Table of Contents

About the Authors iii

Introduction xiii

Chapter 1: Overview of Open-Source Software 1

1.1 Introduction 1

1.2 Need and Advantages of Open-Source Software 2

1.3 FOSS 2

FOSS Applications 3

FOSS Usage 3

1.4 Free Software Movement 3

1.5 Open Source Movement 4

1.6 Open-Source Licensing 4

1.7 Certification 4

1.8 Open-Source Software Development Model 5

1.9 How to Run a Successful Free Software Project 5

1.10 Comparing Open-Source Software with Other Software 6

Comparing with Closed Source/Proprietor Software 7

Comparing with Free Software 7

Comparing with Source Available 8

1.11 Widely Used Open-Source Software Licenses 8

Apache License 8

BSD License 9

GNU General Public License 9

GNU Lesser General Public License 10

MIT License 10

Eclipse Public License 10

Mozilla Public License 11

Summary 11

Review Exercises 11

True and False 11

Multiple-Choice Questions 12

Short Descriptive Questions 13

Chapter 2: Open Source Operating System 15
2.1 Introduction 15
2.2 Introduction to Linux 16
Features of Linux 16
Linux Distributions 17
2.3 Linux's Root in Unix 17
2.4 Comparing Linux with Windows 18
2.5 Installation of Linux 19
Hardware Requirements 19
Setting Up to Dual-boot Linux and Windows 20
Hardisk Partitioning 20
Swap Space 21
LVM 21
Boot Loader 23
Installing Linux 24
Firstboot: After Successful Installation 35
2.6 Command Line Interface 38
2.7 Understanding FHS of Linux 38
2.8 Basic File System Management Tasks 40
Absloute Path vs Relative Path in Linux 41
Working with Files 41
The whatis Command in Linux 48
The whereis Command in Linux 48
The which Command in Linux 48
2.9 Piping and Redirection 48
2.10 Working with the vi Editor 50
Basic Vi Commands 50
2.11 Use of sed 57
Summary 58
Review Exercises 58
True or False 58
Multiple Choice Questions 59
Short Descriptive Questions 60

Chapter 3: System Administrator Tasks 63
3.1 Introduction 63
3.2 Process Management 64
The ps Command 65
The kill Command 66
The killall Command 66
3.3 Job Management 66
3.4 Mounting Devices and the File System 68
Mounting the /etc/fstab File 68
Mount a File Systems 68
Unmount a File System 69
3.5 Backup 69
Archiving Tools 70
Compression Tools 72
3.6 Handling User Accounts 73
Modifying Existing User Information 73
Describing the /etc/shadow File 75
Deleting Users 77
3.7 Groups and Permissions 77
Linux File Permission 78
Changing a File Owner or Group 78
3.8 Managing Software 79
Using Yellowdog Updater Modified 80
3.9 Understanding Boot Process and Related Files 83
BIOS Initialization 83
Master Boot Record 83
Kernel Initialization 84
Init Initialization 85
System Shutdown 86
Rebooting the System 86
3.10 Common Kernel Management Tasks 87
Summary 88
Review Exercises 88
True and False 88
Multiple Choice Questions 89
Short Descriptive Questions 90

Chapter 4: Network and Security Administration 93

4.1 Introduction 93

4.2 Basic Networking Commands 94

The ifconfig Command 95
The ping Command 96
The traceroute Command 96
The netstat Command 97
The nslookup Command 97
The dig Command 97
The route Command 97
The host Command 97
The arp Command 98
The iwconfig Command 98
The hostname Command 98
The telnet Command 98

4.3 Configuration of Apache Web Servers 98

Installing Apache Web Servers 100
Working with Virtual Hosting 101

4.4 DNS Servers 103

Configuring the named.conf File 104
Configuring The Zone Files 106
Time to Live Value 107
DNS Resource Records 107
Name Class Type Data 107
The SOA Record 107
Setting up a Cache-Only DNS Server 108
Setting up a Primary Name Server 108

4.5 DHCP Servers 109

Installing the DHCP Server 111
Configuring and Assigning an IP Address at the Client Machine in the DHCP Server 113

4.6 Mail Servers 114

Understanding the Message Transfer Agent 114
Understanding the Mail User Agent 114
Understanding the Mail Delivery Agent 115
Configuring Mail Servers 115

4.7 Working Principle of NFS 116

Configuring NFS for File Sharing 117
Configuring NFS on the Client 118
Mounting NFS Share 118
Testing NFS 119
4.8 FTP Servers 120
Installing the FTP Server 120
Configuring the FTP Server 121
Accessing the FTP Server with a Client Computer 123
4.9 Securing Servers with IPtables 125
Types of Chains 125
Tables and Rules 126
Using IPtables 127
4.10 Setting Up Cryptographic Services 129
SSL 129
Managing Certificates with OpenSSL 130
Working with the GNU Privacy Guard 131
Summary 131
Review Exercise 132
True and False 132
Multiple-Choice Questions 132
Short Descriptive Questions 134

Chapter 5: Shell Programming 139

5.1 Introduction 139
5.2 Bash Shell Scripting 140
5.3 Executing Script 141
5.4 Working with Variables and Input 141
System Variables 141
User-Defined Variables 142
Accepting Input 143
5.5 Using Control Structures 143
The if-else Statement 144
The case Statement 145
The for loop Statement 146
The while Statement 146
The until loop Statement 147
5.6 Handling Signals 148

Sending Signals to Processes 148
The trap Statement 149
5.7 Creating Functions 149
5.8 Working with sed and gawk Commands 150
Using the sed Command 151
Using the gawk Command 152
5.9 Working with Web Using Shell Script 153
Downloading a Web Page 154
Converting Web Page Content to a Text File 154
Parsing Data 155
Working with cURL 155
Summary 155
Review Exercises 156
True and False 156
Multiple Choice Questions 156
Short Descriptive Questions 157

Chapter 6: Open Source Tools Used in Lab 159

6.1 Introduction 159
6.2 Version Control Using RCS and CVS 160
Using RCS 160
Using CVS 161
6.3 Content Management with Drupal 163
Basic Drupal Components 165
Installing and Configuring Drupal 165
6.4 Security Assessment: OpenVAS 166
6.5 Working in Eclipse IDE 167
Overview of the Eclipse Platform 167
Menu Bar 168
Exploring Views 175
Exploring Perspectives 183
Developing Application Using Eclipse IDE 185
Summary 191
Review Exercises 191
True and False 191
Multiple-Choice Questions 192
Short Descriptive Questions 193

Chapter 7: Open Source Mobile Programming 195
7.1 Introduction 195
7.2 Android Programming 196
Discussing Android APIs 197
Describing the Android Architecture 198
Exploring the Features of Android 201
Exploring Android Applications 201
7.3 Setting Up the Android Environment 202
Downloading and Installing the Android SDK 203
Setting up the Android Virtual Device 204
Setting up the Android Physical Device 206
7.4 Setting Up the Android Environment 208
The Java Perspective Using Eclipse 208
The DDMS Perspective 208
Command-Line Tools 208
Developing and Executing the First Android Application 211
Exploring the Application 216
Using Command-Line Tools 220
7.5 Activities and Intents 221
Working with Activities 222
Using Intents 233
7.6 User Interface 242
Using View Groups 242
7.7 Designing UI Using Views 266
Using TextView 272
Using the EditText View 274
Using the Button View 276
Using the RadioButton View 279
Using the CheckBox View 282
Using the ImageButton View 285
Using the ToggleButton View 287
Using the RatingBar View 290
7.8 Data Persistence 293
Introducing the Data Storage Options 293
7.9 Content Providers 297
Exploring the android.provider Package 298
7.10 Messaging and Networking 300
Handling Telephony 300

Making Outgoing Phone Calls 300
Handling SMSs 301
Sending SMS Using Intent 302
Receiving SMS Using the BroadcastReceiver Object 302
Networking in Android 303
7.11 Location-Based Services 305
Exploring Google Maps External Library 305
Creating an Application Using Google Maps Android API 305
Handling Map Gestures Interaction 312
Geocoding and Reverse Geocoding 313
7.12 Publishing Android Applications 313
Signing the Android Application 314
Exploring the Strategies for Signing the Application 314
Obtaining the Appropriate Private Key 315
Preparing the Application for Release 318
Aligning the APK Package 318
Versioning the Android Application 322
Publishing the Android Application 324
Monetizing Applications 326
Summary 327
Review Exercises 327
True and False 327
Multiple Choice Questions 328
Short Descriptive Questions 330

Practicals 333

Lab 357

Index 387