

THOMSON
COURSE TECHNOLOGY™

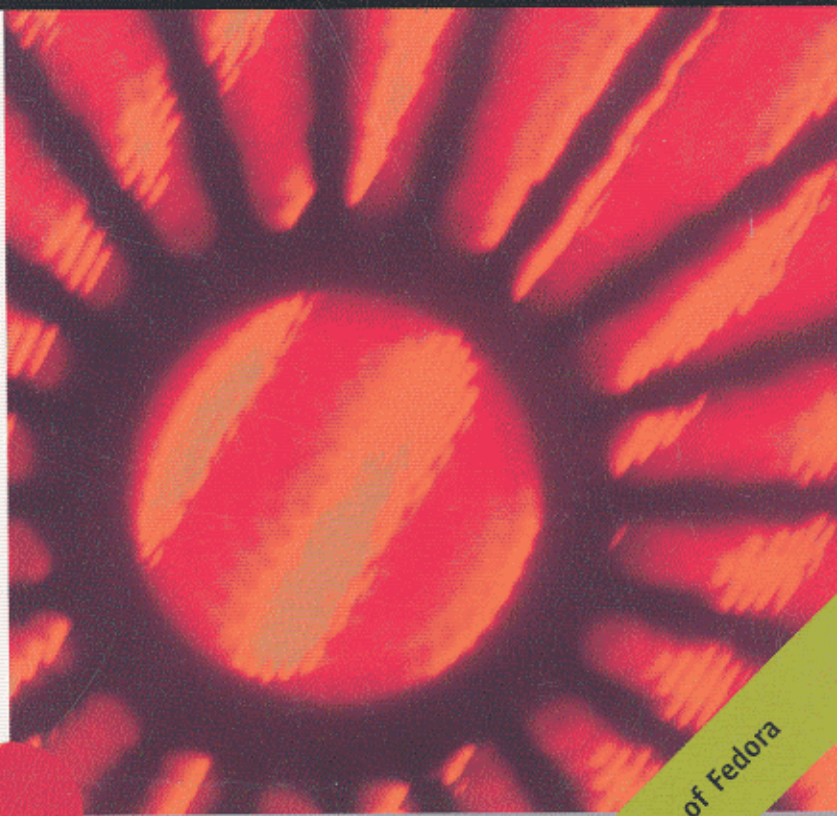
NETWORKING

Guide to Operating Systems



Third Edition

Michael Palmer
Michael Walters
Tom Badgett
Niels Jonker



Includes a copy of Fedora

TABLE OF

Contents

CHAPTER ONE

Operating System Theory

Understanding Operating Systems	1
Types of Operating Systems	2
Time Sharing	10
Real-time Systems	12
Multiuser Systems	13
A Short History of Operating Systems	13
Single-Tasking Versus Multitasking	15
Single-User Versus Multiuser Operating Systems	22
Current Operating Systems	26
Chapter Summary	26
Key Terms	27
Review Questions	28
Hands-On Projects	30
Case Projects	34
	45

CHAPTER TWO

PC Operating System Hardware

Understanding CPUs	47
Design Type	48
Speed	48
Cache	52
Address Bus	53
Data Bus	54
Control Bus	54
CPU Scheduling	54
Popular PC Processors	55
Intel	55
AMD and Cyrix	55
Other Processors	58
Popular PC Operating Systems	59
MS-DOS and PC DOS	61
Windows 3.x	61
Windows 95	62
Windows 98/Me	62
Windows NT	66
Windows 2000	68
Windows 2000 Server and Windows 2000 Professional	72
Windows 2000 Server, Advanced Server, and Datacenter Server	74
Windows XP and Windows Server 2003	75
	76

Windows XP Versions	77
UNIX System V Release 4	81
Mac OS	85
NetWare	89
Chapter Summary	91
Key Terms	92
Review Questions	96
Hands-On Projects	97
Case Projects	103

CHAPTER THREE

File Systems	105
Understanding File System Functions	106
Designing a Directory Structure	109
Disk Storage Basics	112
Block Allocation	113
Partitions	114
Windows 2000/XP/Server 2003 File Systems	116
Extended FAT16	116
FAT32	123
NTFS	125
CDFS and UDF	132
The UNIX File System	132
The NetWare File System	141
The Macintosh File System	142
Chapter Summary	147
Key Terms	148
Review Questions	152
Hands-On Projects	156
Case Projects	167

CHAPTER FOUR

Installing and Upgrading Operating Systems	171
Installing an Operating System	172
Preparing for Installation	174
Upgrading an Operating System	178
Preparing for an Upgrade	178
Making Backups Before Upgrades	182
Conducting a Test Upgrade	184
Installing and Upgrading Windows 2000	186
Hardware Requirements	186
Installing Windows 2000	187
Upgrading to Windows 2000	188
Installing and Upgrading Windows XP	192
Hardware Requirements	192
Installing Windows XP	193
Upgrading to Windows XP	194

Installing and Upgrading Windows Server 2003	196
Hardware Requirements	197
Installing Windows Server 2003	197
Upgrading to Windows Server 2003	197
Installing and Upgrading UNIX: Linux	198
Hardware Requirements	198
Installing Linux	198
Upgrading Linux	199
Installing and Upgrading NetWare 6.5	200
Hardware Requirements	200
Installing NetWare 6.5	200
Upgrading to NetWare 6.5	200
Installing and Upgrading Mac OS X	201
Hardware Requirements	201
Installing Mac OS X	201
Upgrading to Mac OS X	203
Updating Operating Systems	203
Windows Updates	204
NetWare Updates	204
Linux Updates	205
Mac Updates	205
Chapter Summary	205
Key Terms	206
Review Questions	207
Hands-On Projects	209
Case Projects	238
 CHAPTER FIVE	
Configuring Input and Output Devices	241
Operating Systems and Devices: An Overview	242
Using Device Drivers	242
Manufacturer Driver Installation	245
Windows 2000/XP/Server 2003 Device and Driver Installation	246
UNIX/Linux Driver Installation	252
Managing Devices in NetWare 6.x	254
Mac OS X Driver Installation	255
Standard Input Devices	256
Mouse and Keyboard Drivers	256
Other Input Devices	259
Digital Tablets	259
Scanners	260
Joysticks and Game Pads	261
Digital Sound Input	262
Digital Picture and Video Input/Output	263
1394 Technology	263
Printers	264
Printer Types	264
Printer Connections	266
Installing Printers	267

Display Adapters	271
Basic Display Adapter Technology	271
Installing Display Adapters	272
Sound Cards	273
Other Output Devices	273
Installing Circuit Boards	274
Chapter Summary	275
Key Terms	276
Review Questions	278
Hands-On Projects	282
Case Projects	295

CHAPTER SIX

Using and Configuring Storage Devices

Using and Configuring Storage Devices	297
Disk Storage Options	298
Hard Drive Interfaces	298
Basic and Dynamic Disks	301
RAID Arrays	301
CD-ROM and DVD	302
Compact Disc (CD) Technology	302
Digital Video Disc (DVD) Technology	303
Recordable and Rewritable CD and DVD	304
CD-ROM and DVD-ROM Interfaces	304
Connecting Drives	305
Network Storage	305
Removable Disks and Mobile Storage	307
Removable Large-Capacity Floppy Drives	307
Removable Rigid Cartridges	308
Mini USB Drives	309
Tape Drives	310
DAT Drives	310
DLT and SDLT Drives	310
AIT and S-AIT Drives	311
LTO Drives	311
Windows Removable Storage Options	311
Storage Management Tools	312
Windows 2000/XP/Server 2003	312
UNIX/Linux	313
NetWare 6.x	315
Mac OS X	316
Chapter Summary	317
Key Terms	318
Review Questions	319
Hands-On Projects	321
Case Projects	330

CHAPTER SEVEN

Modems and Other Communications Devices	331
Analog Modem Architecture	332
Analog Modem Hardware Basics	332
Software-Based Modems	336
Hayes AT Command Set for Analog Modems	337
Digital Modems	338
ISDN	338
Cable Modems	340
DSL Modems	342
Satellite	345
Data Communications Techniques	347
Software Flow Control	348
Hardware Flow Control	348
Error Correction	348
Data Compression	350
Modems and the Operating System	351
Configuring Dial-up Connections in Windows 2000/XP/Server 2003	352
Configuring Dial-up Connections in UNIX/Linux	353
Configuring Modems and Scripts in NetWare 6.x	357
Configuring Modems in Mac OS X	358
Chapter Summary	360
Key Terms	362
Review Questions	365
Hands-On Projects	369
Case Projects	381

CHAPTER EIGHT

Network Connectivity	383
Networking Basics	384
The Development of Network Operating Systems	385
Local and Wide Area Networks	386
Network Topologies	387
Networking Hardware	388
Packets, Frames, and Cells	391
Networking Protocols	393
Transport Protocols	393
Communications Protocols	397
Implementing Communications Protocols in an Operating System	403
Integrating Different Operating Systems on the Same Network	407
Using Operating Systems for Dial-Up Access	408
Chapter Summary	409
Key Terms	411
Review Questions	414
Hands-On Projects	416
Case Projects	424

CHAPTER NINE**Resource Sharing Over a Network****427**

Sharing Disks, Files, and Printers	428
Securing Shared Resources	429
Sharing Disks and Files Through Server Network Operating Systems	430
Windows 2000 Server and Windows Server 2003	430
UNIX and Linux	445
NetWare	450
Mac OS X Server	456
Accessing and Sharing Disks and Files Through Client Network Operating Systems	457
Accessing and Sharing Resources in Windows 2000 Professional	457
Accessing and Sharing Resources in Windows XP	458
Accessing Shared Resources via UNIX/Linux and Specialized Utilities	459
Accessing and Sharing Resources via Mac OS X	460
Sharing Printing Devices	462
Windows-based Systems	462
UNIX/Linux	463
NetWare	464
Mac OS X	464
Network and Internet Resource Servers	465
Chapter Summary	467
Key Terms	467
Review Questions	469
Hands-On Projects	474
Case Projects	487

CHAPTER TEN**Standard Operating and Maintenance Procedures****489**

File System Maintenance	490
Finding and Deleting Files	496
Deleting Temporary Files in Windows	496
UNIX/Linux	498
Mac OS X	500
NetWare	502
Maintaining Large and Small System Disks	504
Defragmenting Disks	504
Moving Disk Files to Spread the Load	508
Using Disk Utilities to Repair Damaged Files	509
Deploying RAID Techniques	512
Making Backups	514
Windows 2000, Windows XP, and Windows Server 2003 Backups	515
UNIX/Linux	516
NetWare	517
Mac OS X	517
Optimizing Software Installation	518

Tuning the Operating System	519
Tuning Virtual Memory	520
Installing Operating System Updates and Patches	522
Tuning for Network Communications	523
Testing Network Connectivity	525
Chapter Summary	525
Key Terms	526
Review Questions	527
Hands-On Projects	530
Case Projects	539
 APPENDIX A	
Operating System Command-Line Commands	541
Windows 2000/XP/Server 2003 Command Prompt Commands	542
Linux Commands	546
NetWare 6.x Commands	548
Mac OS X Commands	550
 APPENDIX B	
Using Fedora With This Book	553
What Is Fedora?	554
How to Install Fedora	554
Preparing for the Installation	554
Installing Fedora	556
 GLOSSARY	559
 INDEX	583