



Contents

ACKNOWLEDGEMENTS	xiii
INTRODUCTION	xv

PART I

Critical Database Concepts

1 Oracle Database 10g Architecture Options	3
Databases and Instances	5
Inside the Database	5
Choosing Architectures and Options	9
2 Installing Oracle Database 10g and Creating a Database	11
Overview of Licensing and Installation Options	13
3 Upgrading to Oracle Database 10g	27
Choosing an Upgrade Method	29
Before Upgrading	30
Using the Database Upgrade Assistant	30
Performing a Manual Direct Upgrade	31
Using Export and Import	34
Using the Data-Copying Method	35
After Upgrading	36
4 Planning Oracle Applications—Approaches, Risks, and Standards	37
The Cooperative Approach	39
Everyone Has “Data”	40
The Familiar Language of Oracle	41
Some Common, Everyday Examples	45
What Are the Risks?	47
The Importance of the New Vision	48
How to Reduce the Confusion	50
Capitalization in Names and Data	57
Normalizing Names	58
Good Design Has a Human Touch	58
Understanding the Data	62
Toward Object Name Normalization	65
Intelligent Keys and Column Values	68
The Commandments	68

PART II

SQL and SQL*Plus

5	The Basic Parts of Speech in SQL	73
	Style	75
	Creating the NEWSPAPER Table	76
	Using SQL to Select Data from Tables	76
	select, from, where, and order by	80
	Logic and Value	82
	Another Use for where: Subqueries	91
	Combining Tables	95
	Creating a View	97
6	Basic SQL*Plus Reports and Commands	101
	Building a Simple Report	104
	Other Features	114
	Checking the SQL*Plus Environment	120
	Building Blocks	122
7	Getting Text Information and Changing It	123
	Datatypes	124
	What Is a String?	124
	Notation	126
	Concatenation ()	127
	How to Cut and Paste Strings	128
	Using order by and where with String Functions	145
	Review	148
8	Searching for Regular Expressions	149
	Search Strings	150
	REGEXP_SUBSTR	154
9	Playing the Numbers	163
	The Three Classes of Number Functions	164
	Notation	164
	Single-Value Functions	168
	Aggregate Functions	175
	List Functions	182
	Finding Rows with MAX or MIN	183
	Precedence and Parentheses	185
	Review	186
10	Dates: Then, Now, and the Difference	189
	Date Arithmetic	190
	ROUND and TRUNC in Date Calculations	199
	TO_DATE and TO_CHAR Formatting	200
	Dates in where Clauses	211
	Dealing with Multiple Centuries	212
	Using the EXTRACT Function	213
	Using the TIMESTAMP Datatypes	214

11 Conversion and Transformation Functions	217
Elementary Conversion Functions	220
Specialized Conversion Functions	225
Transformation Functions	226
Review	228
12 Grouping Things Together	229
The Use of group by and having	230
Views of Groups	234
The Power of Views of Groups	236
More Grouping Possibilities	241
13 When One Query Depends upon Another	243
Advanced Subqueries	244
Outer Joins	249
Natural and Inner Joins	255
UNION, INTERSECT, and MINUS	256
14 Some Complex Possibilities	261
Complex Groupings	262
Using Temporary Tables	263
Using ROLLUP, GROUPING, and CUBE	264
Family Trees and connect by	268
15 Changing Data: insert, update, merge, and delete	279
insert	280
rollback, commit, and autocommit	283
Multitable Inserts	285
delete	289
update	291
Using the merge Command	293
16 DECODE and CASE: if, then, and else in SQL	297
if, then, else	298
Replacing Values via DECODE	301
DECODE Within DECODE	302
Greater Than and Less Than in DECODE	305
Using CASE	307
17 Creating and Managing Tables, Views, Indexes, Clusters, and Sequences	311
Creating a Table	312
Dropping Tables	320
Altering Tables	321
Creating a Table from a Table	326
Creating an Index-Organized Table	327
Using Partitioned Tables	328
Creating a View	333
Indexes	336
Clusters	342
Sequences	344

18 Basic Oracle Security	345
Users, Roles, and Privileges	346
What Users Can Grant	353
Granting Limited Resources	367

PART III

Beyond the Basics

19 Advanced Security—Virtual Private Databases	371
Initial Configuration	372
Create an Application Context	373
Create a Logon Trigger	375
Create a Security Policy	376
Apply the Security Policy to Tables	377
Test VPD	378
How to Implement Column-Level VPD	379
How to Disable VPD	380
How to Use Policy Groups	381
20 Working with Tablespaces	383
Tablespaces and the Structure of the Database	384
Planning Your Tablespace Usage	389
21 Using SQL*Loader to Load Data	391
The Control File	392
Starting the Load	394
Control File Syntax Notes	398
Managing Data Loads	400
Tuning Data Loads	402
Additional Features	404
22 Using Data Pump Export and Import	405
Creating a Directory	406
Data Pump Export Options	406
Starting a Data Pump Export Job	409
Data Pump Import Options	413
Starting a Data Pump Import Job	416
23 Accessing Remote Data	423
Database Links	424
Using Synonyms for Location Transparency	431
Using the User Pseudo-Column in Views	432
Dynamic Links: Using the SQL*Plus copy Command	434
Connecting to a Remote Database	435
24 Using Materialized Views	437
Functionality	438
Required System Privileges	438
Required Table Privileges	439
Read-Only vs. Updatable	439
create materialized view Syntax	440
Using Materialized Views to Alter Query Execution Paths	445

Using DBMS_ADVISOR	447
Refreshing Materialized Views	449
create materialized view log Syntax	455
Altering Materialized Views and Logs	456
Dropping Materialized Views and Logs	457
25 Using Oracle Text for Text Searches	459
Adding Text to the Database	460
Text Queries and Text Indexes	461
Index Sets	474
26 Using External Tables	477
Accessing the External Data	478
Creating an External Table	479
Altering External Tables	489
Limitations, Benefits, and Potential Uses of External Tables	490
27 Using Flashback Queries	493
Time-Based Flashback Example	494
Saving the Data	496
SCN-Based Flashback Example	497
What If the Flashback Query Fails?	499
What SCN Is Associated with Each Row?	499
Flashback Version Queries	500
Planning for Flashbacks	502
28 Flashback—Tables and Databases	503
The flashback table Command	504
The flashback database Command	507

PART IV

PL/SQL

29 An Introduction to PL/SQL	513
PL/SQL Overview	514
Declarations Section	514
Executable Commands Section	518
Exception Handling Section	531
30 Triggers	535
Required System Privileges	536
Required Table Privileges	536
Types of Triggers	537
Trigger Syntax	538
Enabling and Disabling Triggers	548
Replacing Triggers	549
Dropping Triggers	550
31 Procedures, Functions, and Packages	555
Required System Privileges	556
Required Table Privileges	558
Procedures vs. Functions	558

Procedures vs. Packages	558
create procedure Syntax	559
create function Syntax	561
create package Syntax	568
Viewing Source Code for Procedural Objects	572
Compiling Procedures, Functions, and Packages	572
Replacing Procedures, Functions, and Packages	573
Dropping Procedures, Functions, and Packages	573
32 Using Native Dynamic SQL and DBMS_SQL	575
Using EXECUTE IMMEDIATE	576
Using Bind Variables	578
Using DBMS_SQL	579

PART V

Object-Relational Databases

33 Implementing Types, Object Views, and Methods	587
Working with Abstract Datatypes	588
Implementing Object Views	593
Methods	599
34 Collectors (Nested Tables and Varying Arrays)	603
Varying Arrays	604
Nested Tables	610
Additional Functions for Nested Tables and Varying Arrays	615
Management Issues for Nested Tables and Varying Arrays	615
35 Using Large Objects	619
Available Datatypes	620
Specifying Storage for LOB Data	621
Manipulating and Selecting LOB Values	623
36 Advanced Object-Oriented Concepts	647
Row Objects vs. Column Objects	648
Object Tables and OIDs	648
Object Views with REFs	656
Object PL/SQL	661
Objects in the Database	662

PART VI

Java in Oracle

37 An Introduction to Java	667
Java vs. PL/SQL: An Overview	668
Getting Started	669
Declarations	669
Executable Commands	670
Classes	679

38 JDBC Programming	685
Getting Started	686
Using the JDBC Classes	688
39 Java Stored Procedures	697
Loading the Class into the Database	700
How to Access the Class	702

PART VII

Clustered Oracle—The Grid

40 Oracle Real Application Clusters	709
Preinstallation Steps	710
Installing RAC	710
Starting and Stopping RAC Instances	714
Transparent Application Failover	716
Adding Nodes and Instances to the Cluster	717
Managing the Cluster Registry and Services	718
41 Grid Architecture and Management	719
Hardware and Operating System Configuration Issues	720
Adding Servers to the Grid	723
Sharing Data Across the Grid	724
Managing the Grid	724
Launching OEM	726

PART VIII

Hitchhiker's Guides

42 The Hitchhiker's Guide to the Oracle Data Dictionary	731
A Note About Nomenclature	732
New Views Introduced in Oracle Database 10g	733
New Columns Introduced in Oracle Database 10g	738
The Road Maps: DICTIONARY (DICT) and DICT_COLUMNS	745
Things You Select From: Tables (and Columns), Views, Synonyms, and Sequences	746
Recycle Bin—USER_RECYCLEBIN and DBA_RECYCLEBIN	755
Constraints and Comments	755
Abstract Datatypes, ORDBMS-Related Structures, and LOBs	764
Database Links and Materialized Views	767
Triggers, Procedures, Functions, and Packages	770
Dimensions	773
Space Allocation and Usage, Including Partitions and Subpartitions	774
Users and Privileges	780
Roles	782
Auditing	783
Miscellaneous	785
Monitoring: The V\$ Dynamic Performance Tables	785

43	The Hitchhiker's Guide to Tuning Applications and SQL	791
	New Tuning Features in Oracle Database 10g	792
	Tuning—Best Practices	794
	Generating and Reading Explain Plans	803
	Major Operations Within Explain Plans	808
	Implementing Stored Outlines	831
	Review	833
44	Case Studies in Tuning	835
	Case Study 1: Waits, Waits, and More Waits	836
	Case Study 2: Application-Killing Queries	839
	Case Study 3: Long-Running Batch Jobs	841
45	The Hitchhiker's Guide to Oracle Application Server 10g	845
	What Is Oracle Application Server 10g?	847
	Communication Services	854
	Content Management Services	859
	Business Logic Services	859
	Presentation Services	861
	Business Intelligence Services	863
	Portal Services	865
	Web Services	866
	Developer Toolkits	867
	Persistence Layer Services	872
	Caching Services	874
	System Services	876
	Development Tools	878
46	The Hitchhiker's Guide to Database Administration	885
	Creating a Database	886
	Starting and Stopping the Database	887
	Sizing and Managing Memory Areas	888
	Allocating and Managing Space for the Objects	891
	Monitoring an Undo Tablespace	900
	Automating Storage Management	901
	Segment Space Management	902
	Transporting Tablespaces	903
	Performing Backups	904
	Where to Go from Here	919
47	The Hitchhiker's Guide to XML in Oracle	921
	Document Type Definitions, Elements, and Attributes	922
	XML Schema	926
	Using XSU to Select, Insert, Update, and Delete XML Values	928
	Using XMLType	934
	Other Features	936
	Alphabetical Reference	937
	Index	1331