS Windows 7	153-190
Installing and reinstalling Windows 7	153
Upgrading to Windows 7	153
What are the system recovery options in Windows 7?	157
32-bit and 64-bit Windows 7	159
Convert a hard disk or partition to FAT32 format	161
Create a boot partition, Unallocated disk space	163
Start Disk Cleanup, Schedule Disk Cleanup to run regularly	168
What is virtual memory?	168
Turn Direct Memory Access (DMA) on or off	169
Preventing low memory problems	170

Troubleshooting in MS Windows 7	172
What is safe mode?, Repair Your Computer	179
Safe Mode, Enable Boot Logging, Start Windows Normally	180
What is System Information?	184
How do I restore files?	187
Using sleep, When to shut down	190
13. MS Windows 8	191-210
Clean Installation of MS Windows 8	192
What To Do if Your Windows 8 Installation Media Doesn't Work for You	192
Set up Windows 8, Personalize, Settings	202
Sign in to your PC	203
Windows 8 Installation from USB Drive	204
How To Update Drivers in Windows 8	206
Shut Down Windows 8	209
Use the Charm Bar to Shut Down Windows 8	210

14. Computer Hardware: MCQ's	211-240
---	----------------

Computer Networking

15. Basics of Computer Networking	241-246
Area Networks	241
LAN Basics, WAN Basics, LANs and WANs at Home	242
MAN, SAN, PAN, DAN, and CAN	242
Network topology	243
Client-server Networking, Properties of a server	245
Properties of a client, Thin clients vs. Fat Clients	245
n-Tier Architecture	245
Peer-to-peer Networking, Advantages of peer-to-peer networks	246
16. Ethernet Networking	247-270
Computer Networking	247
Ethernet, Fast Ethernet	248
Topologies, Collisions	250
Ethernet Products, Transceivers, Network Interface Cards	251
Hubs/Repeaters, Adding Speed, Bridges	252
Ethernet Switches	253
Routers, Network Design Criteria	254
Device Servers	256
Maintaining a Quality Network	262
What is a Switch?	263
Twisted Pair Ethernet (10baseT/UTP)	267
17. Wireless Networking	271-286
Wireless networking	271
What is a wireless network made up of?	271
IEEE 802.11?	273
802.11b vs. Bluetooth	284
Bluetooth, Advantages, Disadvantages	286

Data Communication

18. Internet Networking	287-308
Packetization, Services provided by IP	287
IP versions, IP version 4, IP version 6	290
IP version 6 private addresses, Static and dynamic IP addresses	291
IP Packet, IP Packet mechanism	291
Protocol operation	295
Connection establishment, Data transfer	296
Ordered data transfer, Error-free data transfer	296
Congestion control, TCP ports	297
TCP Over Wireless, Debugging TCP	298
User Datagram Protocol, Datagram Sockets	298
Domain Name System	299
Understanding the parts of a domain name	300
DNS applications	301
Netwok Server, Server hardware	303
Client (computing)	304
File server, Database server, Print server, Mail Server, Web server	305
Application server, Advantages of application servers	306
Proxy server, Caching proxy server, Web proxy	307
Split proxy server Open proxy server	308

19. Modem, Router (DSL/ADSL)	309-316
Modem, Router, DSL/ADSL	309
The Smartmodem, V.92 Standard	310
Radio modems, Mobile modems and routers, Broadband Devices	311
Digital subscriber line (DSL), Protocols and configurations	312
Asymmetric Digital Subscriber Line (ADSL)	313
Modulation, Digital subscriber line access multiplexer, Speed vs Distance	314
Routing and Bridging	315

Network Operating System

20. Networking in MS Windows XP	317-328
21. Networking in MS Windows 7	329-348
22. Networking in MS Windows 8	349-360
23. Computer Troubleshooting	361-374
24. MCQ's:Networking and Data Communication	375-433
25. Short Questions-Answers:Networking and Data Communication	434-465
Appendix-A: Basics of Digital Electronics	466-478
Appendix-B: Computer Terminology	479-488