Tech Module Exercises: 0 / 52

PLSQL

* Mini Projects

|  |  |  |
| --- | --- | --- |
| S.No. | Mini-project Description | Topics Covered |
| 1 | Bank Transactions | Procedures, Functions, Packages and Triggers |

* + In this TECH Module, you are expected to complete the below Mini-Project(s)
* Topics to Learn

To complete the above project, you will need to lean the below technical topics-

* + **Introduction to PL/SQL**

Learning Material for **Introduction to PL/SQL**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Start with PLSQL | PL\_SQL\_Chapter 1.pdf | PDF | Mandatory |
| 2. | Introduction to PL/SQL | PL\_SQL\_Chapter 2.pdf | PDF | Mandatory |
| 3. | Basic need and benefits of PL/SQL | https://www.tutorialspoint.com/plsql/plsql\_overview.htm | Web | Suggestive |
| 4. | PL/SQL Block | https://www.youtube.com/watch?v=rbarR4\_gaH8&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ | Video | Suggestive |
| 5. | Basic Syntax of PL/SQL | https://www.tutorialspoint.com/plsql/plsql\_basic\_syntax.htm | PDF/Web | Mandatory |

* + - Hands-on Assignments for **Introduction to PL/SQL**
      * No Hands-on Assignments for this topic
  + **Declaring PL/SQL Variables**

Learning Material for **Declaring PL/SQL Variables**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | PLSQL Variable, Identifiers, Datatypes | PL\_SQL\_Chapter 3.pdf | PDF | Mandatory |
| 2. | Datatypes of PL/SQL | https://www.tutorialspoint.com/plsql/plsql\_data\_types.htm | Web | Suggestive |
| 3. | PL/SQL Variables-1 | https://www.tutorialspoint.com/plsql/plsql\_variable\_types.htm | Web | Suggestive |
| 4. | PL/SQL Variables-2 | https://www.javatpoint.com/pl-sql-variables | Web | Suggestive |
| 5. | Constants and Literals | https://www.tutorialspoint.com/plsql/plsql\_constants.htm | Web | Suggestive |
| 6. | Operators | https://www.tutorialspoint.com/plsql/plsql\_operators.htm | Web | Suggestive |
| 7. | Variables | https://www.youtube.com/watch?v=2MNmodawvnE&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=2 | Video | Suggestive |

* + - Hands-on Assignments for **Declaring PL/SQL Variables**
      * No Hands-on Assignments for this topic
  + **Writing Executable Statements**

Learning Material for **Writing Executable Statements**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Lexical units in PLSQL Block | PL\_SQL\_Chapter 4.pdf | PDF | Mandatory |
| 2. | SQL functions | PL\_SQL\_Chapter 5.pdf | PDF | Mandatory |
| 3. | Conversions | PL\_SQL\_Chapter 6.pdf | PDF | Mandatory |
| 4. | Nested Blocks | PL\_SQL\_Chapter 7.pdf | PDF | Mandatory |
| 5. | Sequences | PL\_SQL\_Chapter 8.pdf | PDF | Mandatory |

* + - Hands-on Assignments for **Writing Executable Statements**
      * No Hands-on Assignments for this topic
  + **Interacting with Oracle Database Server**

Learning Material for **Interacting with Oracle Database Server**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Retrieving data with PL/SQL | PL\_SQL\_Chapter 9.pdf | PDF | Mandatory |
| 2. | Manipulating data with PL/SQL | PL\_SQL\_Chapter 10.pdf | PDF | Mandatory |
| 3. | Using Select in PL/SQL | https://www.youtube.com/watch?v=F5eMJhwmCQs&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=3 | Video | Suggestive |
| 4. | %TYPE | https://www.youtube.com/watch?v=Zt0vlmTqhP4&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=4 | Video | Suggestive |
| 5. | PL/SQL constants | https://www.youtube.com/watch?v=TJtjo3FTBtE&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=6 | Video | Suggestive |
| 6. | Bind Variables | https://www.youtube.com/watch?v=TJtjo3FTBtE&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=6 | Video | Suggestive |
| 7. | Merging rows | PL\_SQL\_Chapter 11.pdf | PDF | Mandatory |
| 8. | SQL Cursors | PL\_SQL\_Chapter 12.pdf | PDF | Mandatory |
| 9. | Implicit Cursors | https://www.tutorialspoint.com/plsql/plsql\_cursors.htm | Web | Suggestive |

* + - Hands-on Assignments for **Interacting with Oracle Database Server**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program that displays the Netsal(Sal+comm) of an employee entered at run time from EMP table.(Use NVL Function). | Program with Database Server |  |

* + **Writing Control Structures**

Learning Material for **Writing Control Structures**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Using IF Statements | PL\_SQL\_Chapter 13.pdf | PDF | Mandatory |
| 2. | IF THEN Statement | https://www.youtube.com/watch?v=IWvuFD6eD30&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=8 | Video | Suggestive |
| 3. | IF THEN ELSE Statement | https://www.youtube.com/watch?v=IWsY\_HzufKw&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=9 | Video | Suggestive |
| 4. | IF THEN ELSIF Statement | https://www.youtube.com/watch?v=aW9XgUHSr0I&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=10 | Video | Suggestive |
| 5. | Case Structures | PL\_SQL\_Chapter 14.pdf | PDF | Mandatory |
| 6. | Loop Structures | PL\_SQL\_Chapter 15.pdf | PDF | Mandatory |
| 7. | Conditional statements in PLSQL-1 | https://www.youtube.com/watch?v=aDBHco\_VgMo&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=8 | Video | Suggestive |
| 8. | Conditional statements in PLSQL-2 | https://www.tutorialspoint.com/plsql/plsql\_conditional\_control.htm | Web | Suggestive |
| 9. | PL/SQL Loops | https://www.tutorialspoint.com/plsql/plsql\_loops.htm | Web | Suggestive |
| 10. | Simple Loops | https://www.youtube.com/watch?v=AFx6QYcY1CU&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=11 | Video | Suggestive |
| 11. | WHILE Loops | https://www.youtube.com/watch?v=IIlc4Sr7kFE&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=12 | Video | Suggestive |
| 12. | For Loops | https://www.youtube.com/watch?v=DfAmnj2j7WI&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=14 | Video | Suggestive |

* + - Hands-on Assignments for **Writing Control Structures**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program that will prompt for a EMPNO,ENAME,SAL. If EMPNO does not exists in EMP table then INSERT the EMPNO,ENAME,SAL into the EMP table else UPDATE ENAME,SAL for that EMPNO. | Control Structures |  |
| 2. | Write a program that will prompt for number and display whether the number is ODD or EVEN number. | Control Structures |  |
| 3. | Write program that prompts for EMPNO and update his salary based on the below specification:  If the employee belongs to DEPTNO 10 then update his salary by 10%.  If the employee belongs to DEPTNO 20 then update his salary by 15%.  If the employee belongs to other DEPTNO then update his salary with SALARY+COMM. | Control Structures |  |
| 4. | In sql Prompt create a table MYTABLE1 with RESULT as a column of number datatype. Write a program that will insert record in the mytable from 1,2,3… to 10 values. Do not insert record 6 and 8 | Control Structures |  |

* + **Working with Composite Data Types**

Learning Material for **Working with Composite Data Types**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Composite Data Types | PL\_SQL\_Chapter 38.pdf | PDF | Mandatory |
| 2. | PL/SQL Records | PL\_SQL\_Chapter 39.pdf | PDF | Mandatory |
| 3. | Record Datatype | https://www.youtube.com/watch?v=1iHbZDuDbis | Video | Suggestive |
| 4. | PL/SQL Collections | PL\_SQL\_Chapter 40.pdf | PDF | Mandatory |
| 5. | PL/SQL Collections-1 | https://www.tutorialspoint.com/plsql/plsql\_collections.htm | Web | Suggestive |
| 6. | PL/SQL Collections-2 | https://www.youtube.com/watch?v=z6SNnXj1JCU&list=PLL\_LQvNX4xKwiW-ogQEKgaj8Ub-Qc4B42 | Video | Suggestive |
| 7. | Table Based Record Datatype -1 | https://www.youtube.com/watch?v=E1KWq4jRrT4 | Video | Suggestive |
| 8. | Table Based Record Datatype -2 | https://www.youtube.com/watch?v=8WqpqKUj9l8 | Video | Suggestive |

* + - Hands-on Assignments for **Working with Composite Data Types**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program that will display the entire row by passing the empno. (Use %ROWTYPE) | Working with Composite Data types |  |

* + **Explicit Cursors**

Learning Material for **Explicit Cursors**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Introduction to PL/SQL | https://www.youtube.com/watch?v=\_snAMqCBitg&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=27 | Video | Suggestive |
| 2. | Using Explicit Cursors | PL\_SQL\_Chapter 16.pdf | PDF | Mandatory |
| 3. | Using Explicit Cursors-1 | https://www.youtube.com/watch?v=3q7dW\_d2KVc&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=28 | Video | Suggestive |
| 4. | Using Explicit Cursors-2 | https://plsql-tutorial.com/plsql-explicit-cursors.htm | Web | Suggestive |
| 5. | Explicit Cursors with parameters-1 | PL\_SQL\_Chapter 17.pdf | PDF | Mandatory |
| 6. | Explicit Cursors with parameters-2 | https://www.youtube.com/watch?v=w1yeQq9DAYU&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=29 | Video | Suggestive |
| 7. | Cursor with -For Update clause | PL\_SQL\_Chapter 18.pdf | PDF | Mandatory |
| 8. | Cursor Variable | PL\_SQL\_Chapter 19.pdf | PDF | Mandatory |
| 9. | Cursor For..Loop | https://www.youtube.com/watch?v=abgVNjPaMVA&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=31 | Video | Suggestive |
| 10. | Cursor based record datatype | https://www.youtube.com/watch?v=mVNa3QomRDM | Video | Suggestive |

* + - Hands-on Assignments for **Explicit Cursors**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a implicit cursor that will prompt for a JOB and delete the employees working in that Job.  Store the number of records deleted in a session variable. | Using Explicit Cursors |  |
| 2. | Rollback the the previous Delete Statement. | Using Explicit Cursors |  |
| 3. | Write a program that displays the Top N salaries using simple Explicit Cursors. | Using Explicit Cursors |  |
| 4. | Create a Simple Explicit Cursor that displays all the employees who are earning more than the average salary of the Emp Table. | Using Explicit Cursors |  |
| 5. | Create a Simple Explicit cursor that displays the employees who earn more than 2000 and have joined the company after 15-Jun-1981. Print the output : <> earns <> and joined the organization on <> | Using Explicit Cursors |  |
| 6. | Create a Simple Explicit cursor that displays the hiredate in the format DD-MM-RRRR and Day. Sort the records on DAY starting from Saturday. | Using Explicit Cursors |  |
| 7. | Create a simple explicit cursor that displays the employees names and commission amounts. If an employee does not earn commission, show “No Commission" . Label the column COMM. | Using Explicit Cursors |  |
| 8. | Create a parameter cursor that takes DEPTNO as a parameter and update the star column with ‘\*’. Every ‘\*’ represent a 1000. For example : If the employees salary is 5000 then update star column with ‘\*\*\*\*\*’. Use Parameter Cursor ,CURSOR WITH FOR LOOP and WHERE CURRENT OF OPTION. | Using Explicit Cursors |  |
| 9. | Write a Parameter Cursor program that promotes CLERK who earn more than 1000 to SR CLERK and increase the salary by 10%. Pass CLERK as a parameter to the Cursor. Use Parameter Cursor, CUSOR WITH FOR LOOP and CURSOR WITH UPDATE CLAUSE. | Using Explicit Cursors |  |
| 10. | Display entire record from the Dept table by passing a DEPTNO. Increase the Salary of employees working in deptno 10 by 15%, Deptno 20 by 15% and others by 5% Also display the corresponding the employees working in that Dept. Use a parameter Cursor , For Loop Cursor and Cursor with Update clause. | Using Explicit Cursors |  |
| 11. | Write a program that will prompt the user for a CHOICE. IF CHOICE is 1 then display all the employees who earn more than 2000 from EMP table else display all the Employees who earn less than 2000.  Use REF CURSORS. | Using Explicit Cursors |  |

* + **Handling Exceptions**

Learning Material for **Handling Exceptions**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Introduction to PL/SQL exception Handling | https://www.youtube.com/watch?v=jBzhLOCBuuA&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=47 | Video | Suggestive |
| 2. | PL/SQL Exception | PL\_SQL\_Chapter 20.pdf | PDF | Mandatory |
| 3. | PL/SQL Exception-1 | https://www.tutorialspoint.com/plsql/plsql\_exceptions.htm | Web | Suggestive |
| 4. | PL/SQL Exception-2 | https://www.guru99.com/exception-handling-pl-sql.html | Web | Suggestive |
| 5. | Trapping Exceptions | PL\_SQL\_Chapter 21.pdf | PDF | Mandatory |
| 6. | User-Defined exception | https://www.youtube.com/watch?v=lpExvX0qfag&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=48 | Video | Suggestive |
| 7. | User-Define Exception using RAISE\_APPLICATION\_ERROR | https://www.youtube.com/watch?v=k3xCWONvRxY&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=49 | Video | Suggestive |
| 8. | User define exception using PRAGMA EXCEPTION\_INIT | https://www.youtube.com/watch?v=c9gBrkufDU0&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=50 | Video | Suggestive |

* + - Hands-on Assignments for **Handling Exceptions**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a table MESSAGES table with a column Result of type varchar2(1000) Write a program that prompt for SAL and get the corresponding ENAME from the EMP table. Do not use Explicit Cursors.  If the value entered return one row then Insert into MESSAGES table with the ENAME||’ ‘||SAL.  If the value returned is more than one row then Insert into MESSAGES table as ‘More than one employee with a salary <>.  If no value is returned then insert into MESSAGES table as ‘No Employee with that salary <>.  Any other error insert ‘Other Error’. Use all NAMED EXCEPTION HANDLERS. | Handling Exceptions |  |
| 2. | Write a program that will prompt for Empno,ename,sal and insert them into the Emp table.  Use Unnamed system defined exception handler | Handling Exceptions |  |
| 3. | Write a program that will prompts for a EMPNO and delete the employee from the EMP table.  Handle with User Defined Exceptions. | Handling Exceptions |  |
| 4. | Create a stock table with columns PNO,PNAME,RATE AND TR\_QTY.  Insert some records in this table.  Create a PL/SQL block that takes PNO,TR\_TYPE and TR\_QTY from the Stock Table.  If PNO is found and TR\_TYPE is ‘R’ then update the TR\_QTY with Old TR\_QTY plus NEW TR\_QTY.  If PNO exists and TR\_TYPE is ‘I’ then update the TR\_QTY with Old TR\_QTY minus NEW TR\_QTY.  Handle the user defined exceptions using USER DEFINED EXCEPTION HANDLERS. | Handling Exceptions |  |

* + **Stored Procedures and Functions**

Learning Material for **Stored Procedures and Functions**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Procedures and Functions | PL\_SQL\_Chapter 22.pdf | PDF | Mandatory |
| 2. | Introduction Stored Procedures-1 | PL\_SQL\_Chapter 23.pdf | PDF | Mandatory |
| 3. | Introduction Stored Procedures-2 | https://www.tutorialspoint.com/plsql/plsql\_procedures.htm | Web | Suggestive |
| 4. | Introduction Functions-1 | PL\_SQL\_Chapter 24.pdf | PDF | Mandatory |
| 5. | Introduction Functions-2 | https://www.tutorialspoint.com/plsql/plsql\_functions.htm | Web | Suggestive |

* + - Hands-on Assignments for **Stored Procedures and Functions**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a procedure to accept an empno as a input parameter and display the detail like ename,sal and deptno. |  |  |
| 2. | Create a function called Add\_Num() that accept two paraemter of number type and return the addition result in number type. |  |  |
| 3. | Create a procedure that will display all the names list of procedures and functions from the current schema by querying user\_source table with the help of cursor. |  |  |

* + **Procedures**

Learning Material for **Procedures**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | PL/SQL Subprograms | PL\_SQL\_Chapter 25.pdf | PDF | Mandatory |
| 2. | Creating Procedures | PL\_SQL\_Chapter 26.pdf | PDF | Mandatory |
| 3. | PL/SQL Procedures | https://www.youtube.com/watch?v=buaSuEMi4lw&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=41 | Video | Suggestive |
| 4. | Exception handling in Procedures | PL\_SQL\_Chapter 27.pdf | PDF | Mandatory |
| 5. | Parameter in PL/SQL | https://www.guru99.com/subprograms-procedures-functions-pl-sql.html | Web | Suggestive |
| 6. | Stored Procedures without parameters | https://www.youtube.com/watch?v=Uld8eE016Kg&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=42 | Video | Suggestive |
| 7. | Stored Procedures with parameters | https://www.youtube.com/watch?v=mJa-tZNfxRc&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=43 | Video | Suggestive |

* + - Hands-on Assignments for **Procedures**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a procedure ADD\_DEPT.  This procedure will take 3 IN arguments DEPTNO,DNAME,LOC. Insert these values into the DEPT table.  Handle the exception if the user tries to insert a duplicate row using User Defined Exception Handler. | Creating Procedures |  |
| 2. | Create a procedure UPDATE\_DEPT and takes 3 arguments DEPTNO,DNAME,LOC. Update the DNAME,LOC for the corresponding DEPTNO.  Handle exception when the user enters DEPTNO that does not exits. | Creating Procedures |  |
| 3. | Create a procedure DELETE\_DEPT which takes 1 argument DEPTNO. Delete the record for the corresponding DEPTNO.  Handle the required exception when the user enters a not existence DEPTNO. | Creating Procedures |  |
| 4. | Create a user WIPRO.  Modify your procedure ADD\_DEPT to accept CURRENT\_USER as an IN parameter.  Grant EXECUTE permission on your procedure to WIPRO user.  WIPRO user must have the DEPT table. Connect to WIPRO user and call the procedure ADD\_DEPT.  Check that the a new dept is added to the WIPRO user and not to SCOTT user. | Creating Procedures |  |
| 5. | Modify the DEPT table to add a new column X. This will make the dependent procedures INVALID. Write a query and check the STATUS of ADD\_DEPT,UPDATE\_DEPT and DELETE\_DEPT. Now make all these procedures VALID and check the STATUS once again. Drop Column X. | Creating Procedures |  |
| 6. | WRAP the ADD\_DEPT procedure and test your procedure. | Creating Procedures |  |
| 7. | Create a Procedure that will insert into the EMP\_TEST table the employees who working in a given deptno and also update the employees salary in emp table by 20% in EMP table.  Use Parameter Cursor, For Loop Cursor, Update clause Cursor. | Creating Procedures |  |
| 8. | Create a Procedure that will delete all the employees from EMP Table for a given deptno and also insert those employees in TEST table.  Use Parameter Cursor, Update Clause Cursor, For Loop Cursor | Creating Procedures |  |
| 9. | Create a procedure GET\_EMP that will take EMPNO(IN),ENAME(OUT),SAL(OUT). Handle the required the Exceptions. Call the procedure from the SQLPROMPT by defining 2 session variables and the output from these variables by passing 7788 EMPNO. | Creating Procedures |  |
| 10. | Write a procedure that take an IN OUT argument for Mobile Number. Pass the Mobile Number as 9999999999 and the procedure should return (999)999-9999. | Creating Procedures |  |

* + **Functions**

Learning Material for **Functions**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Creating Functions | PL\_SQL\_Chapter 28.pdf | PDF | Mandatory |
| 2. | Debugging subprograms | PL\_SQL\_Chapter 29.pdf | PDF | Mandatory |
| 3. | PL/SQL Functions -1 | https://www.youtube.com/watch?v=6OJIrPx61mU&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=39 | Video | Suggestive |
| 4. | PL/SQL Functions -2 | https://www.youtube.com/watch?v=93uqcFVtfWA&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=40 | Video | Suggestive |
| 5. | PL/SQL Functions -3 | https://www.guru99.com/subprograms-procedures-functions-pl-sql.html | Web | Suggestive |

* + - Hands-on Assignments for **Functions**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a Function GET\_JOB, that will return JOB of an Employee. Define a session variable TITLE allowing a length of 35 characters. Invoke the function to return the value in the session variable and print. | Creating Functions |  |
| 2. | Create a function GET\_ANNUAL\_SAL that will calculate the annual salary of an Employee. Call the function from a SELECT statement against the EMP table for employees in DEPTNO 30. | Creating Functions |  |
| 3. | Assuming that there is no relationship in DEPT and EMP tables.  Create a function VALID\_DEPTNO from the DEPT table for an specific DEPTNO. Return a BOOLEAN value TRUE if DEPTNO exists.  Create a procedure ADD\_EMP that will insert EMPNO, ENAME,SAL,DEPTNO in the EMP table. The new row should be added in EMP table only if the function VALID\_DEPTNO return TRUE else alert the user with a message. | Creating Functions |  |
| 4. | Create a PLSQL function CAL\_REVERSE. This function will take a String and return reverse of this string.(Do not used Reverse inbuilt function). | Creating Functions |  |
| 5. | Create a function CAL\_PCT that calculates an employee percentage of salary. Pass EMPNO and percentage of salary to the function .  Call the function using EMP table . Use 16% as default parameter for percentage. | Creating Functions |  |
| 6. | Create a function that returns TRUE if the SAL is less than Average salary else return FALSE.  Create a procedure REC\_INSUPD that takes 3 arguments. EMPNO,ENAME,SAL. The user should insert row and update the rows only if the new salary is less than avgsal. | Creating Functions |  |
| 7. | Create a function CAL\_LDATE that returns the DAY, MONTH DD,YYYY that the Employee joined the company. Return in GERMAN. | Creating Functions |  |
| 8. | Create a function CAL\_WORDS that returns a numeric value in Words. | Creating Functions |  |
| 9. | Wrap the function GET\_JOB and then test using the USER\_SOURCE | Creating Functions |  |

* + **Packages**

Learning Material for **Packages**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Pl/SQL Packages-1 | PL\_SQL\_Chapter 30.pdf | PDF | Mandatory |
| 5. | Pl/SQL Packages-2 | https://www.youtube.com/watch?v=vUBZOgu1rc0&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=45 | Video | Suggestive |
| 8. | Advantages of Using Packages | https://way2tutorial.com/plsql/plsql-packages.php | Web | Suggestive |
| 6. | Creating PL/SQL Packages-1 | https://www.youtube.com/watch?v=Lqz78kOCx9k&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=46 | Video | Suggestive |
| 7. | Creating PL/SQL Packages-2 | https://www.tutorialspoint.com/plsql/plsql\_packages.htm | Web | Suggestive |
| 2. | Working with packages | PL\_SQL\_Chapter 31.pdf | PDF | Mandatory |
| 3. | Overloading subprograms | PL\_SQL\_Chapter 32.pdf | PDF | Mandatory |
| 4. | Manage Package data, associate arrays and records | PL\_SQL\_Chapter 33.pdf | PDF | Mandatory |

* + - Hands-on Assignments for **Packages**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create Package PK1 with below 3 Procedures.    1. Procedure ADD\_DEPT : This procedure will take 3 IN arguments DNO,NAME,LO and duly insert these values into the DEPT table. Handle the exception if the user tries to insert a duplicate row using User Defined Exception Handler.  2. Procedure UPDATE\_DEPT which takes 3 arguments DNO,NAME,LO. Update the DNAME,LOC for the corresponding DEPTNO. Handle exception when the user enters DEPTNO that does not exists.  3. Procedure DELETE\_DEPT which takes 1 argument DNO. Delete the record for the corresponding DEPTNO. Handle the required exception when the user enters a not existing DEPTNO.  4. Create a Local Function CAL\_CNT that returnsTRUE if DEPTNO does not Exists ELSE return FALSE.  Use this Function in all 3 Procedures. Create a One Time Procedure that displays the total number of rows. | Creating Packages |  |
| 2. | Create a Package PK2 that has 2 Procedures DISP\_FIRST3 and DISP\_FIRST6 that will display the first 3 employees and first 6 employees from the EMP Table. Create a Global Cursor. | Creating Packages |  |
| 3. | Create a sequence S2 start with 1 and increment by 1. Create a package PK3 that has 2 procedures with the same name ADD\_EMP. The procedure will take 3 arguments EMPNO,ENAME DEFAULT ‘UNK’, SAL DEFUALT 1000. This procedure inserts these values in the EMP table. The second procedure accepts 2 arguments NAME DEFAULT ‘UNK’, SAL DEFAULT 1000 and inserts into the EMP table calling the sequence S2 for EMPNO column. Also insert other ENAME and SAL columns. | Working with Packages |  |

* + **Triggers**

Learning Material for **Triggers**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Creating Triggers | PL\_SQL\_Chapter 34\_1\_1.pdf | PDF | Mandatory |
| 2. | Creating Triggers | PL\_SQL\_Chapter 34\_1\_2.pdf | PDF | Mandatory |
| 3. | Creating compound Triggers | PL\_SQL\_Chapter 35.pdf | PDF | Mandatory |
| 4. | DDL Triggers, Event Based Triggers | PL\_SQL\_Chapter 36.pdf | PDF | Mandatory |
| 5. | Types of Triggers | https://www.youtube.com/watch?v=R3fvX\_xf5P4&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=14 | Video | Suggestive |
| 6. | DML Trigger With Before Insert, Update and Delete DML | https://www.youtube.com/watch?v=-OR7zLzCh\_I&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=15 | Video | Suggestive |
| 7. | LOGON Trigger | https://www.youtube.com/watch?v=dJSlgiwt7w0&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=19 | Video | Suggestive |
| 8. | LOGOFF Trigger | https://www.youtube.com/watch?v=l5lcE68xK-k&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=20 | Video | Suggestive |
| 9. | Startup Trigger | https://www.youtube.com/watch?v=UQtsKJ-MPyQ&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=21 | Video | Suggestive |
| 10. | Instead-of Insert Trigger | https://www.youtube.com/watch?v=GOqIOiX\_8NY&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=22 | Video | Suggestive |
| 11. | Instead-of Update Trigger | https://www.youtube.com/watch?v=9DScBQ5yhnk&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=23 | Video | Suggestive |
| 12. | Instead-of Delete Trigger | https://www.youtube.com/watch?v=5GQbACGHY\_E&list=PLL\_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ&index=24 | Video | Suggestive |

* + - Hands-on Assignments for **Triggers**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a BEFORE trigger that will restrict the user from performing DML statements between 9 to 17 on EMP Table. | Creating Triggers |  |
| 2. | Create a Audit\_Emp table with columns empno, username,trdate,trtype.  Write a trigger for DML transaction  1. If the user Inserts a row in the EMP table then simultaneously Insert a new row in the AUDIT\_EMP table with the details of new empno, username(current user), date and time of insert and Tr\_Type as ‘I’  2. If the user updates the EMPNO then Insert a new row in the AUDIT\_EMP table with the old empno, username, date and time of update and ‘U’  3. If the user deletes the EMPNO then insert a new row in the AUDIT\_EMP table with old empno, username, date and time of delete and ‘D’.  Make the transaction AUTONOMOUS to COMMIT. Use triggering functions INSERTING, UPDATING OR DELETING. | Creating Triggers |  |
| 3. | Create a complex view V3 that has EMPNO,ENAME, JOB,SAL,EMP.DEPTNO,DNAME,LOC from EMP,DEPT tables.  Write a INSTEAD OF TRIGGER for INSERT OR UPDATE on V3 that will check for if the deptno inserted in the view does not exists in DEPT table, then it will INSERT the row in the DEPT table else it will UPDATE the DNAME,LOC of DEPT table for the corresponding DEPTNO. Again it will check if EMPNO exists or not in EMP table, if EMPNO does not exists then you have to INSERT the EMPNO,ENAME,SAL,JOB,DEPTNO into the EMP table else you have to UPDATE the ENAME,SAL,DEPTNO of EMP table. | Creating Triggers |  |
| 4. | Write a SYSTEM trigger that will restrict the SCOTT user from creating only TABLES. Use ORA\_DICT\_OBJ\_TYPE. | More Triggers |  |
| 5. | Create LOGON trigger that will change to default date format to DL format. | More Triggers |  |

* + **Managing Dependencies**

Learning Material for **Managing Dependencies**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Dependencies | PL\_SQL\_Chapter 37.pdf | PDF | Mandatory |

* + - Hands-on Assignments for **Managing Dependencies**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Use the Deptree view to generate all the dependencies for DEPT table. | Managing Dependencies |  |

* Learning Outcomes

Upon completion of this TECH Module, you should be able to:

* + Learnt how to write basic PLSQL Programs
  + Learnt how to write PLSQL Programs by interacting with the database
  + Learnt how to use control statements and Loops
  + Learnt how to use of cursors in PLSQL Programs.
  + Learnt how to handle run time exception
  + Learnt how to make use of Procedure, Function, Package and Triggers
  + Learnt how to handle object dependencies.
* Sample Questions

After gaining knowledge of the above module, below are the possible interview questions that you should be able to confidently answer.

|  |  |
| --- | --- |
| No. | Questions |
| 1 | How to represent assignment operators |
| 2 | How to use single or multiline Comments |
| 3 | What is the difference between assignment and INTO operators |
| 4 | How to make use of Control statements |
| 5 | How many types of loops are there |
| 6 | What is a cursor and how many types are there |
| 7 | What is an Explicit cursor and use |
| 8 | Why to handle exceptions and how many types of handlers are there |
| 9 | What is the difference between Procedure and Functions |
| 10 | What is a package and advantage |
| 11 | What is a trigger and advantage |
| 12 | What are dependent and referenced objects |