
Contents

Introduction	1
Acknowledgments	2
Conventions	2
PL/SQL Language Fundamentals	2
PL/SQL Character Set	2
Identifiers	3
Boolean, Numeric, and String Literals	4
Numeric Literals	5
Datetime Interval Literals	5
Delimiters	6
Comments	7
Pragmas	8
Statements	9
Block Structure	9
Variables and Program Data	11
Scalar Datatypes	11
NLS Character Datatypes	17
LOB Datatypes	17
Implicit Datatype Conversions	18
NULLs in PL/SQL	18
Declaring Variables	18
Anchored Declarations	21
Programmer-Defined Subtypes	22

Conditional and Sequential Control	22	Named Program Units	56
Conditional Control Statements	22	Procedures	56
Sequential Control Statements	26	Functions	57
Loops	27	Parameters	58
Simple Loop	27	Triggers	72
Numeric FOR Loop	28	Creating Triggers	73
Cursor FOR Loop	29	Trigger Predicates	76
WHILE Loop	29	DML Events	76
REPEAT UNTIL Loop Emulation	30	DDL Events	77
EXIT Statement	30	Database Events	77
Loop Labels	30	Packages	77
Database Interaction	31	Package Structure	78
Transaction Management	31	Referencing Package Elements	80
Autonomous Transactions	34	Package Data	80
Cursors in PL/SQL	35	SERIALLY_REUSABLE Pragma	80
Explicit Cursors	35	Package Initialization	81
Implicit Cursors	39	Calling PL/SQL Functions in SQL	82
Dynamic Cursors	42	Calling a Function	83
Cursor Variables	43	Requirements and Restrictions	84
Cursor Expressions	44	Calling Packaged Functions in SQL	84
Exception Handling	46	Column/Function Name Precedence	85
Declaring Exceptions	46	Oracle's Object-Oriented Features	85
Raising Exceptions	48	Object Types	86
Scope	49	Type Inheritance	87
Propagation	49	Methods	88
Records in PL/SQL	52	Methods in Subtypes	91
Declaring Records	52	Manipulating Objects in PL/SQL and SQL	93
Referencing Fields of Records	53	Upcasting and Downcasting	94
Assigning Records	53	Changing Object Types	97
DML and Records	54		
Nested Records	55		

Collections	99
Declaring a Collection	101
Initializing a Collection	102
Adding and Removing Elements	103
Nested Table Functions	104
Collection Methods	107
Collections and Privileges	110
Nested Collections	110
Bulk Binds	110
External Procedures	114
Creating an External Procedure	114
Parameters	120
Java Language Integration	124
Example	125
Publishing Java to PL/SQL	126
Data Dictionary	128
Regular Expressions (Oracle Database 10g)	128
Metacharacters	128
REGEXP_LIKE	129
REGEXP_INSTR	130
REGEXP_SUBSTR	131
REGEXP_REPLACE	132
Match Modifiers	133
Reserved Words	133
Index	135