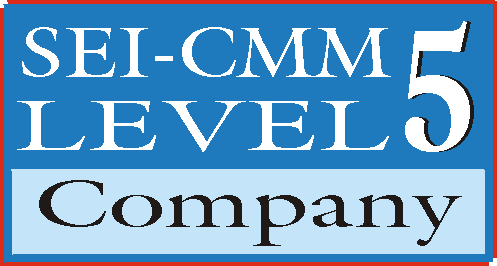
Oracle PL/SQL

Lab Book



Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Revision No. | Author | **Summary of Changes** |
| 05-Feb-2009 | 0.1D | Rajita Dhumal | Content Creation |
| 09-Feb-2009 |  | CLS team | Review |
| 02-Jun-2011 | 2.0 | Anu Mitra | Integration Refinements |
| 30-Nov-2012 | 3.0 | Hareshkumar Chandiramani | Revamp of Assignments and Conversion to iGATE format. |

Table of Contents

[Document Revision History 2](#_Toc343531638)

[Table of Contents 3](#_Toc343531639)

[Getting Started 4](#_Toc343531640)

[Overview 4](#_Toc343531641)

[Setup Checklist for Oracle 9i 4](#_Toc343531642)

[Instructions 4](#_Toc343531643)

[Learning More (Bibliography if applicable) 4](#_Toc343531644)

[Lab 1. Introduction to Data Dictionary 5](#_Toc343531645)

[Lab 2. Introduction to PL/SQL and Cursors 6](#_Toc343531646)

[Lab 3. Exception Handling and Dynamic SQL 8](#_Toc343531647)

[Lab 4. Database Programming 10](#_Toc343531648)

[Lab 5. Case Study 1 14](#_Toc343531649)

[Lab 6. Case Study 2 16](#_Toc343531650)

[Lab 7. Handling Files, DBMS\_LOB 18](#_Toc343531651)

[Lab 8. SQL\*Plus Reports 19](#_Toc343531652)

[Lab 9. SQL Loader 23](#_Toc343531653)

[Appendices 28](#_Toc343531654)

[Appendix A: Oracle Standards 28](#_Toc343531655)

[Appendix B: Coding Best Practices 29](#_Toc343531656)

[Appendix C: Table of Figures 30](#_Toc343531657)

[Appendix D: Table of Examples 31](#_Toc343531658)

Getting Started

## Overview

This lab book is a guided tour for learning Oracle 9i. It comprises ‘To Do’ assignments. Follow the steps provided and work out the ‘To Do’ assignments.

## Setup Checklist for Oracle 9i

Here is what is expected on your machine in order for the lab to work.

Minimum System Requirements

* Intel Pentium 90 or higher (P166 recommended)
* Microsoft Windows 95, 98, or NT 4.0, 2k, XP.
* Memory: 32MB of RAM (64MB or more recommended)

Please ensure that the following is done:

* Oracle Client is installed on every machine
* Connectivity to Oracle Server

## Instructions

* For all coding standards refer Appendix A. All lab assignments should refer coding standards.
* Create a directory by your name in drive <drive>. In this directory, create a subdirectory Oracle 9i\_assgn. For each lab exercise create a directory as lab <lab number>.

## Learning More (Bibliography if applicable)

* Oracle10g - SQL - Student Guide - Volume 1 by Oracle Press
* Oracle10g - SQL - Student Guide - Volume 2 by Oracle Press
* Oracle10g database administration fundamentals volume 1 by Oracle Press
* Oracle10g Complete Reference by Oracle Press
* Oracle10g SQL with an Introduction to PL/SQL by Lannes L. Morris-Murphy

1. Introduction to Data Dictionary

|  |  |
| --- | --- |
| **Goals** | Getting the details from various Data Dictionary Objects |
| **Time** | 45 min |

1.1: Get the details of all the database objects and their types created by the current

user.

1.2 Get the details of all the table names owned by current user

1.3 Get the details of table names and corresponding column names

1.4 Get the details of column names and corresponding constraint names

1.5: Get the details of the constraints and corresponding table name.

1.6: Get the details of all the View names and corresponding Text of the same.

1.7: Get the details of all the Sequence names and their last numbers reached so far.

1.8: Get the details of all the Synonym names and their parent object names.

1.9: Get the list of all the Index names

1. Introduction to PL/SQL and Cursors

|  |  |
| --- | --- |
| **Goals** | The following set of exercises are designed to implement the following   * PL/SQL variables and data types * Create, Compile and Run anonymous PL/SQL blocks * Usage of Cursors |
| **Time** | 1hr 30 min |

2.1

Identify the problems(if any) in the below declarations:

DECLARE

V\_Sample1 NUMBER(2);

V\_Sample2 CONSTANT NUMBER(2) ;

V\_Sample3 NUMBER(2) NOT NULL ;

V\_Sample4 NUMBER(2) := 50;

V\_Sample5 NUMBER(2) DEFAULT 25;

Example 1: Declaration Block

2.2

The following PL/SQL block is incomplete.

Modify the block to achieve requirements as stated in the comments in the block.

DECLARE --outer block

var\_num1 NUMBER := 5;

BEGIN

DECLARE --inner block

var\_num1 NUMBER := 10;

BEGIN

DBMS\_OUTPUT.PUT\_LINE('Value for var\_num1:' ||var\_num1);

--Can outer block variable (var\_num1) be printed here.If Yes,Print the same.

END;

--Can inner block variable(var\_num1) be printed here.If Yes,Print the same.

END;

Example 2: PL/SQL block

2.3. Write a PL/SQL block to retrieve all staff (code, name, salary) under specific department number and display the result. (Note: The Department\_Code will be accepted from user. Cursor to be used.**)**

2.4.Write a PL/SQL block to increase the salary by 30 % or 5000 whichever minimum for a given Department\_Code.

2.5. Write a PL/SQL block to generate the following report for a given Department code

Student\_Code Sudent\_Name Subject1 Subject2 Subject3 Total Percentage Grade

Note: Display suitable error massage if wrong department code has entered and if there is no student in the given department.

For Grade:

Student should pass in each subject individually (pass marks 60).

Percent >= 80 then grade= A

Percent >= 70 and < 80 then grade= B

Percent >= 60 and < 70 then grade= C

Else D

2.6. Write a PL/SQL block to retrieve the details of the staff belonging to a particular department. Department code should be passed as a parameter to the cursor.

1. Exception Handling and Dynamic SQL

|  |  |
| --- | --- |
| **Goals** | Implementing Exception Handling ,Analyzing and Debugging |
| **Time** | 1 hr |

3.1: Modify the programs created in Lab2 to implement Exception Handling

3.2 The following PL/SQL block attempts to calculate bonus of staff for a given MGR\_CODE. Bonus is to be considered as twice of salary. Though Exception Handling has been implemented but block is unable to handle the same.

Debug and verify the current behavior to trace the problem.

DECLARE

V\_BONUS V\_SAL%TYPE;

V\_SAL STAFF\_MASTER.STAFF\_SAL%TYPE;

BEGIN

SELECT STAFF\_SAL INTO V\_SAL

FROM STAFF\_MASTER

WHERE MGR\_CODE=100006;

V\_BONUS:=2\*V\_SAL;

DBMS\_OUTPUT.PUT\_LINE('STAFF SALARY IS ' || V\_SAL);

DBMS\_OUTPUT.PUT\_LINE('STAFF BONUS IS ' || V\_BONUS);

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('GIVEN CODE IS NOT VALID.ENTER VALID CODE');

END;

Example 3: PL/SQL block

3.3 Rewrite the above block to achieve the requirement.

3.4

Predict the output of the following block ? What corrections would be needed to make it more efficient?

BEGIN

DECLARE

fname emp.ename%TYPE;

BEGIN

SELECT ename INTO fname

FROM emp

WHERE 1=2;

DBMS\_OUTPUT.PUT\_LINE('This statement will print');

EXCEPTION

WHEN OTHERS THEN

DBMS\_OUTPUT.PUT\_LINE('Some inner block error');

END;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('No data found in fname');

WHEN OTHERS THEN

DBMS\_OUTPUT.PUT\_LINE('Some outer block error');

END;

Example 4: PL/SQL Block with Exception Handling

3.5 Debug the above block to trace the flow of control.

Additionally one can make appropriate changes in Select statement defined in the

block to check the flow.

3.6: Write a PL/SQL program to check for the commission for an employee no 7369. If no commission exists, then display the error message. Use Exceptions.

3.7: Write a PL/SQL block to drop any user defined table.

1. Database Programming

|  |  |
| --- | --- |
| **Goals** | The following set of exercises are designed to implement the following   * Implement business logic using Database Programming like Procedures and Functions * Implement validations in Procedures and Functions * Working with Packages * Performance Tuning |
| **Time** | 3.5 Hrs |

**Note:** Procedures and functions should handle validations, pre-defined oracle server and user defined exceptions wherever applicable. Also use cursors wherever applicable.

4.1Write a PL/SQL block to find the maximum salary of the staff in the given department. Note: Department code should be passed as parameter to the cursor.

4.2. Write a function to compute age. The function should accept a date and return age in years.

4.3. Write a procedure that accept staff code and update staff name to Upper case. If the staff name is null raise a user defined exception.

4.4 Write a procedure to find the manager of a staff. Procedure should return the following – Staff\_Code, Staff\_Name, Dept\_Code and Manager Name.

4.5. Write a function to compute the following. Function should take Staff\_Code and return the cost to company.

DA = 15% Salary, HRA= 20% of Salary, TA= 8% of Salary.

Special Allowance will be decided based on the service in the company.

< 1 Year Nil

>=1 Year< 2 Year 10% of Salary

>=2 Year< 4 Year 20% of Salary

>4 Year 30% of Salary

4.6. Write a procedure that displays the following information of all staff

Staff\_Name Department Name Designation Salary Status

Note: - Status will be (Greater, Lesser or Equal) respective to average salary of their own department. Display an error message Staff\_Master table is empty if there is no matching record.

4.7. Write a procedure that accept Staff\_Code and update the salary and store the old salary details in Staff\_Master\_Back (Staff\_Master\_Back has the same structure without any constraint) table.

Exp < 2 then no Update

Exp > 2 and < 5 then 20% of salary

Exp > 5 then 25% of salary

4.8. Create a procedure that accepts the book code as parameter from the user. Display the details of the students/staff that have borrowed that book and has not returned the same. The following details should be displayed

Student/Staff Code Student/Staff Name Issue Date Designation Expected Ret\_Date

4.9. Write a package which will contain a procedure and a function.

Function: This function will return years of experience for a staff. This function will take the hiredate of the staff as an input parameter. The output will be rounded to the nearest year (1.4 year will be considered as 1 year and 1.5 year will be considered as 2 year).

Procedure: Capture the value returned by the above function to calculate the additional allowance for the staff based on the experience.

Additional Allowance = Year of experience x 3000

Calculate the additional allowance and store Staff\_Code, Date of Joining, and Experience in years and additional allowance in Staff\_Allowance table.

4.10. Write a procedure to insert details into Book\_Transaction table. Procedure should accept the book code and staff/student code. Date of issue is current date and the expected return date should be 10 days from the current date. If the expected return date falls on Saturday or Sunday, then it should be the next working day.

4.11: Write a function named ‘get\_total\_records’, to pass the table name as a parameter, and get back the number of records that are contained in the table. Test your function with multiple tables.

4.12

**Tune the following Oracle Procedure enabling to gain better performance.**

**Objective:**The Procedure should update the salary of an employee and at the same time retrieve the employee's name and new salary into PL/SQL variables.

CREATE OR REPLACE PROCEDURE update\_salary (emp\_id NUMBER) IS

v\_name VARCHAR2(15);

v\_newsal NUMBER;

BEGIN

UPDATE emp\_copy SET sal = sal \* 1.1

WHERE empno = emp\_id;

SELECT ename, sal INTO v\_name, v\_newsal

FROM emp\_copy

WHERE empno = emp\_id;

DBMS\_OUTPUT.PUT\_LINE('Emp Name:' || v\_name);

DBMS\_OUTPUT.PUT\_LINE('Ename:' || v\_newsal);

END;

Example 5: Oracle Procedure

4.13

The following procedure attempts to delete data from table passed as parameter.This procedure has compilation errors. Identify and correct the problem.

CREATE or REPLACE PROCEDURE gettable(table\_name in varchar2) AS

BEGIN

DELETE FROM table\_name;

END;

Example 6: Oracle Procedure

4.14

Write a procedure which prints the following report using procedure:

The procedure should take deptno as user input and appropriately print the emp details.

Also display :

Number of Employees,Total Salary,Maximum Salary,Average Salary

**Note:** The block should achieve the same without using Aggregate Functions.

Sample output for deptno 10 is shown below:

Employee Name : CLARK

Employee Job : MANAGER

Employee Salary : 2450

Employee Comission :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Employee Name : KING

Employee Job : PRESIDENT

Employee Salary : 5000

Employee Comission :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Employee Name : MILLER

Employee Job : CLERK

Employee Salary : 1300

Employee Comission :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Number of Employees : 3

Total Salary : 8750

Maximum Salary : 5000

Average Salary : 2916.67

------------------------------------

Figure 1 :Report

4.15: Write a query to view the list of all procedures ,functions and packages from the Data Dictionary.

1. Case Study 1

|  |  |
| --- | --- |
| **Goals** | Implementation of Procedures/Functions ,Packages with Testing and Review |
| **Time** | 2.5hrs |

Consider the following tables for the case study.

**Customer\_Masters**

|  |  |  |
| --- | --- | --- |
| **Name** | **Null?** | **Type** |
| Cust\_Id | Not Null | Number(6) |
| Cust\_Name | Not Null | Varchar2(20) |
| Address |  | Varchar2(50) |
| Date\_of\_acc\_creation |  | Date |
| Customer\_Type |  | Char(3) |

Note: Customer type can be either IND or NRI

**Account\_Masters Table**

|  |  |  |
| --- | --- | --- |
| **Name** | **Null?** | **Type** |
| Account\_Number | Not Null | Number(6) |
| Cust\_ID |  | Number(6) |
| Account\_Type |  | Char(3) |
| Ledger\_Balance |  | Number(10) |

Note: Account type can be either Savings (SAV) or Salary (SAL) account.

For savings account minimum amount should be 5000.

**Transaction\_Masters**

|  |  |  |
| --- | --- | --- |
| **Name** | **Null?** | **Type** |
| Transaction\_Id | Not Null | Number(6) |
| Account\_Number |  | Number(6) |
| Date\_of\_Transaction |  | Date |
| From\_Account\_Number | Not Null | Number(6) |
| To\_Account\_Number | Not Null | Number(6) |
| Amount | Not Null | Number(10) |
| Transaction\_Type | Not Null | Char(2) |

Note: Transaction type can be either Credit (CR) or Debit (DB).

Procedure and function should be written inside a package.

All validations should be taken care.

5.1 Create appropriate Test Cases for the case study followed up by Self/Peer to Peer

Review and close any defects for the same.

5.2Write a procedure to accept customer name, address, and customer type and account type. Insert the details into the respective tables.

5.3. Write a procedure to accept customer id, amount and the account number to which the customer requires to transfer money. Following validations need to be done

* Customer id should be valid
* From account number should belong to that customer
* To account number cannot be null but can be an account which need not exist in account masters (some other account)
* Adequate balance needs to be available for debit

5.4 Ensure all the Test cases defined are executed. Have appropriate Self/Peer to Peer

Code Review and close any defects for the same.

1. Case Study 2

|  |  |
| --- | --- |
| **Goals** | Implementation of Procedures/Functions ,Packages with Testing and Review |
| **Time** | 2.5hrs |

Consider the following table (myEmp) structure for the case study

EmpNo Ename City Designation Salary

-------------------------------------------------------------------

The following procedure accepts Task number and based on the same performs an

appropriate task.

PROCEDURE run\_task (task\_number\_in IN INTEGER)

IS

BEGIN

IF task\_number\_in = 1

THEN

add\_emp;

--should add new emps in myEmp.

--EmpNo should be inserted through Sequence.

--All other data to be taken as parameters.Default location is Mumbai.

END IF;

IF task\_number\_in = 2

THEN

raise\_sal;

--should modify salary of an existing emp.

--should take new salary and empno as input parameters

--Should handle exception in case empno not found

--upper limit of rasing salary is 30%. should raise exception appropriately

END IF;

IF task\_number\_in = 3

THEN

remove\_emp;

--should remove an existing emp

--should take empno as parameter

--Handle exception if empno not available

END IF;

END run\_task;

Example 7: Sample Oracle Procedure

However ,it has been observed the method adopted in above procedure is inefficient.

6.1

Create appropriate Test Cases for the case study followed up by Self/Peer to Peer

Review and close any defects for the same.

6.2

Recreate the procedure (run\_task) which is more efficient in performing the same.

6.3

Also, create relevant procedures (add\_emp , raise\_sal ,remove\_emp)

with relevant logic (read comments)to verify the same.

6.4 Extend the above implementation using Packages

6.5) Ensure all the Test cases defined are executed. Have appropriate Self/Peer to Peer

Code Review and close any defects for the same.

1. Handling Files, DBMS\_LOB

|  |  |
| --- | --- |
| **Goals** | Working with UTL\_FILE and subprograms of this package |
| **Time** | 2 hr 30 mins |

7.1: The following PL/SQL block creates file “TestFile.txt” with appropriate contents.

Enhance the block by reading the contents back from the file and displaying it at SQL prompt.

Declare

TextHandler Utl\_File.File\_type;

WriteMessage Varchar2(400);

ReadMessage Varchar2(400);

Begin

TextHandler:=Utl\_File.Fopen('d:\Sample','TestFile.txt','W');

WriteMessage:='FOPEN is a Function, which returns the value of type

File\_Type \n UTL\_file.PUT\_LINE is a procedure in UTL\_FILE, which write a line

to a file,Specific line terminator will be appended \n';

Utl\_file.Putf(Texthandler,writemessage);

Utl\_File.Fflush(Texthandler);

Utl\_File.Fclose(Texthandler);

End;

/

Example 8: Block using File Handling operations

7.2 Extend the implementation in the above block by incorporating Exception Handling.

7.3 We need to maintain the above block in database permanently.What can be done for the same ? Rewrite the above to achieve the same.

7.4: Write a PL/SQL block to create a file “EmpDeptDetails.Txt” .The contents in the file map to columns from both the tables Emp and Dept.

(Empno,Ename,Job, Sal, Dname, Loc)

Also read the contents back from the file and display it on prompt.

1. SQL\*Plus Reports

**Note:** Demos are provided for additional reference.

|  |  |
| --- | --- |
| **Goals** | Use SQL\*Plus Reports feature and come up with reports in specified formats. |
| **Time** | 1 hr |

8.1: Using Multiple Spacing Techniques

Suppose you have more than one column in your ORDER BY clause and wish to insert space when each column’s value changes. Each BREAK command you enter replaces the previous one.

Now consider a scenario where you want to do either of the following:

* to use different spacing techniques in one report, or
* to insert space after the value changes in more than one ordered column

Then you must specify “multiple columns” and “actions” in a single BREAK command.

**Step 1:** Combine the Spacing Techniques.

SELECT DEPARTMENT\_ID, JOB\_ID, LAST\_NAME, SALARY FROM EMP\_DETAILS\_VIEW

WHERE SALARY>12000

ORDER BY DEPARTMENT\_ID, JOB\_ID;

Example 9: Sample Code

Now, to skip a page when the value of DEPARTMENT\_ID changes, and to skip one line when the value of JOB\_ID changes, key in the following command:

BREAK ON DEPARTMENT\_ID SKIP PAGE ON JOB\_ID SKIP 1

Example 10: Sample Code

To show that SKIP PAGE has taken effect, create a TTITLE with a page number:

TTITLE COL 35 FORMAT 9 'Page:' SQL.PNO

Example 101: Sample Code

Page: 1

DEPARTMENT\_ID JOB\_ID LAST\_NAME SALARY

------------- ---------- ------------------------- ----------

20 MK\_MAN Hartstein 13000

Page: 2

DEPARTMENT\_ID JOB\_ID LAST\_NAME SALARY

------------- ---------- ------------------------- ----------

80 SA\_MAN Russell 14000

Partners 13500

Page: 3

DEPARTMENT\_ID JOB\_ID LAST\_NAME SALARY

------------- ---------- ------------------------- ----------

90 AD\_PRES King 24000

AD\_VP Kochhar 17000

De Haan 17000

6 rows selected.

Figure 2: Report

**Step 2:** Produce a report that does the following when the value of JOB\_ID changes:

* prints duplicate job values,
* prints the average of SALARY, and
* inserts one blank line

Additionally the report should do the following when the value of DEPT\_ID changes:

* prints the sum of SALARY, and
* inserts another blank line

The details should be displayed for all departments respective to jobs. **(To Do)**

DEPT\_ID JOB\_ID ENAME SALARY

------- ------ ------------- ----------

50 SH\_CLERK Taylor 3200

SH\_CLERK Fleaur 3100

.

.

.

SH\_CLERK Gates 2900

\*\*\*\*\*\*\*\*\*\* -----------

Avg: 3000

DEPT\_ID JOB\_ID ENAME SALARY

------- --------- ------------- ----------

50 SALESMAN Perkins 2500

SALESMAN Bell 4000

.

.

.

SALESMAN Grant 2600

\*\*\*\*\*\*\*\*\*\* ----------

Avg: 3215

DEPT\_ID JOB\_ID ENAME SALARY

------- ------ ------------- ---------

\*\*\*\*\*\*\*\* ----------

sum 64300

-

-

-

-

-

25 rows selected.

Figure 3: Report

8.2: Computing and Printing Subtotals

**Step 1:** Generate SQL Report in the following format.

SALES DEPARTMENT PERSONNEL REPORT

PERFECT WIDGETS

01-JAN-2008

PAGE: 1

DEPARTMENT\_ID LAST\_NAME SALARY

------------- ------------------------- ----------

20 Hartstein 13000

80 Russell 14000

80 Partners 13500

90 King 24000

90 Kochhar 17000

90 De Haan 17000

----------

98500

COMPANY CONFIDENTIAL

6 rows selected.

Figure 4: SQL Report

**Step 2:** Generate SQL Report in the following format.

Dept Job No. of Average

No. Name Employees Salary/Job

---- -------- ------------- -------------

10 SALES 4 $13,000.00

CLEARK 2 $10,666.00

20 MANAGER 3 $14,000.00

SALES 6 $11,000.00

30 CLERK 10 $13,500.00

MANAGER 3 $15,000.00

SALES 4 $10,000.00

40 PRESIDENT 1 424,000.00

.

.

.

----------

Grand Total of Sal: $98,560.00

No. Of Employees: 100

Figure 5: SQL Report

1. SQL Loader

**Note:** Demos are provided for additional reference.

|  |  |
| --- | --- |
| **Goals** | * Use the SQL Loader utility and upload the given files under specified conditions. |
| **Time** | 1 hr |

9.1: Load Variable-Length Data

**Step 1:** Crosscheck for the relation. If it does not exist, create the Dept table.

**Step 2:** Create and save the control file named as ‘deptcontrol.ctl’ in the specified location. Control file should contain following details:

12,RESEARCH,"SARATOGA"

10,"ACCOUNTING",CLEVELAND

11,"ART",SALEM

13,FINANCE,"BOSTON"

21,"SALES",PHILA.

22,"SALES",ROCHESTER

42,"INT'L","SAN FRAN

Example 112: Control File

**Step 3:** Execute the SQL Loader command at the command prompt and verify the updated Relation by issuing the command given below:

SQL>select \* from dept;

Example 13: Sample Code

9.2: Use the SQL Loader utility. Upload the data file having Fixed-Format Fields, as shown below, into Emp table.

**Data file**

* Given below are a few sample data lines from the file ulcase2.dat.
* Blank fields are automatically set to null.

7782 CLARK MANAGER 7839 2572.50 10

7839 KING PRESIDENT 5500.00 10

7934 MILLER CLERK 7782 920.00 10

7566 JONES MANAGER 7839 3123.75 20

7499 ALLEN SALESMAN 7698 1600.00 300.00 30

7654 MARTIN SALESMAN 7698 1312.50 1400.00 30

7658 CHAN ANALYST 7566 3450.00 20

7654 MARTIN SALESMAN 7698 1312.50 1400.00 30

Example 124: Sample Code

9.3: Load combined physical records

**Control file:**

The control file is ulcase4.ctl:

LOAD DATA

INFILE 'ulcase4.dat'

1) DISCARDFILE 'ulcase4.dsc'

2) DISCARDMAX 999

3) REPLACE

4) CONTINUEIF THIS (1) = '\*'

INTO TABLE emp

(empno POSITION(1:4) INTEGER EXTERNAL,

ename POSITION(6:15) CHAR,

job POSITION(17:25) CHAR,

mgr POSITION(27:30) INTEGER EXTERNAL,

sal POSITION(32:39) DECIMAL EXTERNAL,

comm POSITION(41:48) DECIMAL EXTERNAL,

deptno POSITION(50:51) INTEGER EXTERNAL,

hiredate POSITION(52:60) INTEGER EXTERNAL)

Example 135: Control file

**Datafile**

A sample datafile used for this case, ulcase4.dat, is shown below. Asterisks are in the first position. Further, a newline character, though not visible, is in position 20. Note that clerk’s commission is -10, and SQL\*Loader loads the value, converting it to a negative number.

\*7782 CLARK

MANAGER 7839 2572.50 -10 25 12-NOV-85

\*7839 KING

PRESIDENT 5500.00 25 05-APR-83

\*7934 MILLER

CLERK 7782 920.00 25 08-MAY-80

\*7566 JONES

MANAGER 7839 3123.75 25 17-JUL-85

\*7499 ALLEN

SALESMAN 7698 1600.00 300.00 25 3-JUN-84

\*7654 MARTIN

SALESMAN 7698 1312.50 1400.00 25 21-DEC-85

\*7658 CHAN

ANALYST 7566 3450.00 25 16-FEB-84

\*CHEN

ANALYST 7566 3450.00 25 16-FEB-84

\*7658 CHIN

ANALYST 7566 3450.00 25 16-FEB-84

Example 146: Datafile

9.4: Load data into multiple tables.

The control file is ulcase5.ctl.

-- Loads EMP records from first 23 characters

-- Creates and loads PROJ records for each PROJNO listed

-- for each employee

LOAD DATA

INFILE 'ulcase5.dat'

BADFILE 'ulcase5.bad'

DISCARDFILE 'ulcase5.dsc'

1) REPLACE

2) INTO TABLE emp

(empno POSITION(1:4) INTEGER EXTERNAL,

ename POSITION(6:15) CHAR,

deptno POSITION(17:18) CHAR,

mgr POSITION(20:23) INTEGER EXTERNAL)

2) INTO TABLE proj

-- PROJ has two columns, both not null: EMPNO and PROJNO

3) WHEN projno != ' '

(empno POSITION(1:4) INTEGER EXTERNAL,

3) projno POSITION(25:27) INTEGER EXTERNAL) -- 1st proj

2) INTO TABLE proj

4) WHEN projno != ' '

(empno POSITION(1:4) INTEGER EXTERNAL,

4) projno POSITION(29:31 INTEGER EXTERNAL) -- 2nd proj

2) INTO TABLE proj

5) WHEN projno != ' '

(empno POSITION(1:4) INTEGER EXTERNAL,

5) projno POSITION(33:35) INTEGER EXTERNAL) -- 3rd proj

Example 157: Control File

**Notes:**

1. REPLACE specifies that if there is data in the tables to be loaded (emp and proj), SQL\*loader should delete the data before loading new rows.
2. Multiple INTO TABLE clauses load two tables, emp and proj. The same set of records is processed three times, using different combinations of columns each time to load table proj.
3. WHEN loads only rows with nonblank project numbers. When projno is defined as columns 25...27, rows are inserted into proj only if there is a value in those columns.
4. When projno is defined as columns 29...31, rows are inserted into proj only if there is a value in those columns.
5. When projno is defined as columns 33...35, rows are inserted into proj only if there is a value in those columns.

**Datafile:**

1234 BAKER 10 9999 101 102 103

1234 JOKER 10 9999 777 888 999

2664 YOUNG 20 2893 425 abc 102

5321 OTOOLE 10 9999 321 55 40

2134 FARMER 20 4555 236 456

2414 LITTLE 20 5634 236 456 40

6542 LEE 10 4532 102 321 14

2849 EDDS xx 4555 294 40

4532 PERKINS 10 9999 40

1244 HUNT 11 3452 665 133 456

123 DOOLITTLE 12 9940 132

1453 MACDONALD 25 5532 200

Example 18: Datafile

9.5: Use SQL Loader utility to load specific data from the given flat file into the table. (To Do)

The given flat file contains data in the form of DEPTNO, DEPTNAME, and LOCATION. Using SQL Loader utility, load only DEPTNO and LOCATION from the .dat file into the department table. Do not overwrite the source data present in department table.

12, Research, "Saratoga"

10, "Accounting", Cleveland

11, "Art", Salem

13, Finance, Boston

21, Sales, Phila

22, Sales, Rochester

42, "Int'l", "San Fran"

Example19: Flat file

Appendices

## Appendix A: Oracle Standards

Key points to keep in mind:

1. Write comments in your stored Procedures, Functions and SQL batches generously, whenever something is not very obvious. This helps other programmers to clearly understand your code. Do not worry about the length of the comments, as it will not impact the performance.
2. Prefix the table names with owner names, as this improves readability, and avoids any unnecessary confusion.

Some more Oracle standards:

To be shared by Faculty in class

## Appendix B: Coding Best Practices

1. Avoid Dynamic SQL statements as much as possible. Dynamic SQL tends to be slower than Static SQL.
2. Perform all your referential integrity checks and data validations by using constraints (foreign key and check constraints). These constraints are faster than triggers. So use triggers only for auditing, custom tasks, and validations that cannot be performed by using these constraints.
3. Do not call functions repeatedly within your stored procedures, triggers, functions, and batches. For example: You might need the length of a string variable in many places of your procedure. However do not call the LENGTH function whenever it is needed. Instead call the LENGTH function once, and store the result in a variable, for later use.

## Appendix C: Table of Figures

Figure 1: [Report](OraclePLSQL_Labbook_Final2.docx#B1) 20

[Figure 2: Report 20](#_Toc343267789)0

[Figure 3: Report 21](#_Toc343267790)1

[Figure 4: SQL Report 22](#_Toc343267791)2

[Figure 5: SQL Report 22](#_Toc343267792)3

## Appendix D: Table of Examples

[Example 1: Declaration Block 6](#_Toc343531989)

[Example 2: PL/SQL block 6](#_Toc343531990)

[Example 3: PL/SQL block 8](#_Toc343531991)

[Example 4: PL/SQL Block with Exception Handling 9](#_Toc343531992)

[Example 5: Oracle Procedure 12](#_Toc343531993)

[Example 6: Oracle Procedure 12](#_Toc343531994)

[Example 7: Sample Oracle Procedure 17](#_Toc343531995)

[Example 8: Block using File Handling operations 18](#_Toc343531996)

[Example 9: Sample Code 19](#_Toc343531997)

[Example 11: Sample Code 19](#_Toc343531998)

[Example 12: Control File 23](#_Toc343531999)

[Example 14: Sample Code 24](#_Toc343532000)

[Example 15: Control file 24](#_Toc343532001)

[Example 16: Datafile 25](#_Toc343532002)

[Example 17: Control File 26](#_Toc343532003)