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ACADEMY

Database Programming with SQL

19-3
Final Exam Review

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Objectives

This lesson covers the following objectives:

- Review the key points about case and character manipulation
- Review number, date, conversion, and general functions
- Review conditional expressions
- Review Cartesian product and join operations
- Review non-equijoins, outer joins, self joins, cross joins, natural joins, and join clauses
- Review group functions, group by syntax, and having clauses

Objectives

This lesson covers the following objectives:

- Review single-row and multiple row subqueries
- Review pair-wise and non-pair-wise subqueries
- Review correlated subqueries
- Review DML statements insert, update, delete, merge, and multi-table inserts
- Review DDL statements CREATE, ALTER, RENAME, TRUNCATE, FLASHBACK TABLE, DROP, and FLASHBACK QUERY
- Review DCL statements CREATE and REVOKE object privileges

Purpose

- Review is the best preparation for assessment.
- Assessment helps you realize how much you've learned and highlights areas in which you may wish to improve.
- Reviewing the topics learned to this point will help you be your best during the final exam.

Syntax Review

- This is a review of the syntax.
- Ensure that you also review the rules concerning the syntax.
- These are covered throughout the course.

Case and Character Manipulation

- Case

```
LOWER(column name|expression)
UPPER(column name|expression)
INITCAP(column name|expression)
```

- Character

```
CONCAT(column name|expression, column name|expression)
SUBSTR(column name|expression,n,m)
LENGTH(column name|expression)
INSTR(column name|expression, string literal)
LPAD (column name|expression, n, character literal)
RPAD(column name|expression, n, character literal)
TRIM ( [leading | trailing | both]  char1 FROM char2)
REPLACE (column name|expression, string to be replaced, replacement
         string)
```

Number Functions

```
ROUND(column|expression,n)
TRUNC(column|expression,n)
MOD(column|expression, column|expression)
```

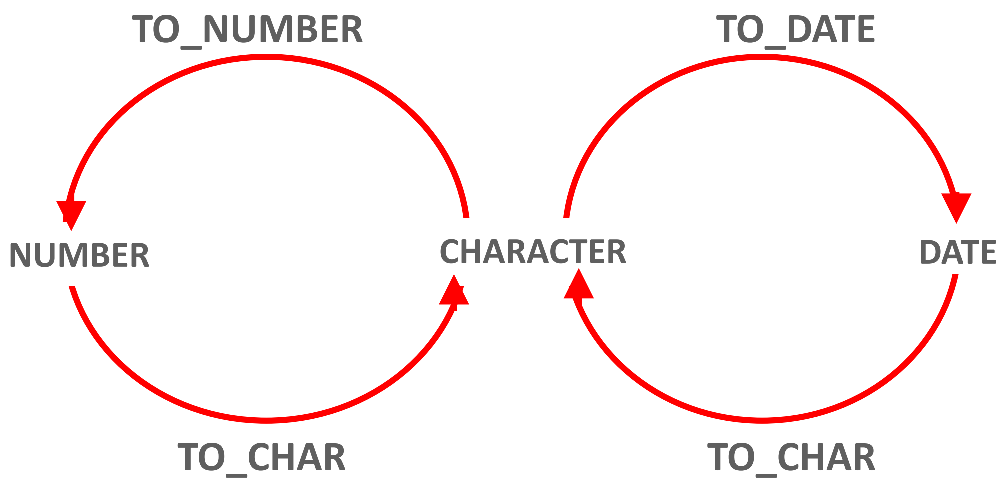
Date Functions

```
ROUND(column|expression,string)
TRUNC(column|expression,string)

MONTHS_BETWEEN(column|expression, column|expression)
ADD_MONTHS(column|expression,n)
NEXT_DAY(column|expression,'day')
LAST_DAY(column|expression)
```

Conversion Functions

```
TO_CHAR(number, 'format model')
TO_CHAR(date, 'format model')
TO_NUMBER(character string, 'format model')
TO_DATE(character string, 'format model')
```



NULL Functions

```
NVL(column|expression, value)
```

```
NVL2(column|expression, column|expression,
             column|expression)
```

```
NULLIF(column|expression, column|expression)
```

```
COALESCE(column|expression, column|expression,
            column|expression…. column|expression)
```

Conditional Expressions

- Oracle-specific

```
DECODE(columnl|expression, search1, result1
         [, search2, result2,...,]
         [, default])
```

- ANSI

```
CASE expr WHEN comparison_expr1 THEN return_expr1
         [WHEN comparison_expr2 THEN return_expr2
          WHEN comparison_exprn THEN return_exprn
          ELSE else_expr]
END
```

ANSI SQL Standard Syntax

- Cross Join

```
SELECT last_name, department_name
FROM employees CROSS JOIN departments;
```

- Natural Join

```
SELECT employee_id, last_name, department_name
FROM employees NATURAL JOIN departments;
```

- Join .. On

```
SELECT e.employee_id, e.last_name, e.salary, j.grade_level
FROM employees e JOIN job_grades j
ON (e.salary BETWEEN j.lowest_sal AND j.highest_sal);
```

ANSI SQL Standard Syntax

- Joins .. Using

```
SELECT employee_id, last_name, department_name
FROM employees JOIN departments
USING (department_id);
```

- Join .. On

```
SELECT e.employee_id, e.last_name, d.department_id, d.location_id
FROM employees e JOIN departments d
ON (e.department_id = d.department_id);
```

ANSI SQL Standard Syntax

Outer Joins

- Right Outer Join

```
SELECT e.employee_id, e.last_name, e.department_id, d.department_name
FROM employees e RIGHT OUTER JOIN departments d
ON (e.department_id = d.department_id);
```

- Left Outer Join

```
SELECT e.employee_id, e.last_name, e.department_id, d.department_name
FROM employees e LEFT OUTER JOIN departments d
ON (e.department_id = d.department_id);
```

ANSI SQL Standard Syntax

Outer Joins

- Full Outer Join (No comparable Oracle specific Join)

```
SELECT e.employee_id, e.last_name, e.department_id, d.department_name
FROM employees e FULL OUTER JOIN departments d
ON (e.department_id = d.department_id);
```

Group Functions, Group By Syntax and Having Clauses

```
AVG (column |expression)
COUNT (column |expression)
MIN (column |expression)
MAX (column |expression)
SUM (column |expression)
VARIANCE (column |expression)
STDDEV (column |expression)
```

```
SELECT column1, AVG (column |expression)
FROM table 1
GROUP BY (ROLLUP | CUBE)  (column1 | GROUPING SETS)
HAVING AVG (column |expression)
```

Single-row and Multiple-row Subqueries

```
SELECT column1..
FROM table 1
WHERE column2 = (SELECT column2
                 FROM table 1
                 WHERE column 3 = expression)
```

- Single row operators: =,>,<,>=,<=,<>
- Multiple row operators: IN, ANY, ALL

Pairwise and Non-Pairwise Subqueries

- Pairwise

```
SELECT column1..
FROM table 1
WHERE (column2, column3) = (SELECT column2, column3
                            FROM table 1
                            WHERE column 4 = expression);
```

- Non-pairwise

```
SELECT column1..
FROM table 1
WHERE column2 = (SELECT column2
                 FROM table 1
                 WHERE column 4 = expression)
AND   column3 = (SELECT column3
                FROM table 2
                WHERE column 4 = expression);
```

Correlated Subqueries

```
SELECT o.column1..
FROM table_1 o
WHERE o.column2 = (SELECT i.column2
                   FROM table_2 i
                   WHERE i.column1 = o.column1)
```

Inserting, Updating, and Deleting Data

- Explicit Insert

```
INSERT INTO table (column1, column2…)
VALUES (value1, value2…) ;
```

- Implicit Insert

```
INSERT INTO table
VALUES (value1, value2, value3, value4);
```

```
UPDATE table1
SET column1 = value1,
         column2 = value2…
WHERE column1 = value;
```

```
DELETE FROM table1
WHERE column1 = value;
```

Inserting, Updating, and Deleting Data

```
UPDATE table1
SET column1 = value1,
         column2 = value2…
WHERE column1 = value;
```

```
DELETE FROM table1
WHERE column1 = value;
```

Inserting, Updating, and Deleting Data

```
conditional_insert_clause
[ ALL | FIRST ]
WHEN condition THEN
    insert_into_clause [ values_clause ]
WHEN condition THEN
    insert_into_clause [ values_clause ]
ELSE insert_into_clause [ values_clause ]
```

Default Values

```
CREATE TABLE table1 (
column1           DATE DEFAULT SYSDATE,…)

INSERT INTO table1
   (column1,….)
VALUES
   (DEFAULT,…);
```

The Merge Statement

Multi-table Insert

```
MERGE INTO destination-table USING source-table
ON matching-condition
WHEN MATCHED THEN UPDATE
SET ……
WHEN NOT MATCHED THEN INSERT
VALUES (……);
```

Creating Tables

```
CREATE TABLE table
(column data type [DEFAULT expression],
column data type [DEFAULT expression],
……[ ] );
```

```
CREATE TABLE tablename
[(column, column, …)]
AS subquery;
```

Specifying Data Types

```
NUMBER(p,s)
CHAR
VARCHAR2(n)
DATE
TIMESTAMP
TIMESTAMP WITH TIMEZONE
TIMESTAMP WITH LOCAL TIME ZONE
INTERVAL YEAR TO MONTH
INTERVAL DAY TO SECOND
CLOB
BLOB
RAW
```

Modifying a Table

```
ALTER TABLE tablename
ADD (column_name data type [DEFAULT expression]…);
```

```
ALTER TABLE tablename MODIFY (column_name VARCHAR2(30));
```

```
ALTER TABLE tablename DROP COLUMN column name;
```

```
ALTER TABLE tablename SET UNUSED (column name);
```

```
ALTER TABLE tablename DROP UNUSED COLUMNS;
```

Modifying a Table

```
DROP TABLE tablename;
```

```
FLASHBACK TABLE tablename TO BEFORE DROP;
```

```
SELECT * FROM user_recyclebin;
```

```
SELECT versions_starttime "START_DATE",
       versions_endtime   "END_DATE",
       column, column......
FROM   table
   VERSIONS BETWEEN SCN MINVALUE AND MAXVALUE
WHERE  column = value;
```

Column Level Constraints

```
CREATE TABLE table
(col1 data type CONSTRAINT tab_col1_pk PRIMARY KEY,
 col2 data type CONSTRAINT tab_col2_nn NOT NULL,
 col3 data type CONSTRAINT tab_col3_uk UNIQUE,
 col4 data type CONSTRAINT tab_col4_ck CHECK (col4 > value),
 col5 data type CONSTRAINT tab_col5 REFERENCES table2 (col1));
```

Table Level Constraints

```
CREATE TABLE table
(col1 data type,
 col2 data type,
 col3 data type,
 col4 data type,
 col5 data type,
CONSTRAINT tab_col1_pk PRIMARY(col1),
CONSTRAINT tab_col3_uk UNIQUE(col2),
CONSTRAINT tab_col4_ck CHECK (col4 > value),
CONSTRAINT tab1_col5_fk FOREIGN KEY (col5) REFERENCES table2 (col1));
```

Creating and Managing Views

```
CREATE [OR REPLACE] [FORCE| NOFORCE] VIEW view  [(alias [, alias]...)]
AS subquery
[WITH CHECK OPTION [CONSTRAINT constraint]]
[WITH READ ONLY [CONSTRAINT constraint]];
```

```
DROP VIEW viewname;
```

Top-n Analysis

```
SELECT ROWNUM as RANK, col1, col2
FROM (SELECT col1, col2 FROM table1
ORDER BY col1)
WHERE ROWNUM <= n;
```

Inline Views

```
SELECT t1.col1, t2.col2…
FROM table 1 t1, (SELECT col1, col2..
                  FROM table2
                  WHERE …) t2
WHERE ……;
```

Creating Sequences

```
CREATE SEQUENCE sequence
       [INCREMENT BY n]
       [START WITH n]
       [{MAXVALUE n | NOMAXVALUE}]
       [{MINVALUE n | NOMINVALUE}]
       [{CYCLE | NOCYCLE}]
       [{CACHE n | NOCACHE}];
```

```
DROP SEQUENCE sequence_name;
```

Creating Indexes, and Synonyms

```
CREATE INDEX index_name
ON   table_name( column...,column);
```

```
DROP INDEX index_name;
```

```
CREATE [PUBLIC] SYNONYM synonym
FOR object;
```

```
DROP [PUBLIC] SYNONYM name_of_synonym
```

Creating and Revoking Object Privileges

```
CREATE USER user
IDENTIFIED BY   password;
```

```
GRANT privilege [, privilege...]
TO user [, user| role, PUBLIC...];
```

```
ALTER USER user
IDENTIFIED BY password;
```

Creating and Revoking Object Privileges

```
CREATE ROLE role_name;
```

```
GRANT object_priv [(column_list)]
ON object_name
TO {user|role|PUBLIC}
[WITH GRANT OPTION];
```

```
REVOKE {privilege [, privilege...]|ALL}
ON  object
FROM   {user[, user...]|role|PUBLIC}
[CASCADE CONSTRAINTS];
```

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In this lesson, you should have reviewed:

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In this lesson, you should have reviewed:

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- DML statements, insert, update, delete, merge and multi-table inserts
- DDL statements, FLASHBACK TABLE, DROP and FLASHBACK QUERY

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