



# Database Programming with PL/SQL

3-1

Review of SQL DML



# Objectives

This lesson covers the following objectives:

- Insert data into a database table
- Update data in a database table
- Delete data from a database table
- Merge data into a database table

# Purpose

- When you create, change, or delete an object in a database, the language you use to make a change is referred to as data definition language (DDL). When you change data within an object (for example, by inserting or deleting rows), it is called data manipulation language (DML).
- This lesson reviews basic SQL DML statements. Later, you will use DML statements in your PL/SQL code to modify data.

# Data Manipulation Language (DML)

- You can use DML commands to modify the data in a database table.
- The DML commands are INSERT, UPDATE, DELETE, and MERGE.



# INSERT

- You use the INSERT statement to add new rows to a table. Three items are included in the statement:
- The name of the table
- The names of the columns to populate in the table
- Values for the columns

# INSERT Syntax

- The syntax shown explicitly lists each column as it appears in the table. The values for each column must be listed in the same order.

```
INSERT INTO art (id, title, artist, description)
VALUES (35, 'Mona Lisa', 'Leonardo da Vinci', 'oil
painting');
```

ID	TITLE	ARTIST	DESCRIPTION
20	Skriget	Edvard Munch	oil painting
10	Guernica	Pablo Picasso	oil painting
30	Femmes de Tahiti (Sur la plage)	Edvard Munch	oil painting

# INSERT Implicitly

- Another way to insert values in a table is to implicitly add them by omitting the column names. The values for each column must match the default order in which they appear in the table, and a value must be provided for each column.

```
INSERT INTO art  
VALUES (40, 'Stained Glass window at the United Nations Building, New  
York', 'Marc Chagall', 'oil painting');
```

ID	TITLE	ARTIST	DESCRIPTION
20	Skriget	Edvard Munch	oil painting
10	Guernica	Pablo Picasso	oil painting
30	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
35	Mona Lisa	Leonardo da Vinci	oil painting



# UPDATE

- The UPDATE statement is used to modify existing rows in a table. It requires at least three values:
- The name of the table
- The name of the column in the table to modify
- A corresponding value or subquery for the column
- (Optionally) a condition that identifies the rows to be modified by the statement

# UPDATE

```
UPDATE art
  SET description = 'Stained Glass Window'
 WHERE id = 40;
```

ID	TITLE	ARTIST	DESCRIPTION
10	Guerrica	Pablo Picasso	oil painting
20	Skriget	Edvard Munch	oil painting
30	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
35	Mona Lisa	Leonardo da Vinci	oil painting
40	Stained Glass window at the United Nations Building, New York	Leonardo da Vinci	oil painting

↓  
Stained...

# DELETE

- You use the DELETE statement to remove existing rows in a table. The statement requires at least one value:
- The name of the table
- (Optionally) the condition that identifies the rows to be deleted

# DELETE

- In the example shown, the highlighted row is deleted.

```
DELETE FROM art
WHERE id = 10;
```

ID	TITLE	ARTIST	DESCRIPTION
10	Guernica	Pablo Picasso	oil painting
20	Skriget	Edvard Munch	oil painting
30	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
35	Mona Lisa	Leonardo da Vinci	oil painting
40	Stained Glass window at the United Nations Building, New York	Marc Chagall	Stained Glass Window

# MERGE

- The MERGE statement will INSERT and/or UPDATE a target table, based on matching values in a source table. If a matching value is missing, a new row is inserted. If a matching value exists, but needs to be changed, then MERGE updates it.

# MERGE

Merge the data from the ITEMS table into:

ITEM_ID	TITLE	ARTIST	DESCRIPTION
1	Madonna	Edward Munch	oil painting
3	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
4	Stained Glass window at the United Nations Building, New York		Paul Gauguin oil painting
35	Mona Lisa	Leonardo da Vinci	Small Oil Painting on Wood

The ART table

ITEM_ID	TITLE	ARTIST	DESCRIPTION
20	Skriget	Edward Munch	oil painting
30	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
35	Mona Lisa	Leonardo da Vinci	oil painting
40	Stained Glass window at the United Nations Building, New York Marc Chagall Stained Glass Window		

# MERGE Example

- The statement shown uses ITEMS (alias i) as the source table to merge and update information into ART (alias a), the target table.

```
MERGE INTO art a
  USING items i
    ON (a.id = i.item_id)
  WHEN MATCHED
  THEN UPDATE SET
    a.artist      = i.artist,
    a.description = i.description
  WHEN NOT MATCHED
  THEN INSERT
    VALUES(i.item_id, i.title, i.artist, i.description);
```

# MERGE Example

The ART table  
after the MERGE

ID	TITLE	ARTIST	DESCRIPTION
1	Madonna	Edvard Munch	oil painting
3	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
4	Stained Glass window at the United Nations Building, New York		Marc Chagall Stained Glass Window
20	Skriget	Edvard Munch	oil painting
30	Femmes de Tahiti (Sur la plage)	Paul Gauguin	oil painting
35	Mona Lisa	Leonardo de Vinci	Small oil painting on Wood
40	Stained Glass window at the United Nations Building, New York		Marc Chagall Stained Glass Window



# Terminology

Key terms used in this lesson included:

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- DELETE
- INSERT
- MERGE
- UPDATE

# Summary

In this lesson, you should have learned how to:

- Insert data into a database table
- Update data in a database table
- Delete data from a database table
- Merge data into a database table

