

Table of Contents

Introduction.....	xix
Chapter 1: Network Programming.....	1
1.1 Networking Basics.....	1
1.1.1 TCP/IP Suite.....	2
1.1.2 UDP.....	3
1.1.3 Port and Socket.....	3
1.1.4 URL.....	4
1.2 Network Programming in Java Using the java.net Package.....	5
1.2.1 Identifying IP Address.....	5
1.2.2 Using the URL Class.....	6
1.2.3 Using the URLConnection Class.....	7
1.2.4 Creating a Network Application.....	9
1.3 Establishing the two-way Communication between Server and Client.....	15
1.3.1 Creating the Server Program.....	15
1.3.2 Creating the Client Program.....	16
1.3.3 Executing the Client and Server Program.....	17
1.4 Retrieving a File from Server.....	18
1.4.1 Creating the Server Program.....	18
1.4.2 Creating the Client Program.....	20
1.4.3 Executing the Server and Client Program.....	21
1.5 Learning the DatagramSocket and DatagramPacket Classes.....	21
1.5.1 The DatagramPacket Class.....	21
1.5.2 The DatagramSocket Class.....	22
1.5.3 Creating an Application using the DatagramPacket and DatagramSocket classes.....	22
1.6 Understanding the Content and Protocol Handlers.....	25
Summary.....	25
Key Terms.....	26
Quick Revise.....	26
True or False.....	26
Multiple Choice Questions.....	27
Descriptive Questions.....	28
Test Yourself.....	29

Chapter 2: JDBC Programming.....	31
2.1 Introducing JDBC.....	31
2.1.1 Components of JDBC.....	32
2.1.2 JDBC Specification.....	32
2.1.3 JDBC Architecture.....	33
2.2 Exploring JDBC Drivers.....	34
2.2.1 Type-1 Driver.....	35
2.2.2 Type-2 Driver (Java to Native API).....	36
2.2.3 Type-3 Driver (Java to Network Protocol/All Java Driver).....	37
2.2.4 Type-4 Driver (Java to Database Protocol).....	38
2.3 Exploring the Features of JDBC.....	40
2.3.1 Additional Features of JDBC 3.0.....	40
2.3.2 New Features in JDBC 4.0.....	42
2.4 Describing JDBC APIs.....	43
2.4.1 The java.sql Package.....	44
2.4.2 The javax.sql Package.....	47
2.5 Exploring Major Classes and Interfaces.....	49
2.5.1 The DriverManager Class.....	49
2.5.2 The Driver Interface.....	50
2.5.3 The Connection Interface.....	51
2.5.4 The Statement Interface.....	54
2.6 Exploring JDBC Processes with the java.sql Package.....	58
2.6.1 Understanding Basic JDBC Steps.....	59
2.6.2 Creating a Simple JDBC Application.....	60
2.6.3 Working with the PreparedStatement Interface.....	66
2.6.4 Working with the CallableStatement Interface.....	72
2.6.5 Working with ResultSets.....	83
2.6.6 Describing SQL 99 Data Types.....	96
2.7 Working with Transactions.....	117
2.7.1 ACID Properties.....	118
2.7.2 Types of Transactions.....	119
2.7.3 Transaction Management.....	119
Summary.....	123
Key Terms.....	123
Quick Revise.....	124

True or False.....	124
Multiple Choice Questions.....	124
Short Answer Questions.....	125
Test Yourself.....	127
Chapter 3: Working with Servlets.....	129
3.1 Exploring the Features of Java Servlet.....	130
3.1.1 Servlet – A Request and Response Model.....	130
3.1.2 Servlet and Environment State.....	131
3.1.3 Security Features.....	133
3.1.4 HTML-Aware Servlets.....	134
3.1.5 HTTP-Specific Servlets.....	135
3.1.6 Performance Features.....	135
3.1.7 3 Tier Applications.....	137
3.1.8 Web Publishing System.....	137
3.2 Exploring New Features in Servlet 3.0.....	138
3.3 Exploring the Servlet API.....	140
3.3.1 The javax.servlet Package.....	141
3.3.2 The javax.servlet.http Package.....	144
3.4 Explaining the Servlet Life Cycle.....	145
3.4.1 The init() Method.....	146
3.4.2 The service() Method.....	147
3.4.3 The destroy() Method.....	149
3.5 Understanding Servlet Configuration.....	149
3.6 Creating a Sample Servlet.....	151
3.6.1 Exploring Directory Structure.....	152
3.6.2 Configuring the Servlet.....	153
3.6.3 Packaging, Deploying and Running the Web Application.....	154
3.7 Creating a Servlet by using Annotation.....	157
3.8 Working with ServletConfig and ServletContext Objects.....	158
3.9 Working with the HttpServletRequest and HttpServletResponse Interfaces.....	159
3.9.1 Using the HttpServletRequest Interface.....	159
3.9.2 Using the HttpServletResponse Interface.....	167
3.10 Exploring Request Delegation and Request Scope.....	175
3.11 Describing a Session.....	179
3.11.1 Introducing Session Tracking.....	179

3.11.2	Exploring the Session Tracking Mechanisms.....	180
3.12	Using the Java Servlet API for Session Tracking.....	191
3.12.1	History of Session Tracking.....	191
3.12.2	Session Creation and Tracking.....	192
	Summary.....	205
	Key Terms.....	206
	Quick Revise.....	206
	True or False.....	206
	Multiple Choice Questions.....	207
	Descriptive Questions.....	208
	Test Yourself.....	210

Chapter 4: Working with Filters..... 211

4.1	Introducing Filters.....	211
4.1.1	Need of Filters.....	212
4.1.2	Exploring the Working of Filters.....	212
4.2	Exploring Filter API.....	213
4.2.1	The Filter Interface.....	213
4.2.2	The FilterConfig Interface.....	215
4.2.3	The FilterChain Interface.....	215
4.3	Configuring a Filter.....	216
4.3.1	Configuring Filters Using Deployment Descriptor.....	216
4.3.2	Configuring Filters Using Annotations.....	218
4.4	Creating a Web Application Using Filters.....	218
4.4.1	Using Deployment Descriptor to Configure a Filter.....	218
4.4.2	Using Annotations to Configure a Filter.....	226
4.5	Using Initializing Parameter in Filters.....	230
4.5.1	Creating the MsgFilter Filter.....	230
4.5.2	Creating a JSP Page to Test the Filter.....	231
4.5.3	Configuring the Filter.....	232
4.5.4	Testing a Filter.....	232
4.6	Manipulating Responses.....	234
4.6.1	Creating the ServletOutputStreamFilter Class.....	234
4.6.2	Creating the MyGenericResponseWrapper Class.....	235
4.6.3	Creating the Filter.....	237
4.6.4	Creating the Servlet to Test the Filter.....	237

4.6.5	Configuring the Filter.....	238
4.6.6	Testing the FilterPrePost Filter.....	239
4.7	Discussing Issues in Using Threads with Filters.....	239
	Summary.....	240
	Key Terms.....	241
	Quick Revise.....	241
	True or False.....	241
	Multiple Choice Questions.....	242
	Descriptive Questions.....	243
	Test Yourself.....	243
Chapter 5: Working with JavaServer Pages (JSP).....		245
5.1	Introducing JSP Technology.....	245
5.2	Exploring New Features of JSP 2.1.....	246
5.3	Listing Advantages of JSP over Java Servlet.....	246
5.4	Exploring the Architecture of a JSP Page.....	247
	5.4.1 The JSP Model I Architecture.....	247
	5.4.2 The JSP Model II Architecture.....	248
5.5	Describing the Life Cycle of a JSP Page.....	248
	5.5.1 The Page Translation Stage.....	248
	5.5.2 The Compilation Stage.....	249
	5.5.3 The Loading and Initialization Stage.....	249
	5.5.4 The Request Handling Stage.....	250
	5.5.5 The Destroying Stage.....	250
5.6	Working with JSP Basic Tags and Implicit Objects.....	251
	5.6.1 Exploring Scripting Tags.....	251
	5.6.2 Exploring Implicit Objects.....	256
	5.6.3 Exploring Directive Tags.....	264
	5.6.4 Using JSP Directive Tags.....	266
5.7	Working with Action Tags in JSP.....	271
	5.7.1 Exploring Action Tags.....	271
	5.7.2 Declaring a Bean in a JSP Page.....	282
5.8	Exploring the JSP Unified EL.....	288
	5.8.1 Understanding the Basic Syntax of using EL.....	289
	5.8.2 Classifying EL Expressions.....	290
	5.8.3 Describing Tag Attribute Types.....	292

5.8.4	Resolving EL Expressions.....	293
5.8.5	Describing EL Operators.....	294
5.8.6	Describing EL Objects.....	298
5.9	Using Functions with EL.....	304
	Summary.....	307
	Key Terms.....	307
	Quick Revise.....	308
	True or False.....	308
	Multiple Choice Questions.....	309
	Descriptive Questions.....	310
	Test Yourself.....	311

Chapter 6: JSP Tag Extensions and Standard Tag Library 313

6.1	Exploring the Elements of Tag Extensions.....	314
6.1.1	The TLD File.....	315
6.1.2	The taglib Directive.....	315
6.1.3	The Tag Handler.....	315
6.2	Exploring the Tag Extension API.....	316
6.2.1	The Tag Extension Interfaces.....	316
6.2.2	The Tag Extension Classes.....	321
6.3	Working with Classic Tag Handlers.....	334
6.3.1	Exploring the Life Cycle of Classic Tag Handlers.....	334
6.3.2	Implementing Classic Tags.....	335
6.4	Working with Simple Tag Handlers.....	340
6.4.1	Exploring the Life Cycle of Simple Tag Handlers.....	340
6.4.2	Implementing Simple Tag Handler.....	340
6.5	Working with JSP Fragments.....	344
6.5.1	Creating a JSP Fragment.....	344
6.5.2	Invoking a JSP Fragment.....	344
6.5.3	Exploring the JspFragment Class.....	345
6.6	Working with Tag Files.....	346
6.6.1	Handling Dynamic Attributes in Tag Files.....	346
6.6.2	Exporting Variables from a Tag File to a JSP Page.....	346
6.6.3	Using Attributes to Provide Names for Variables.....	347
6.6.4	Invoking JSP Fragments from Tag Files.....	348
6.7	Introducing JSTL.....	349

6.7.1	Explaining the Features of JSTL.....	349
6.7.2	Exploring the Tag Libraries in JSTL.....	349
6.8	Working with the Core Tag Library.....	350
6.8.1	Exploring the Tags in the Core Tag Library.....	350
6.8.2	Using the Core Tag Library in the coreTagApp Application.....	355
6.9	Working with the XML Tag Library.....	360
6.9.1	Exploring the Tags of the XML Tag Library.....	360
6.9.2	Using the XML Tag Library in the XMLTagApp Application.....	368
6.10	Working with the SQL Tag Library.....	371
6.10.1	Exploring Tags of the SQL Tag Library.....	372
6.10.2	Using the SQL Tag Library in the SqlTagApp Application.....	380
	Summary.....	383
	Key Terms.....	383
	Quick Revise.....	383
	True or False.....	383
	Multiple Choice Questions.....	384
	Descriptive Questions.....	385
	Test Yourself.....	386
Chapter 7: Working with JavaServer Faces 2.2		387
7.1	Introducing JSF.....	388
7.2	Explaining the Features of JSF.....	389
7.3	Exploring the JSF Architecture.....	392
7.4	Describing JSF Elements.....	393
7.4.1	UI Component.....	394
7.4.2	Renderer.....	395
7.4.3	Validators.....	395
7.4.4	Backing Beans.....	396
7.4.5	Converters.....	397
7.4.6	Events and Listeners.....	398
7.4.7	Message.....	401
7.4.8	Navigation.....	402
7.5	Exploring the JSF Request Processing Life Cycle.....	403
7.5.1	The Restore View Phase.....	404
7.5.2	The Apply Request Values Phase.....	404
7.5.3	The Process Validations Phase.....	405

7.5.4	The Update Model Values Phase.....	405
7.5.5	The Invoke Application Phase.....	406
7.5.6	The Render Response Phase.....	406
7.6	Exploring JSF Tag Libraries.....	407
7.6.1	JSF HTML Tags.....	407
7.6.2	JSF Core Tags.....	430
7.7	JSF Standard UI Components.....	444
7.7.1	Command Components.....	447
7.7.2	Data Component.....	448
7.7.3	Form Component.....	448
7.7.4	Image Component.....	448
7.7.5	Input Component.....	448
7.7.6	Message and Messages Component.....	448
7.7.7	Output Component.....	448
7.7.8	Parameter Component.....	449
7.7.9	Checkbox Component.....	449
7.7.10	SelectItem and SelectItems Component.....	449
7.7.11	SelectMany and SelectOne Component.....	449
7.7.12	ViewRoot Component.....	449
7.8	Working with Backing Beans.....	450
7.8.1	Using the Backing Bean Method as an Event Handler.....	452
7.8.2	Using Backing Bean Method as Validator.....	453
7.8.3	Managing Backing Beans.....	454
7.9	JSF Input Validation.....	456
7.9.1	Using Validator Method.....	456
7.9.2	Using Validators.....	456
7.10	JSF Type Conversion.....	458
7.10.1	Standard JSF Converters.....	459
7.10.2	Creating Custom Converters.....	460
7.11	Handling Page Navigation in JSF.....	461
7.12	Describing Internationalization Support in JSF.....	463
7.12.1	Configuring Supported Locales.....	463
7.13	Creating Resource Bundles.....	464
7.13.1	Accessing Localized Messages from Resource Bundle.....	464
7.14	Configuring JSF Applications.....	467
7.14.1	Setting web.xml.....	467

7.14.2	Setting the faces-config.xml File.....	469
7.15	Developing a JSF Application.....	470
7.15.1	Setting Development Environment.....	471
7.15.2	Creating JSF Pages.....	471
7.16	Creating the Employee Backing Bean.....	484
7.16.1	String getEmployees().....	488
7.16.2	String addNew().....	488
7.16.3	String update().....	488
7.16.4	String deleteEmployee().....	488
7.16.5	String getDetail().....	489
7.16.6	void getEmployee(ActionEvent).....	489
7.16.7	Managing Employee Bean.....	489
7.17	Creating the EmployeeDB Class.....	489
7.18	Creating the EmailValidator Class.....	493
7.19	Configuring a JSF Application.....	495
7.19.1	Enabling JSF Servlet in the web.xml File.....	495
7.19.2	Navigation Rules Defined in the faces-config.xml File.....	496
7.19.3	Supporting Internationalization.....	498
7.20	Exploring the Directory Structure of the Application.....	500
7.21	Running the DreamtechPro Application.....	501
7.21.1	Displaying All Employees.....	501
7.21.2	Getting Employee Detail.....	502
7.21.3	Adding New Employee.....	502
7.21.4	Editing Employee Detail.....	503
7.21.5	Deleting Employee.....	504
	Summary.....	504
	Key Terms.....	505
	Quick Revise.....	505
	True or False.....	505
	Multiple Choice Questions.....	506
	Descriptive Questions.....	506
	Test Yourself.....	507
Chapter 8: Introducing Hibernate.....		509
8.1	Introducing Hibernate.....	509
8.1.1	Need for the Hibernate Framework.....	510

8.1.2	New Features in Hibernate 3.5.....	511
8.2	Exploring the Architecture of Hibernate.....	512
8.2.1	Noteworthy Interfaces of Hibernate.....	513
8.2.2	The Hibernate Cache Architecture.....	513
8.2.3	Downloading Hibernate.....	516
8.3	Exploring HQL.....	516
8.3.1	Need of HQL.....	517
8.3.2	HQL Syntax.....	517
8.4	Understanding Hibernate O/R Mapping.....	522
8.5	Working with Hibernate.....	531
8.5.1	Setting up the Development Environment.....	532
8.5.2	Creating Database Table.....	532
8.5.3	Writing Hibernate configuration file, JavaBean, and Hibernate Mapping File.....	532
8.6	Implementing O/R Mapping with Hibernate.....	536
8.6.1	Developing a Java Bean.....	537
8.6.2	Developing Hibernate Configuration File.....	538
8.6.3	Developing Hibernate Mapping File.....	539
8.6.4	Creating the EmployeeData.java File.....	539
8.6.5	Developing Controller Component.....	543
8.6.6	Developing View Components.....	548
8.6.7	Creating the web.xml File.....	551
8.6.8	Exploring Directory Structure.....	553
8.6.9	Running the Application.....	554
	Summary.....	557
	Key Terms.....	557
	Quick Revise.....	558
	True or False.....	558
	Multiple Choice Questions.....	558
	Descriptive Questions.....	560
	Test Yourself.....	561
	Chapter 9: Working with Spring.....	563
9.1	Features of the Spring Framework.....	564
9.2	What's New in Spring 4.0.....	565

9.3	Exploring the Spring Framework Architecture.....	568
9.3.1	Explaining the Spring Core Module.....	568
9.3.2	Explaining the Spring AOP Module.....	568
9.3.3	Explaining the Spring ORM Module.....	569
9.3.4	Explaining the Spring Web MVC Module.....	569
9.3.5	Explaining the Spring Web Flow Module.....	569
9.3.6	Explaining the Spring DAO Module.....	570
9.3.7	Explaining the Spring Application Context Module.....	570
9.4	Exploring Dependency Injection and Inversion of Control.....	570
9.4.1	Explaining DI.....	571
9.4.2	Explaining IoC Container.....	571
9.5	Exploring AOP with Spring.....	572
9.5.1	Describing the AOP Concepts.....	572
9.5.2	Explaining Types of Advices.....	573
9.5.3	Spring AOP Capabilities and Its Goals.....	573
9.6	Managing Transactions.....	574
9.6.1	Need of Transaction Management Support.....	574
9.6.2	Spring Transaction Abstraction.....	575
9.6.3	Resource Synchronization with Transactions.....	578
9.6.4	Declarative Transaction Management.....	579
9.6.5	Programmatic Transaction Management.....	579
9.6.6	Choosing between Programmatic and Declarative Transaction Managements.....	581
9.6.7	Application Server-Specific Integration.....	581
9.7	Exploring Spring Form Tag Library.....	582
9.7.1	Classifying the Types of Tags.....	583
9.8	Exploring Spring's Web MVC Framework.....	593
9.8.1	Key Features of Spring Web MVC.....	593
9.8.2	The DispatcherServlet Class.....	594
9.8.3	Controllers.....	596
9.8.4	Handler Mappings.....	598
9.8.5	Views and View Resolvers.....	598
9.9	Implementing Spring Web MVC Framework.....	600
9.9.1	Creating the Controller.....	601
9.9.2	Creating the Views.....	601
9.9.3	Creating the Spring Configuration File.....	602

xviii ▶ Table of Contents

9.9.4	Creating the Web Configuration File.....	603
9.9.5	Exploring the Directory Structure.....	603
9.9.6	Running the Application.....	604
9.10	Testing Spring Applications.....	605
9.10.1	The Unit Testing.....	605
9.10.2	The Integration Testing.....	605
9.11	Integrating Spring with Hibernate.....	609
	Summary.....	609
	Key Terms.....	609
	Quick Revise.....	610
	True of False.....	610
	Multiple Choice Questions.....	610
	Descriptive Questions.....	611
	Test Yourself.....	612
	Index.....	613