## TheoryandConcept

##### Objective:-ToimplementthebasicsofPL/SQL.

**Introduction –**PL/SQL bridges the gap between database technology and procedural programming languages. It can be thought of as a development toolthat extends the facilities of OraclesSQLdatabase language.ViaPL/SQLyoucaninsert,delete,updateandretrieve tabledataas well as use proceduraltechniQuestions such as writing loops or branching to another block ofcode.

##### PL/SQLBlockstructure-

DECLARE

Declarationsofmemoryvariablesusedlater BEGIN

SQLexecutablestatementsformanipulatingtabledata. EXCEPTIONS

SQLand/orPL.SQLcodetohandleerrors. END;

**Displaying userMessagesonthescreen–**Anyprogrammingtoolrequiresa method through which messages can be displayed to the user.

**dbms\_output**is a package that includes a number of procedure and functions that accumulate informationina buffersothat it canberetrieved later.These functionscanalso beusedtodisplay message to the user.

**put\_line**:put apieceofinformationinthebuffer followed byaendofline marker.It canalso beused to display message to the user.

Settingtheserveroutputon:

#### SETSERVEROUTPUTON:

Example:Writethe followingcodeinthePL/SQLblocktodisplaymessageto user DBMS\_OUTPUT.PUT\_LINE(‘Display user message’);

##### ConditionalcontrolinPL/SQL-

Syntax:

IF<condition> THEN

<Action> ELSEIF<condition>

<Action>ELSE

<Action> ENDIF;

##### TheWHILELOOP:

Syntax:

WHILE<condition>LOOP

<Action>ENDLOOP;

##### TheFORLOOPstatement:

Syntax:

FORvariableIN[REVERSE]start—end LOOP

<Action>ENDLOOP;

**TheGOTOstatement**:Thegotostatement allowsyouto changethe flowofcontrolwithina PL/SQL Block.

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ExperimentNo.10

Q1.WAP in PL/SQL for addition of two numbers.

Q2. WAP in PL/SQL for addition of 1 to 100 numbers.

Q3.WAP in PL/SQL to check the given number is even or odd.

Q4.WAP in PL/SQL to inverse a number, eg. Number 5639 when inverted must be display output 9365.

Q5.WAP in PL/SQL for changing the price of product ‘P00001’to 4000 if the price is less than 4000 in product\_master table. The change is recorded in the old\_price\_table along with product\_no and the date on which the price was changed last.

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## TheoryandConcept

##### Objective:-ToimplementtheconceptofCursorandTrigger. Cursor–

WehaveseenhoworacleexecutesanSQLstatement.OracleDBAusesaworkareaforitsinternal

processing.ThisworkareaisprivatetoSQL’soperationandiscalleda**cursor.**

The datathat is stored inthe cursor is called the **Active Dataset.** The size ofthe cursor in memoryis the size required to hold the number of rows in the Active Data Set.

##### ExplicitCursor-

You can explicitly declare a cursor to process the rows individually. A cursor declared by the user is called **Explicit Cursor.** For Queries that return more than one row, You must declare a cursor explicitly.

Thedatathatisstoredinthecursoriscalledthe **ActiveDataset.**Thesizeofthecursor inmemoryis the size required to hold the number of rows in the Active

**Why useanExplicitCursor-**Cursor canbe usedwhentheuser wantstoprocessdataonerow at a time.

##### ExplicitCursorManagement-

Thesteps involvedindeclaringacursorandmanipulatingdataintheactivedatasetare:-

* DeclareacursorthatspecifiestheSQLselectstatementthatyouwanttoprocess.
* Openthe Cursor.
* Fetchthedatafromthecursoronerowata time.
* Closethe cursor.

##### ExplicitCursorAttributes-

Oracleprovidescertainattributes/cursorvariablestocontroltheexecutionofthecursor.Whenever anycursor(explicit or implicit) is opened and used Oracle creates a set offour systemvariables via which Oracle keeps track of the ‘Current’status of the cursor.

* DeclareacursorthatspecifiestheSQLselectstatementthatyouwanttoprocess.
* Openthe Cursor.
* Fetchthedatafromthecursoronerowata time.
* Closethe cursor.

##### HowtoDeclaretheCursor:-

TheGeneralSyntexto create anyperticularcursorisasfollows:-

**Cursor<Cursorname>isSqlStatement;**

##### HowtoOpentheCursor:-

TheGeneralSyntextoOpenanyperticularcursorisasfollows:-

**OpenCursorname;**

##### FetchingarecordFromtheCursor:-

The fetch statement retrieves the rows from the active set to the variables one at a time. Each time a fetch is executed. The focus of the DBA cursor advances to the next row in the Active set.

One can make use of any loop structute(Loop-End Loop along with While,For) to fetch the recordsfrom the cursor into variable one row at a time.

TheGeneralSyntextoFetchthe recordsfromthe cursorisasfollows:-

**Fetchcursornameinto variable1,variable2,**

##### ClosingaCursor:-

TheGeneralSyntexto Closethecursorisasfollows:-

**Close<cursorname>;**

##### DatabaseTriggers:-

Databasetriggersareproceduresthatarestoredinthedatabaseandareimplicitlyexecuted(fired) when the contents of a table are changed.

##### UseofDatabaseTriggers:-

Database triggerssupport Oracle to provide a highlycustomized database management system. Some ofthe uses to whichthe database triggers can be put to customize management information in Oracle are as follows:-

* A Trigger can permitDML statements againsta table anly if they are issued, during regularbussiness hours or on predetermined weekdays.
* A trigger can also be used to keep an audit trailof a table along with the operation performed and the time on which the operation was performed.
* Itcanbeusedtopreventinvalid transactions.
* Enforcecomplexsecurityauthorizations.

##### HowtoapplyDataBaseTriggers:-

Atriggerhasthreebasicparts:-

1. Atriggeringeventorststement.
2. Atrigerrestriction
3. Atriggeraction.

##### TypesofTriggers:-

Usingthevariousoptions,fourtypesoftriggerscanbe created:-

1. **Before Statement Trigger:-**Before executing the triggering statement, the trigger action is executed.
2. **Before Row Trigger:-**Before modifying the each row affected by the triggering statement and before appropriate integrity constraints, the trigger is executed if the trigger restriction either evaluated to TRUE or was not included.’
3. **After StstementTrigger:-**After executing the triggering statement and applying anydeferred integrity canstraints, the trigger action is executed.
4. **After row Trigger:-**After modifying each row affected by the triggering statement and possibly applying appropriate integrity constraints, the trigger action is executed for the current row if the trigger restriction either evaluates to TRUE or was not included.

##### SyntexForCreatingTrigger:-

ThesyntexforCreatingtheTriggerisas follows:-

Create or replace Trigger<Triggername> {Before,After} {Delete, Insert, Update } On <Tablename> For Each row when Condition

Declare

<Variabledeclarations>;

<ConstantDeclarations>; Begin

<PL/SQL>SubprogramBody; Exception

ExceptionPl/SQLblock; End;

##### HowtoDeleteaTrigger:-

ThesyntexforDeletingtheTriggerisas follows:-

###### DropTrigger<Triggername>;

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TableName:0-Employee

|  |  |  |  |
| --- | --- | --- | --- |
| ColumnName | DataType | Size | Attributes |
| Emp\_Code | Varchar2 | 10 | PrimaryKey |
| Ename | Varchar2 | 20 | The name oftheCandidate |
| Deptno | Number | 5 | TheDepartmentNo |
| Job | Vrachar2 | 20 | TheEmployeeJobDetail |
| Salary | Number | 8,2 | TheCurrentsalaryofEm |

**Tablename:-Emp\_raise**

|  |  |  |  |
| --- | --- | --- | --- |
| ColumnName | DataType | Size | Attributes |
| Emp\_Code | Varchar2 | 10 | PrimaryKey |
| Raise\_Date | date |  | TheDate Onwhichthe raise wasgiven |
| Raise\_Amt | Number | 8,2 | Theraise giventothe employee |

The HRD manager has decided to raise the salary for all the employees in the Dept No 20 by 5%. Whenever any such raise is given to the employees, a record for the same is maintained in the emp\_raise table. It includes the EmpNo, the datewhen the raise was given and the actualraise. Write a PL/SQL block to update the salaryof each employee and insert a record in the emp\_raise table.

Q2:- TwoTablesarethere

TableName:-Client\_Master

|  |  |  |  |
| --- | --- | --- | --- |
| ColumnName | DataType | Size | Attributes |
| Client\_No | Varchar2 | 6 | PrimaryKey/First lettermuststartwith‘C’ |
| Name | Varchar2 | 20 | Not Null |
| City | Varchar2 | 10 |  |
| State | Vrachar2 | 10 |  |
| Bal\_Due | Number | 10,2 |  |

**Tablename:-auditclient**

|  |  |  |  |
| --- | --- | --- | --- |
| ColumnName | DataType | Size | Attributes |
| Client\_No | Varchar2 | 10 | PrimaryKey |
| Name | Varchar2 | 20 |  |
| Bal\_Due | Number | 10,2 |  |
| Operation | Varchar2 | 8 |  |
| Odate | Date |  |  |

Createatransparent audit systemforatableClient\_master.Thesystemmust keeptrackoftherecords that are being deleted or modified and when they have been deleted or modified.