

**Database Principles:
Fundamentals of Design,
Implementation, and
Management
Tenth Edition**

*Beginning Structured Query Language
Data Manipulation Language
(SQL-DML)*

Objectives

In this chapter, students will learn:

- The basic SQL-DML commands.
- How to add data into tables.
- How to modify data in tables.
- How to remove data from tables.
- How to retrieve data from tables.

Data Manipulation Commands

- INSERT (to add data)
- UPDATE (to modify data)
- DELETE (to remove data)
- SELECT (to retrieve data)
- ROLLBACK (to undo changes)
- COMMIT (to save changes)

Adding Table Rows

- INSERT
 - Used to enter data into table
 - Syntax:
 - INSERT INTO *tablename*
VALUES (*value1*, *value2*, ... , *valueN*);
- Example: Focus on VENDOR and PRODUCT tables as shown in the next slides.

ERD : Vendor and Product

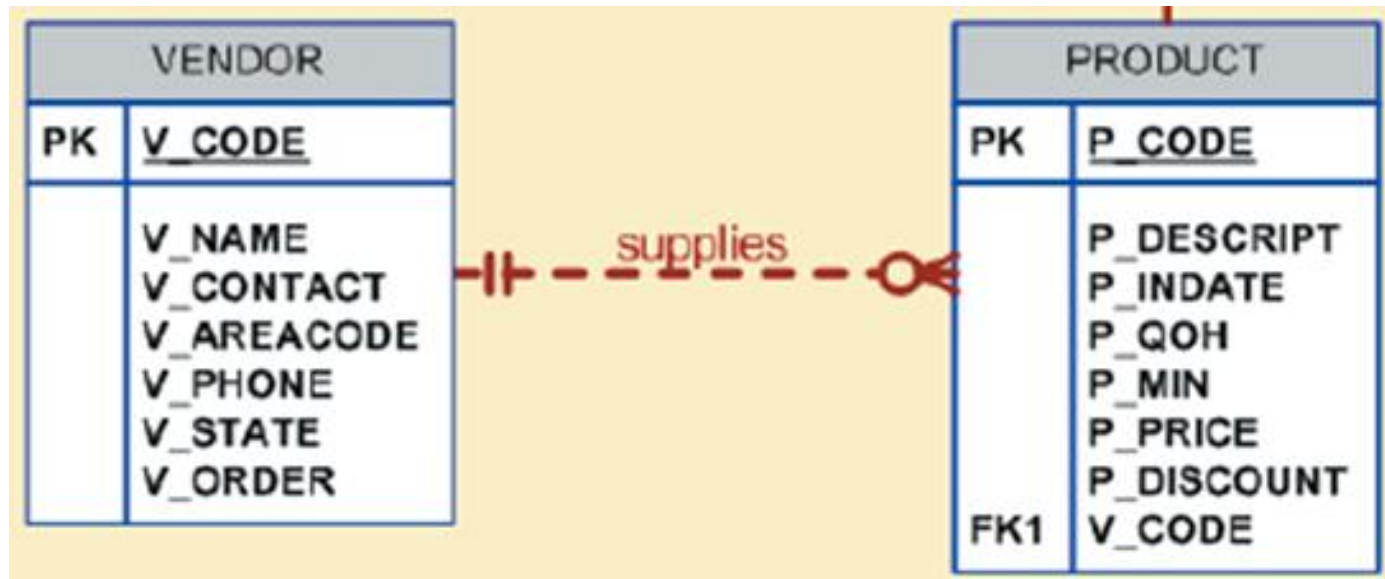


TABLE
5.3

Data Dictionary for the Ch05_SaleCo Database

TABLE NAME	ATTRIBUTE NAME	CONTENTS	TYPE	FORMAT	RANGE ^a	REQUIRED	PK OR FK	FK REFERENCED TABLE
PRODUCT	P_CODE	Product code	VARCHAR(10)	XXXXXXXXXX	NA	Y	PK	
	P_DESCRIPT	Product description	VARCHAR(35)	XXXXXXXXXXXXX	NA	Y		
	P_INDATE	Stocking date	DATE	DD-MON-YYYY	NA	Y		
	P_QOH	Units available	SMALLINT	####	0-9999	Y		
	P_MIN	Minimum units	SMALLINT	####	0-9999	Y		
	P_PRICE	Product price	NUMBER(8,2)	####.##	0.00-9999.00	Y		
	P_DISCOUNT	Discount rate	NUMBER(5,2)	0.##	0.00-0.20	Y		
	V_CODE	Vendor code	INTEGER	###	100-999		FK	VENDOR
VENDOR	V_CODE	Vendor code	INTEGER	#####	1000-9999	Y	PK	
	V_NAME	Vendor name	VARCHAR(35)	XXXXXXXXXXXXXXX	NA	Y		
	V_CONTACT	Contact person	VARCHAR(25)	XXXXXXXXXXXXXXX	NA	Y		
	V_AREACODE	Area code	CHAR(3)	999	NA	Y		
	V_PHONE	Phone number	CHAR(8)	999-9999	NA	Y		
	V_STATE	State	CHAR(2)	XX	NA	Y		
	V_ORDER	Previous order	CHAR(1)	X	Y or N	Y		

Between VENDOR and PRODUCT, which table need to be populated first ?

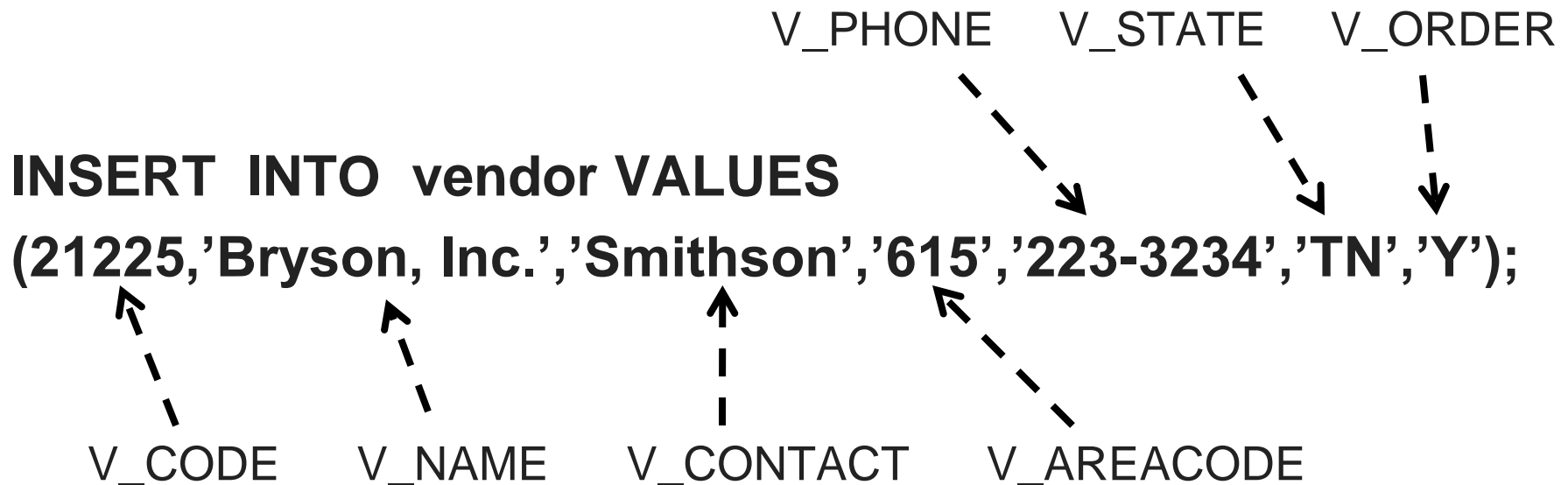
Adding Table Rows

- When entering values for a row :
 - Contents are entered between parentheses.
 - Character and date values are entered between apostrophes.
 - Numerical entries are not enclosed in apostrophes
 - Attribute entries are separated by commas.
 - A value is required for each column.
 - Use NULL for unknown value, BUT if column has NOT NULL constraint, use default value.

Adding a Row to Vendor Table

E.g.

INSERT INTO vendor VALUES
(21225,'Bryson, Inc.','Smithson','615','223-3234','TN','Y');



The diagram illustrates the mapping of values in the SQL statement to the columns of the 'vendor' table. Dashed arrows point from the column names to their corresponding values in the parentheses:

- V_CODE points to 21225
- V_NAME points to 'Bryson, Inc.'
- V_CONTACT points to 'Smithson'
- V_PHONE points to '615'
- V_STATE points to '223-3234'
- V_ORDER points to 'TN'
- V_ORDER points to 'Y'

Columns shown: V_CODE, V_NAME, V_CONTACT, V_PHONE, V_STATE, V_ORDER, V_ORDER.

Adding a Row to Product Table

E.g.

INSERT INTO product VALUES
(‘11QER/31’, ‘Power Painter’, ‘03-Nov-11’, 8, 5, 109.99, 0.00, 25595);

P_CODE P_DESCRIPT P_INDATE P_QOH P_MIN P_PRICE P_DISCOUNT V_CODE

***** Note: The above INSERT statement will fail if the VENDOR table does not have the row with V_CODE=25595.**

Adding a Row with NULL value

E.g. The V_CODE is NULL because the vendor for the product is Unknown.

INSERT INTO product VALUES
(‘11QER/31’,’Power Painter’,’03-Nov-11’,8,5,109.99,0.00,NULL);

P_CODE P_DESCRIPT P_INDATE P_QOH P_MIN P_PRICE P_DISCOUNT V_CODE

Saving Table Changes

- Changes made to table contents are not physically saved on disk until:
 - Database is closed
 - Program is closed
 - COMMIT command is used
- Syntax:
 - COMMIT [WORK];
- Will permanently save any changes made to any table in the database

Listing Table Rows

(Will be discussed in detail from Lecture 8 onwards)

- **SELECT**
 - Used to list contents of table
 - Syntax:
 SELECT columnlist
 FROM tablename;
- Columnlist represents one or more attributes, separated by commas
- Asterisk can be used as wildcard character to list all attributes

Listing Table Rows

(Will be discussed in detail from Lecture 8 onwards)

E.g. List the detail of all vendors.

```
SELECT * FROM vendor;
```

E.g. List the product code and units available.

```
SELECT p_code, p_qoh  
FROM product
```

Updating Table Rows

- UPDATE
 - Modify data in a table
 - Syntax:
UPDATE tablename
SET columnname = expression [, columnname =
expression]
[WHERE conditionlist];
- If more than one attribute is to be updated in row, separate corrections with commas

PRODUCT

January 18, 2012

P_CODE	P_DESCRIPTOR	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE
11QER/31	Power painter, 15 psi., 3-nozzle	03-Nov-11	8	5	109.99	0.00	25595
13-Q2/P2	7.25-in. pwr. saw blade	13-Dec-11	32	15	14.99	0.05	21344
14-Q1/L3	9.00-in. pwr. saw blade	13-Nov-11	18	12	17.49	0.00	21344
1546-QQ2	Hrd. cloth, 1/4-in., 2x50	15-Jan-12	15	8	39.95	0.00	23119
1558-QW1	Hrd. cloth, 1/2-in., 3x50	15-Jan-12	23	5	43.99	0.00	23119
2232/QTY	B&D jigsaw, 12-in. blade	30-Dec-11	8	5	109.92	0.05	24288
2232/QWE	B&D jigsaw, 8-in. blade	24-Dec-11	6	5	99.87	0.05	24288
2238/QPD	B&D cordless drill, 1/2-in.	20-Jan-12	12	5	38.95	0.05	25595
23109-HB	Claw hammer	20-Jan-12	23	10	9.95	0.10	21225
23114-AA	Sledge hammer, 12 lb.	02-Jan-12	8	5	14.40	0.05	
54778-2T	Rat-tail file, 1/8-in. fine	15-Dec-11	43	20	4.99	0.00	21344
89-WRE-Q	Hicut chain saw, 16 in.	07-Feb-12	11	5	256.99	0.05	24288
PVC23DRT	PVC pipe, 3.5-in., 8-ft	20-Feb-12	188	75	5.87	0.00	
SM-18277	1.25-in. metal screw, 25	01-Mar-12	172	75	6.99	0.00	21225
SW-23116	2.5-in. wd. screw, 50	24-Feb-12	237	100	8.45	0.00	21231
WR3/TT3	Steel matting, 4'x8'x1/6", .5" mesh	17-Jan-12	18	5	119.95	0.10	25595

Updating Table Rows

E.g. Change p_indate to January 18, 2012 for
 product code 13-Q2/P2

```
UPDATE product
SET p_indate = '18-JAN-2012', p_price=17.99,p_min=10
WHERE p_code='13-Q2/P2';
```


PRODUCT		January 18, 2012	10	17.99			
P_CODE	P_DESCRIPTOR	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE
11QER/31	Power painter, 15 psi., 3-nozzle	03-Nov-11	8	5	109.99	0.00	25595
13-Q2/P2	7.25-in. pwr. saw blade	13-Dec-11	32	15	14.99	0.05	21344
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PVC23DRT	PVC pipe, 3.5-in., 8-ft	20-Feb-12	188	75	5.87	0.00	
SM-18277	1.25-in. metal screw, 25	01-Mar-12	172	75	6.99	0.00	21225
SW-23116	2.5-in. wd. screw, 50	24-Feb-12	237	100	8.45	0.00	21231
WR3/TT3	Steel matting, 4'x8'x1/6", .5" mesh	17-Jan-12	18	5	119.95	0.10	25595

Updating Table Rows

E.g. Change p_indate, p_price and p_min for
product code 13-Q2/P2

```
UPDATE product  
SET p_indate = '18-JAN-2012', p_price=17.99,p_min=10  
WHERE p_code='13-Q2/P2';
```

Restoring Table Contents

- ROLLBACK
 - Undoes changes since last COMMIT
 - Brings data back to prechange values
- Syntax:
 ROLLBACK;
- COMMIT and ROLLBACK only work with commands to add, modify, or delete table rows

Deleting Table Rows

- DELETE
 - Deletes a table row
 - Syntax:

```
DELETE FROM tablename  
[WHERE conditionlist ];
```
- WHERE condition is optional
- If WHERE condition is not specified, all rows from specified table will be deleted

Inserting Table Rows with a SELECT Subquery

- INSERT
 - Inserts multiple rows from another table (source)
 - Uses SELECT subquery
 - Subquery: query embedded (or nested or inner) inside another query
 - Subquery executed first
 - Syntax:

```
INSERT INTO tablename SELECT columnlist  
FROM tablename;
```

Copying Parts of Tables

- SQL permits copying contents of selected table columns
 - Data need not be reentered manually into newly created table(s)
- First create the table structure
- Next add rows to new table using table rows from another table

Summary

- DML commands allow you to add, modify, and delete rows from tables
- The basic DML commands:
 - SELECT, INSERT, UPDATE, DELETE, COMMIT, and ROLLBACK
- SELECT statement is main data retrieval command in SQL
- WHERE clause can be used with SELECT, UPDATE, and DELETE statements

Summary

- INSERT and SELECT statement is used to copy the content of a table to another table.
- COMMIT statement will make changes permanent .
- ROLLBACK statement will undo all unCOMMITted changes

Exercise

Base on the VENDOR and PRODUCT tables, write the DML statement for the following request.

1. Add a new vendor with the following data :

Vendor code : 26111

Vendor name: ABC Supply

Contact person: Raymon

Area code: 754

Phone number: 224-2563

State : TN

Previous order : N

Exercise

2. Add a new product with the following data :

Product code : SW-32611

Product description : 3.5-in. wd. Screw. 80

Stocking date: 25 March 2013

Units available : 55

Minimum units : 10

Product price : 12.99

Discount rate : 0.05

Vendor code : unknown

Exercise

3. Change the value of P_QOH to 212 and P_DISCOUNT to 0.05 for product code SW-23116.
4. Increase the product price of product code SM-18277 by 3.00.
5. Change the contact person for vendor code 21344 to Robert.

Exercise

6. Increase the product price of product code SM-18277 by 3.00.
7. Change the discount rate for all products to 0.08.
8. Delete all products with unknown supplier.