

## Essential PL/SQL for Oracle 12c Index

<b>One</b>	<b>PLSQL Introduction</b>	2
	– Procedural Language for SQL	3
<b>Two</b>	<b>PLSQL Structure</b>	5
	– Basic Structure of PLSQL	6
	– The Declaration Section in PLSQL	7
	– Local Variables in PLSQL	8
	– Naming Local Variables in PLSQL	10
	– Quoted Identifier Variables	12
	– Variable Datatypes (varchar2)	16
	– Variable Datatypes (numbers)	17
	– Variable Datatypes (number)	18
	– Variable Datatypes (decimal)	21
	– Variable Datatypes (integer)	22
	– Variable Datatypes (pls_integer)	23
	– Variable Datatypes (binary_integer)	24
	– Variable Datatypes (natural)	25
	– Variable Datatypes (naturaln)	26
	– Variable Datatypes (positive)	27
	– Variable Datatypes (positiven)	28
	– Variable Datatypes (signtype)	29
	– Variable Datatypes (simple_integer)	30
	– Variable Datatypes (boolean)	31
	– Variable Datatypes - Constants	32
	– Running PLSQL in SQL*Plus	34
	– Compiling PLSQL in SQL*Plus	36
	– Common Compilation Problems	39
	– Commenting PLSQL	41
	– Documenting PLSQL	43
<b>Three</b>	<b>The SQL Plus Interface</b>	44
	– Introduction	45
	– Anatomy of SQL Plus	49
	– ORA-12560:TNS:protocol adapter error	50
	– ORA-12545:Connect failed	51
	– Exiting an SQL Plus Session	52
	– Using the DOS Window	53
	– Copying and Pasting	54
	– Using the Function Keys	57
	– Using the Line Editor in SQL Plus	58
	– Using the Editor in SQL Plus	59
	– SQL Plus Environment Settings	60
	– File Manipulation in SQL Plus	57
	– Spooling Results in SQL Plus	62
	– Changing Passwords/Clearing the Screen in SQL	63
	– <i>Exercise One</i>	64
<b>Four</b>	<b>Performing Simple DML in PLSQL</b>	66
	– Introduction	67
	– Using Local Variables	68
	– Declaring Variables Using %Type	71
	– Using Substitution Values in PLSQL	75
	– <i>Exercise Two</i>	78
<b>Five</b>	<b>Performing Conditional Statements in PLSQL</b>	80
	– If .. Then Statements	81
	– If .. Then Else Statements	84
	– If .. Then Elself Statements	86

## Essential PL/SQL for Oracle 12c Index

	– Combining Tests	87
	– Nesting Conditions	88
	– Boolean Conditions	89
<b>Six</b>	<b>Communicating from PLSQL</b>	90
	– Messaging Via PLSQL	91
	– <i>Exercise Three</i>	96
<b>Seven</b>	<b>Exception Handling</b>	98
	– Introduction	99
	– The When Clause	102
	– The When Others Clause	105
	– Raise_Application_Error	107
	– Oracle Defined Exceptions	111
	– Raising User Defined Exceptions	112
	– Pragma Exceptions in PLSQL	115
	– Grouping Exceptions in PLSQL	119
	– Alternative Way to Handle SQL Errors in PLSQL	120
	– Handling SQL Errors in PLSQL	121
	– Advanced SQLErrm	123
	– <i>Exercise Four</i>	124
<b>Eight</b>	<b>Implicit Cursors</b>	127
	– Using Implicit Cursors in PLSQL	128
	– Using Implicit Cursors to Select Records	130
	– Exceptions in PLSQL	131
	– Attributes of Implicit Cursors	133
	– SQL%FOUND	134
	– SQL%NOTFOUND	135
	– SQL%ROWCOUNT	136
<b>Nine</b>	<b>Sub-Blocking in PLSQL</b>	137
	– Introduction	138
	– Defining	139
	– Re-Raising Exceptions in PLSQL	141
	– <i>Exercise Five</i>	144
<b>Ten</b>	<b>Explicit Cursors</b>	148
	– Using Explicit Cursors in PLSQL	149
	– How Explicit Cursors Work	151
	– Attributes of an Explicit Cursor	154
	– Passing Parameters to Explicit Cursors	157
	– Explicit Cursors Versus Implicit Cursors	160
	– <i>Exercise Six</i>	161
<b>Eleven</b>	<b>Using Sequences in PLSQL 12c</b>	164
<b>Twelve</b>	<b>Loop Processing</b>	167
	– Iterative Processing in PLSQL	168
	– Basic Looping in PLSQL	169
	– While Looping in PLSQL	173
	– For Looping in PLSQL	176
	– Using Dates in For Loops in PLSQL	180
	– Using Characters in For Loops in PLSQL	181
	– Implicit Cursor Looping in PLSQL	182
	– Explicit Cursor Looping in PLSQL	185
	– Using other Loops with Explicit Cursors	187
	– Loop Labels in PLSQL	190
	– Loop Continue and Continue When	192
	– <i>Exercise Seven</i>	196

# Essential PL/SQL for Oracle 12c Index

<b>Thirteen</b>	<b>PL/SQL Database Objects</b>	202
	– PLSQL Objects	203
	– Compiling PLSQL Objects	204
	– Metadata For PLSQL Objects	205
	– Re-Compiling PLSQL Objects	206
	– Dropping PLSQL Objects	208
	– Passing Parameters in PLSQL	209
	– Passing Parameters in PLSQL using Positional Notation	210
	– Passing Parameters in PLSQL using Named Notation	212
	– Using Mixed Notation in SQL	213
	– Metadata (User Source)	215
	– Describing PLSQL Objects in SQL*Plus	216
<b>Fourteen</b>	<b>Programmer Defined Functions</b>	217
	– Syntax of Functions in Oracle	218
	– Suggested Naming Convention of Functions in Oracle	221
	– Function Example in PLSQL	222
	– Running Functions in SQL and PLSQL	224
	– Running Functions in Oracle	225
	– <i>Exercise Eight</i>	226
<b>Fifteen</b>	<b>Programmer Defined Procedures</b>	230
	– Syntax of Procedures in Oracle	231
	– Example of Procedures in Oracle	233
	– Executing Procedures in Oracle within SQL Plus	234
	– Executing Procedures in Oracle within PLSQL	235
<b>Sixteen</b>	<b>Sub-programming Techniques</b>	236
	– Introduction	237
	– Example	238
	– <i>Exercise Nine</i>	240
<b>Seventeen</b>	<b>Packaging Programmer Defined Programs</b>	243
	– Syntax of Packages in Oracle	244
	– Compiling of Packages in Oracle	249
	– Private Processes in PLSQL Packages	250
	– Executing Packages in Oracle	252
	– Handling Exceptions in Packages in PLSQL	253
	– <i>Exercise Ten</i>	255
<b>Eighteen</b>	<b>DML Triggers in Oracle</b>	256
	– Oracle Triggers Introduction	257
	– DML Triggers Introduction	258
	– DML Triggers Timing Points	260
	– DML Triggers When Conditions	261
	– DML Triggers When Conditions Examples	262
	– DML Triggers Suggested Naming Conventions	264
	– Syntax of DML Triggers in PLSQL	266
	– Referencing Values within Triggers	267
	– Checking the Event which fired the DML Trigger	271
	– Using the Follows syntax to dictate Trigger Firing	273
	– ORA-25022: cannot reference a trigger of a different type	277
	– Using the Disable syntax when Compiling Triggers	278
	– Enabling/Disabling Triggers in an Oracle Database	279

## Essential PL/SQL for Oracle 12c Index

		- Metadata for Triggers (User_Triggers)	281
		- Mutating DML Triggers in Oracle	282
		- <i>Exercise Eleven</i>	286
<b>Nineteen</b>	<b>Rowtypes in PLSQL</b>		293
		- Using %Rowtype in PLSQL	294
		- Declaring a Variable as a %Rowtype	295
		- Referencing a %Rowtype Variable	296
		- Populating a Variable which is a %Rowtype	297
		- Passing a %Rowtype between Processes	300
		- Declaring a Cursor %Rowtype	302
<b>Twenty</b>	<b>Advanced Cursors in Oracle 12c</b>		305
		- For Update with Explicit Cursors	306
		- Where Current of Explicit Cursors	307
		- Example of Updating with Explicit Cursors	308
		- Using Nowait with Explicit Cursors	309
		- Using Skip Locked with Explicit Cursors	310
		- Using Wait with an Explicit Cursor	311
		- Using Rowid with Explicit Cursors	312
		- Using Returning Into in PLSQL	313
		- Using Rowtype for DML	316
<b>Twenty One</b>	<b>Savepoints in PLSQL</b>		318
		- Using Savepoints in a PLSQL process	319
		- Example of Savepoints in PLSQL process	320
<b>Twenty Two</b>	<b>Case Statements and Case Expressions</b>		321
		- Introduction	322
		- Using Searched Case in PLSQL	323
		- Using Case in PLSQL	324
		- Using Nested Case in PLSQL	325
		- Using Case Expressions in PLSQL	327
		- Using Nullif in PLSQL	331
		- Using Coalesce in PLSQL	332
		- <i>Exercise Twelve</i>	333
<b>Twenty Three</b>	<b>File I/O</b>		336
		- Reading and Writing Files in PLSQL	337
		- Accessing the File System using Directories	338
		- Creating Directories	339
		- Simple Write using UTL_FILE.PUT_LINE	341
		- Simple Read Using UTL_FILE.GET_LINE	342
		- Additional Functions in the UTL_FILE Package	343
		- Using UTL_FILE.PUTF in PLSQL	344
		- UTL_FILE Exceptions	346
		- Using UTL_FILE to perform Operating System Commands	348
		- Using UTL_FILE.Fcopy in PLSQL	349
		- Using UTL_FILE.Fgetattr in PLSQL	350
		- Using UTL_FILE.Fremove in PLSQL	351
		- Using UTL_FILE.Frename in PLSQL	352
<b>Twenty Four</b>	<b>Dynamic SQL</b>		353
		- Introduction to Dynamic SQL	354
		- Native Dynamic SQL (NDS) with Execute Immediate	355
		- NDS Error Handling	358
		- NDS with Inputs	359
		- NDS with Output	361

## Essential PL/SQL for Oracle 12c Index

- Dynamic Cursors and Sys_Refcursor	352
- NDS with Outputs	364
- Introduction to DBMS_SQL	365
- DBMS_SQL Example	366
- <i>Exercise Thirteen</i>	367

### Appendices :

<b>Appendix PL1</b>	- <b>SQL Functions</b>
<b>Appendix PL2</b>	- <b>SQL Line Editor Commands</b>
<b>Appendix PL3</b>	- <b>SQL Environment Settings</b>
<b>Appendix PL4</b>	- <b>SQL Column Formats</b>
<b>Appendix PL5</b>	- <b>SQL Number Formats</b>
<b>Appendix PL6</b>	- <b>SQL Date Formats</b>
<b>Appendix PL7</b>	- <b>Compute Formats</b>
<b>Appendix PL8</b>	- <b>System Exceptions</b>

### Delegate Questionnaire

