Contents

Preface, xi

Acknowledgments, xi Disclaimer, xii Dedication, xii

Chapter 1

The Internet, 1

Building on the TCP/IP Protocol, 2
The Second Wave: Finding Things, 13
The Third Wave: Commercialization of the Net, 15
How It Runs and Fits Together, 18
Distributed Administration, 19
Connecting to the Internet, 22
Case Study 1: Using the Internet for Learning, 24
Summary, 28

Chapter 2

The World Wide Web, 31

Hypertext Leading to the Early Web, 32



Browsers, 35

Browsers Are the Future of the Desktop, 37

Browser Plug-ins, 40

Software "Lock-in" Through Unique Features, 42

How to Say Where to Look: URLs, 43

Somewhat Technical Aside, 45

Searching for Web Sites, 47

Limitations of Searching, 48

HTML—Hypertext Markup Language, 50

Striving for Interactiveness: Forms and CGI, 54

JavaScript, 59

Case Study 2: A Commercial Web Site, 64

Summary, 66

Chapter 3

Java Systemwide Features, 69

The Java Phenomenon, 69

Distribution of Executable Content, 72

Why Is It Useful to Run a Program from a Web Page?, 73

Changing Model of Software Distribution, 76

Heterogeneous Support, 77

Platform Independence, 78

Volume Drives Everything, 79

Portability, 82

Why Source Standards Aren't Much Help, 85

Microsoft OS Standards Divergence, 87

Internals of the Java Virtual Machine, 90

Limitations on Platform Independence, 96

Who Has Java?, 98

Summary, 98

Chapter 4

Java Security Issues, 101

What Is Security?, 101

Web Site Security Measures, 103

Java Security Measures, 106



Security for Java Applets, 106
Security Measures for Applets, 107
Early History of Security Attacks, 112
Security Comparison: Java, ActiveX, Plug-ins, 113
Case Study 3: Lack of Security with ActiveX, 114
Why ActiveX is Unsafe for Internet Use, 116
Finer-grained Security, 117
Other Security Issues, 118
Decompiling, 119
Denial-of-Service Attacks, 119
Encryption, 120
Netscape's SSL, 121
Internet Security versus Openess, 121

Chapter 5

Summary, 126

Java Language Specifics, 129

The Java Philosophy, 129

Object-Oriented Programming, 136

The First Tenet of OOP: Encapsulation, 137

The Second Tenet of OOP: Inheritance, 139

The Third Tenet of OOP: Polymorphism, 141

Language Features: Uniform Data Types, 146

What Happens on Overflow?, 148

Language Features: Threads, 149

How to Prevent Race Conditions, 153

Language Features: Automatic Memory Management

(Garbage Collection), 156

Language Features: Exceptions, 159

Case Study 4: USPS Use of Java, 165

Summary, 167

Chapter 6

Java Libraries, 169

The Java Libraries—The Process and the Purpose, 169 Core Libraries, 173



- 1. Java Language and Utilities, 173
- 2. The Java Enterprise API Family, 176
- 3. The Java Commerce API Family, 177
- 4. The Java Security API Family, 178
- 5. The Java Beans API Family, 178
- 6. The Java Media API Family (Core), 179

Standard Extension Libraries, 179

- 7. The Java Media API Family, 179
- 8. The Java Server API Family, 180
- 9. The Java Management API Family, 181
- 10. The Java Embedded API Family, 181

Internationalization, 182

Related Initiatives, 184

The Java Fund, 184

Programmer Certification, 185

100% Pure Java, 186

Java Appearing in Operating Systems, 187

Some Final Words on Productivity, 189

Case Study 5: How Java Affects Programmer

Productivity, 191

Summary, 193

Chapter 7

Client/Server and the Intranet, 195

What Is Client/Server?, 195

How Is Client/Server Different from Timesharing?, 196

Why Client/Server?, 196

Advantages and Disadvantages of Client/Server, 199

The Hidden Costs of PCs, 201

What Is a Thin Client?, 207

Network Computers, 210

The Network Computer Reference Profile, 214

Where Can a Network Computer Be Used?, 215

What Java Brings to NCs, 218

The Changing Role of ISPs, 218

Scaling Up to an Intranet, 220



Intranet Security, 227

One-, Two-, and Three-Tier Systems, 227

Case Study 6: Multi-tiered System across Internet, 232

Summary, 234

Chapter 8

Enterprise Computing and Databases, 237

Software Frameworks, 237

In the Beginning, There Was DDE, 237

Compound Documents, 239

Microsoft's COM Model, 243

Java, ActiveX, and COM, 247

JavaBeans, 250

The Industry's CORBA Model, 253

Interface Definition Language (IDL), 256

Apple's OpenDoc, 258

Java and Databases: JBDC, 258

About SQL and Relational Databases, 259

Using the JDBC, 262

Summary, 265

Chapter 9

Industry Trends for the New Millennium, 267

Players and Spectators, 268

Sun Microsystems, 268

Oracle, 272

IBM/Lotus, 273

Microsoft, 276

Netscape, 282

Apple, 286

Case Study 7: Large-scale Java Applications, 290

The Changing Computer Industry—

Retooling the COBOL Programmer, 291

Glossary, 297

Index, 305