

Let Us Take the Advantage of Pseudo Columns in Oracle

Pseudo Column:

- Pseudo Columns Behave Like a Table Column, but is Not Actually Stored in a Table.
- Upon Pseudo Columns Only SELECT Statements Can Be Implemented, But INSERT, UPDATE or DELETE Cannot be Implemented.
- The Available PSEUDO COLUMNS Are...
 - **CURRVAL**
 - **NEXTVAL**
 - **LEVEL**
 - **ROWID**
 - **ROWNUM**

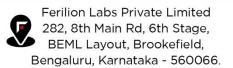
CURRVAL And NEXTVAL Pseudo Columns:

- These Pseudo Columns Are Applied Upon the SEQUENCE Schema Object.
- CURRVAL Returns the CURRENT Value of a Sequence.
- NEXTVAL INCREMENTS The Sequence and Returns the NEXT VALUE.
- The CURRVAL And NEXTVAL Can be Used Only in...
 - The SELECT List of a SELECT Statement.
 - The VALUES Clause of an INSERT Statement.
 - The SET Clause of an UPDATE Statement.

Restrictions:

- The CURRVAL and NEXTVAL Cannot Be Used in...
 - A Sub Query.
 - A View's Query or SNAPSHOT's Query.
 - A SELECT With the DISTINCT Option.
 - A SELECT With a GROUP BY or ORDER BY Clause.











- A SELECT Statements With UNION, INTERSECT, MINUS SET Operators.
- The WHERE Clause of a SELECT.
- The DEFAULT Option in CREATE TABLE or ALTER TABLE Statement.
- The Condition of a CHECK Constraint.

Syntax:

- SEQUENCENAME.CURRVAL --- > Returns the Current Value of the Sequence.
- SEQUENCENAME.NEXTVAL --- > Increments the Sequence Value by the Declared Specification.

SEQUENCE Schema Object:

- A SEQUENCE is a Schema Object That Can Generate UNIQUE Sequential Values.
- The SEQUENCE Values Are Often Used for PRIMARY KEY's and UNIQUE KEY's.
- To Refer to The CURRENT or NEXT Value of a SEQUENCE in The SCHEMA of Another User, The Following Privileges Should Be Available...
 - SELECT OBJECT PRIVILEGE
 - SELECT ANY SEQUENCE
- For SEQUENCES in Other Schema the QUALIFYING SYNTAX is
 - SCHEMANAME.SEQUENCENAME.CURRVAL
 - SCHEMANAME.SEQUENCENAME.NEXTVAL
- To Refer to The Value of a SEQUENCE on a REMOTE Database, The SEQUENCE Should Be Qualified with a Complete or Partial Name of The Database Link.
 - SCHEMANAME.SEQUENCENAME.CURRVAL@DBLINK
 - SCHEMANAME.SEQUENCENAME.NEXTVAL@DBLINK
- In a Single SELECT Statement, All Referenced Sequences, LONG Columns, Updated Tables, and Locked Tables, Must Be Located on The Same Database.
- When a SEQUENCE Is Created, We Can Define its INITI VALUE And the INCREMENT Between Its Values.
- · The First References to The NEXTVAL Returns the SEQUENCES Initial Value.
- Before The CURRVAL Can Be Used for a SEQUENCE in a Session, First the SEQUENCE Should Be Incremented With NEXTVAL.











- A SEQUENCE Can Be Incremented Only Once in a Single SQL Statement.
- A SEQUENCE Can Be Accessed by Many Users Concurrently with No WAITING, No LOCKING.
- CURRVAL and NEXTVAL Should Be Qualified with The Name of The Sequence.

Creating Sequences:

Purpose:

- An Object from Which Multiple Users May Generate Unique Integers.
- CAN Be Used to Generate PRIMARY KEY Values Automatically.

Syntax:

CREATE SEQUENCE SequenceName INCREMENT BY Integer START WITH Integer MAXVAL Integer/NOMAX VALUE MINVAL Integer/NOMIN VALUE CYCLE/NOCYCLE CACHE Integer/NOCACHE ORDER/ NOORDER;

SEQUENCE Can be Either Incremented Sequence OR Decremented Sequence.

INCREMENT BY Clause:

- Specifies The Interval Between the Sequences Numbers.
- Value Can Be Positive or Negative, But Cannot Be 0.
- If The Value is Positive, it is Incremented Sequence Else it is Decremented Sequence.
- If Omitted Default to Increment By 1.

MINVALUE Clause:

Specifies The Sequence's Minimum Value.

NOMINVALUE Clause:

Specifies a Minimum Value of 1 For an Ascending Sequence OR -(10)26 For Descending Sequence.

MAXVALUE Clause:









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Specifies The Maximum Value That Can Be Generated.

NOMAXVALUE Clause:

Specifies a Maximum Value of 1027 for Ascending Sequence OR -1 For Descending Sequence.

CYCLE Clause:

Specifies The Sequence Will Continue to Generate Values After Reaching Either Maximum or Minimum Value.

NOCYCLE Clause:

Specifies The SEQUENCE Cannot Generate More Values After the Targeted Limit.

CACHE Clause:

Specifies Pre-Allocation of SEQUENCE Numbers, The Minimum is 2.

NOCACHE Clause:

Specifies Values of a SEQUENCE Are Not Pre-Allocated.

ORDER Clause:

Guarantees The Sequence Numbers to Be Generated in The Order of Request.

NOORDER Clause:

Does Not Guarantee the Sequence Number with Order.

Note:

- If The Above Parameters Are Not Specified by Default
 - START WITH Will Be 1.
 - INCREMENT BY Will be Positive 1.
 - SEQUENCE IS NOCYCLE
 - The CACHE Value Will Be 20.
 - SEQUENCE IS ORDER Sequence.

Illustrations:

SQL> CREATE TABLE Sample (Sampid NUMBER(4) CONSTRAINT Sampid PK PRIMARY KEY, Sampname VARCHAR2(25), SampDate DATE);

Creation of Incremental Sequence:









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```
SQL>CREATE SEQUENCE Sampleseq01
          INCREMENT BY 1
          START WITH 0
          MINVALUE 0
          MAXVALUE 5
          NOCACHE
          NOCYCLE;
```

Activating And Attaching the Sequence to a Table:

```
SQL>INSERT INTO Sample01
           VALUES(SampleSeq.NEXTVAL,'SAMPLE', SYSDATE);
```

Creating Sequence With CYCLE:

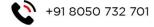
```
SQL>CREATE SEQUENCE Sampleseq02
          INCREMENT BY 1
          START WITH 0
          MINVALUE 0
          MAXVALUE 5
          NOCACHE
          CYCLE;
```

<u>Creation of Decremental Sequence:</u>

```
SQL>CREATE SEQUENCE Sampleseq03
          INCREMENT BY
          START WITH 5
          MAXVALUE 5
          MINVALUE 0
          NOCACHE
          NOCYCLE;
```

Modifying a Sequence:

- The ALTER Command Can Be Used to Change the Present Status of a SEQUENCE.
- The ALTER SEQUENCE Command Can Be Used to Change...
- Increment Value
- Maximum Value.
- Minimum Value.











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- Cycle Option.
- Cache Option.

Syntax:

```
SQL> ALTER SEQUENCE SequenceName
          [INCREMENT BY n]
          [{MAXVALUE n/NOMAXVALUE}]
          [{MINVALUE n/NOMINVALUE}]
          [{CYCLE/NOCYCLE}]
           [{CACHE n/NOCACHE}];
```

Illustration:

```
SQL>ALTER SEQUENCE SampleSeq
         MAXVALUE 10
          CACHE
          NOCYCLE;
```

Guidelines For Altering a Sequence:

- The ALTER Privilege Should Be Available.
- Only The Future Sequence Numbers Are Affected by The ALTER SEQUENCE Statement.
- The START WITH Option Cannot Be Changed Using ALTER SEQUENCE.
- To Change the START WITH Option, Drop the SEQUENCE And Then Recreate The SEQUENCE.
- Some Validation Performed, i.e., A NEW MAXVALUE Cannot Be Imposed That is Less Than the Current SEQUENCE Number.

Viewing the Current Value of a Sequence:

```
SQL>SELECT Sampleseq.CURRVAL FROM DUAL;
```

Dropping An Existing Sequence:

- A SEQUENCE Can Be DROPPED At Any Time.
- Once Removed, The SEQUENCE Can No Longer Be Referenced.

SQL> DROP SEQUENCE SampleSeq;













Confirming Sequences:

- All SEQUENCES That Have Been Created Are Documented in The Data Dictionary.
- · The Data Dictionary in Which the Information of SEQUENCES Are Stored is USER OBJECTS.
- The Settings of The SEQUENCE Can Be Confirmed By SELECTING on USER SEQUENCES Catalog.

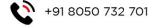
SQL> SELECT SEQUENCE NAME, MIN VALUE, MAX VALUE, INCREMENT BY, LAST NUMBER FROM User Sequences;

LEVEL Pseudo Column:

- · This Pseudo Column Return 1 For a Child of a ROOT And So on.
 - Child --- > Any Non-Root Node.
 - Root --- > Highest Node Within an Inverted Tree.
 - Parent --- > Any Node/Row That Has Children.
 - Leaf --- > Any Node Without Children.
- To Establish the Hierarchical Relationship with LEVEL We Need.
 - START WITH Clause.
 - CONNECT BY Clause.

```
SQL> SELECT Ename, Job, MGR, Level FROM Emp;
SQL> SELECT LPAD(' ',2 *(LEVEL - 1)) Org Level, Ename, Empno, Mgr, Job
FROM Emp START WITH Job='PRESIDENT' CONNECT BY PRIOR Empno=MGR;
SQL> SELECT LPAD(' ',2 *(LEVEL - 1))||Ename Org_Level, Ename, Empno, Mgr,
Job FROM Emp START WITH Job='PRESIDENT' CONNECT BY PRIOR Empno=MGR;
SQL> SELECT LPAD(' ',2 *(LEVEL - 1))||Ename Org Level, Ename, Empno, Mgr,
Job FROM Emp WHERE Job!='ANALYST' START WITH Job='PRESIDENT' CONNECT
BY PRIOR Empno=MGR;
SQL> SELECT LPAD(' ',2 *(LEVEL - 1))||Ename Org Level, Ename, Empno, Mgr,
Job FROM Emp START WITH Job='PRESIDENT' CONNECT BY PRIOR Empno=MGR
AND LEVEL <=2;
```

Selecting Nth Highest Value from Table:











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Syntax:

SQL>SELECT LEVEL, MAX(ColName) FROM TableName WHERE LEVEL = &LEVELNO CONNECT BY PRIOR ColName > ColName GROUP BY LEVEL;

ILLUSTRATION:

SQL> SELECT LEVEL , MAX(Sal) FROM Emp WHERE LEVEL = &LEVELNO CONNECT BY PRIOR Sal > Sal GROUP BY LEVEL;

Selecting Nth Lowest Value from Table:

Syntax:

SQL>SELECT LEVEL, MIN(ColName) FROM TableName WHERE LEVEL = &LEVELNO CONNECT BY PRIOR ColName < ColName GROUP BY LEVEL;

ILLUSTRATION:

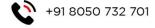
SQL> SELECT LEVEL , MIN(Sal) FROM Emp WHERE LEVEL = &LEVELNO CONNECT BY PRIOR Sal < Sal GROUP BY LEVEL;

ROWNUM Pseudo Column:

- For Each Row Returned by a Query, The ROWNUM Pseudo Column Returns a Number Indicating the Order in Which Oracle Selects the Rows from a Set of Joined Rows or Non-Joined Rows.
- The First Row Selected Has a ROWNUM of 1, The Second Has 2. And So On...
- The ROWNUM Can Be Used to Limit the Number of Rows Returned by The Query.
- When ORDER BY Clause Follows a ROWNUM, The Rows Will Be Re-Ordered by ORDER BY Clause.
- If ORDER BY Clause is Embedded in a Sub Query and ROWNUM Condition is Placed in the TOP_LEVEL Query, Then The ROWNUM, Condition Can Be Forced To Get Applied After The Ordering Of The Rows.
- Conditions Testing for ROWNUM Values Greater Than a Positive Integer Are Always FALSE.

SQL> SELECT LPAD(' ', ROWNUM, '*') FROM Emp; SQL> SELECT ROWNUM, Ename, Sal FROM Emp;

Querying For Top 'N' Records:











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- · We Can Ask for Nth Largest OR Smallest Values of a Column.
- Never Use ROWNUM And ORDER BY Clause Together as Oracle First Fetches the Rows According to ROWNUM And Then Scort's The Found Rows.
- From Oracle 8i, ORDER BY Clause Can Be Used in INLINE VIEWS.

```
SQL>SELECT ROWNUM, Ename, Sal FROM Emp WHERE ROWNUM <6
ORDER BY SAL DESC;
-- Wrong Way.
```

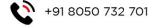
SQL>SELECT * FROM (SELECT * FROM Emp ORDER BY Sal DESC) WHERE ROWNUM <6; -Proper Way.

ROWID Pseudo Column:

- This Pseudo Column Returns a ROW's Address for Each Row Stored in The Database.
- ROWID Values Contain Information Necessary to Locate the Physical Area of The Data Base Row.
 - The Row Belongs to Which Data Block in the Data File.
 - The Row Belongs to Which Row in The Data Block(First Row is 0).
 - The Row Belongs to Which Data File(First File is 1)
- The Rows in Different Tables That Are Stored Together in The Same Cluster Can Have the Same ROWID.

Uses of ROWID Values:

- · ROWID is The Fastest Means of Accessing a Single Row from Data Base.
- ROWID Can Show How a Tables Rows Are Physically Stored.
- · ROWID's Are UNIQUE Identifiers for a Row in a Table.
- A ROWID Can Never Change During the Life Time of Its Row.
- ROWID's Should Not Be Assigned as PRIMARY KEY's As There is a Chance of ROWID To Change When The Database is EXPORTED or IMPORTED.
- When a Row is DELETED, ORACLE May Reassign Its ROWID To a New Row That is Inserted.
- · The ROWID Can Never Be INSERTED, UPDATED and DELETED Manually.











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The ROWID Pseudo Column Can Be Used in SELECT and WHERE Clauses.

SQL>SELECT ROWID, Ename, Job FROM Emp WHERE Empno=20;

SQL>SELECT Ename, Sal, Job FROM Emp WHERE ROWID = 'AACQQAACAAAAEHAAA';

SQL>SELECT Ename, Sal, Job FROM Emp WHERE ROWID < 'AACQQAACAAAAEHAAA';

SQL>SELECT B.Sal, Sum(A.Sal) "Cum Sal" FROM Emp A, Emp B WHERE

A.ROWID <=B.ROWID GROUP BY B.ROWID, B.Sal;

SQL> SELECT B.Ename, B.Job, B.Sal, Sum(A.Sal) "Cum Sal" FROM Emp A, Emp

B WHERE A.ROWID <= B.ROWID GROUP BY B.ROWID, B.Sal;

New Pseudo Columns (Oracle 10g):

- i. CONNECT_BY_ISCYCLE
- ii. CONNECT_BY_ISLEAF

i. CONNECT_BY_ISCYCLE PsedoColumn:

- The CONNECT_BY_ISCYCLE Pseudo Column Retuns 1 If the Current Row Has a Child Which is Also Its Ancestor Otherwise It Returns 0.
- We Can Specify CONNECT_BY_ISCYCLE Only if We Have Specified the NOCYCLE parameter of The CONNECT BY Clause.
- NOCYCLE Enables Oracle to Return the Results of A Query That Would Otherwise Fail Because of A CONNECT BY LOOP in The Database.

SQL>SELECT Ename, CONNECT_BY_ISCYCLE "Cycle", LEVEL,
SYS_CONNECT_BY_PATH(Sal,'/') SalPath FROM Emp START WITH Ename='KING'
CONNECT BY NOCYCLE PRIOR Empno=MGR;

ii. CONNECT BY ISLEAF Pseudocolumn:

- The CONNECT_BY_ISLEAF Pseudo Column Returns 1, If the Current Row is A Leaf of The Tree Defined by The CONNECT BY Condition, Else It Returns 0.
- This Information Indicates Whether a Given Row Can Be Further Expanded To Show More of The Hierarchy.

SQL> SELECT Ename "Employee", CONNECT_BY_ISLEAF "IsLeaf",
SYS_CONNECT_BY_PATH(Ename,'/') Path FROM Emp START WITH Empno=7839
CONNECT BY PRIOR Empno=MGR;







