Database Systems
INSERT and UPDATE Statements

CS 630 Database Systems

Professor Nardi

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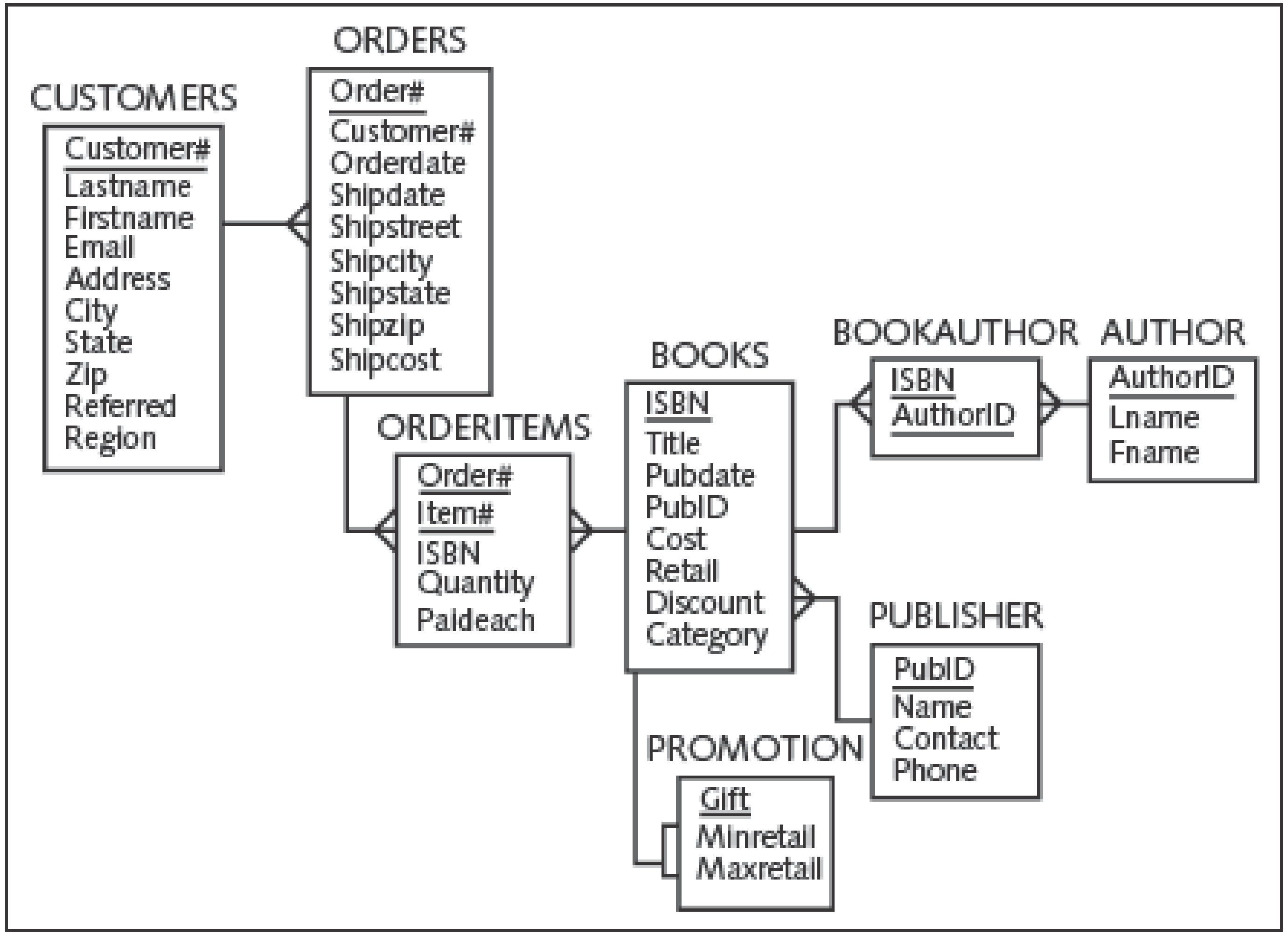
Normalized JustLee Books Database…



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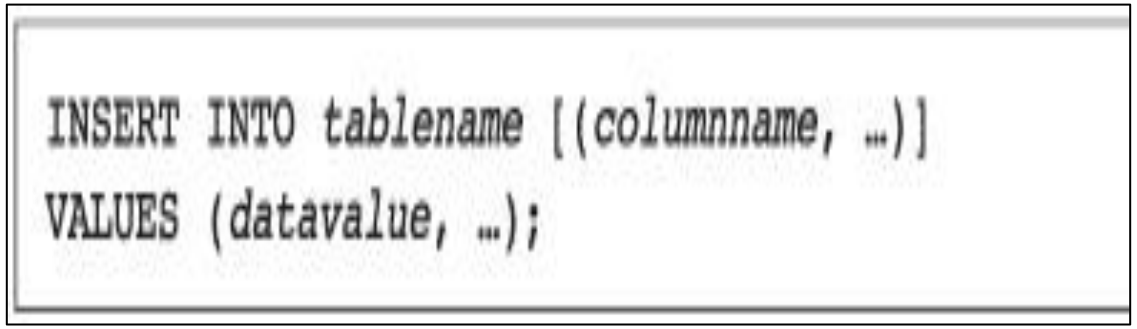
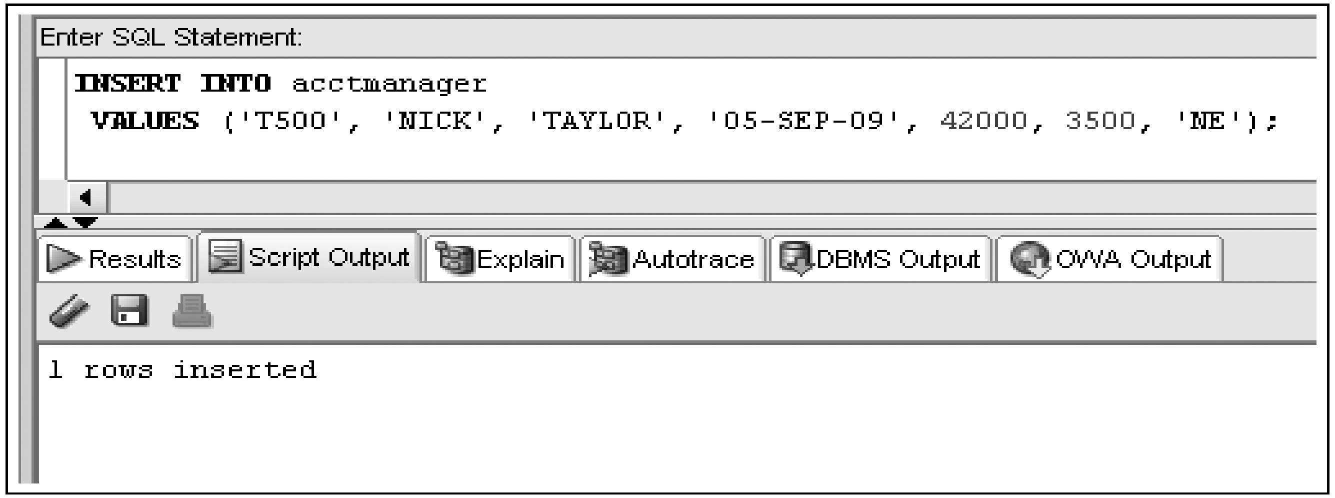
INSERT Statement Syntax – Part 1…

- Used to Add Rows to Existing Tables…
- Identify the Table in the INSERT INTO Clause and Specify Data in the VALUES Clause…
- Enclose Nonnumeric Data in Single Quotes…
- Can Only Add One Row at a Time to a Table…But Can Add Many Rows Using One INSERT…Enclose Each ROW of Data Inside a Parentheseis and Separate by a Comma…
- Can Provide a Column List to Add Data to Specific Columns…
- If a Column List is Not Provided, a Value Must Be Assigned to Each Column in the Table…



```
INSERT INTO tablename [(columnname, …)]
VALUES (datavalue, …);
```

INSERT Statement Syntax – Part 2…

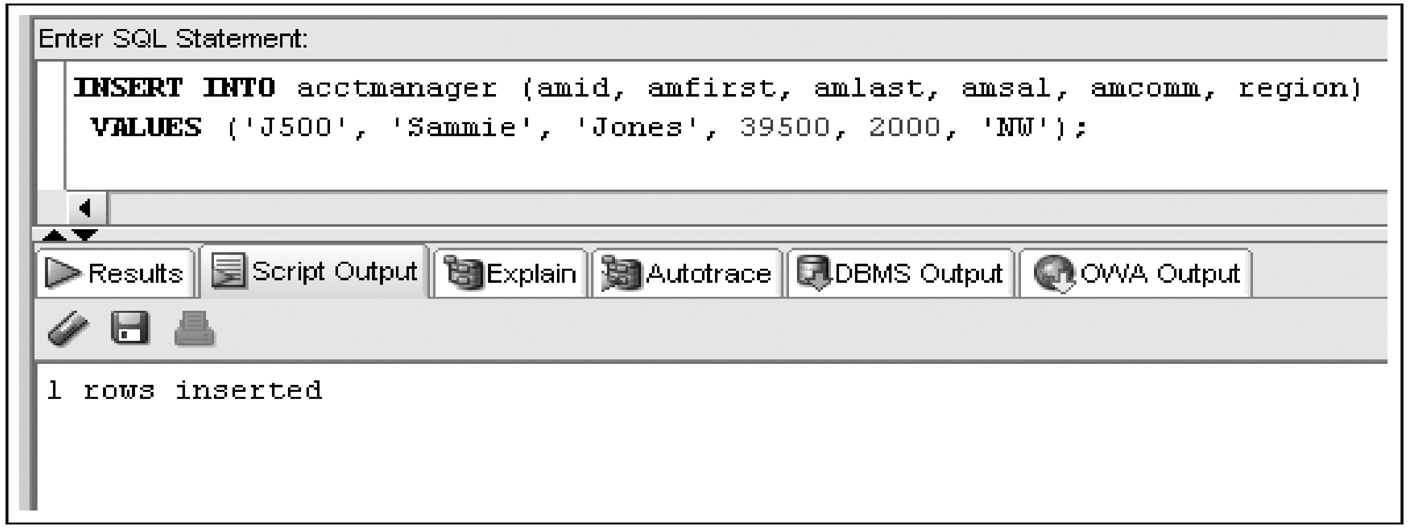


```
INSERT INTO acctmanager
 VALUES ('T500', 'NICK', 'TAYLOR', '05-SEP-09', 42000, 3500, 'NE');
```

```
1 rows inserted
```

No Column List

Column List



```
INSERT INTO acctmanager (amid, amfirst, amlast, amsal, amcomm, region)
 VALUES ('J500', 'Sammie', 'Jones', 39500, 2000, 'NW');
```

```
1 rows inserted
```

Activating the DEFAULT Option…

- Include a Column List in the INSERT Statement Ignoring the Column to Use the DEFAULT Option…
- Use the DEFAULT Keyword As the Value For the Column…
- DEFAULT Must Be Defined When the Table is Created…
- Good When a Large Majority of Values Are the Same…i.e., if 90% of Your Customers Are From ‘NY’, You Can Default the STATE Field to ‘NY’…
- Use CAREFULLY!!!...

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NULL Values…

- Represents an Unknown or a Missing Value…
- **A NULL VALUE DOES NOT MEAN A ZERO OR AN EMPTY TEXT STRING…**
- Zero (0) Can Have Meaning…i.e., the Balance of a Bank Account, Amount of a Product in Stock…
- A Blank Space is a Valid Character…i.e., City Is Not Part of a Country, Someone Has No Middle Initial…

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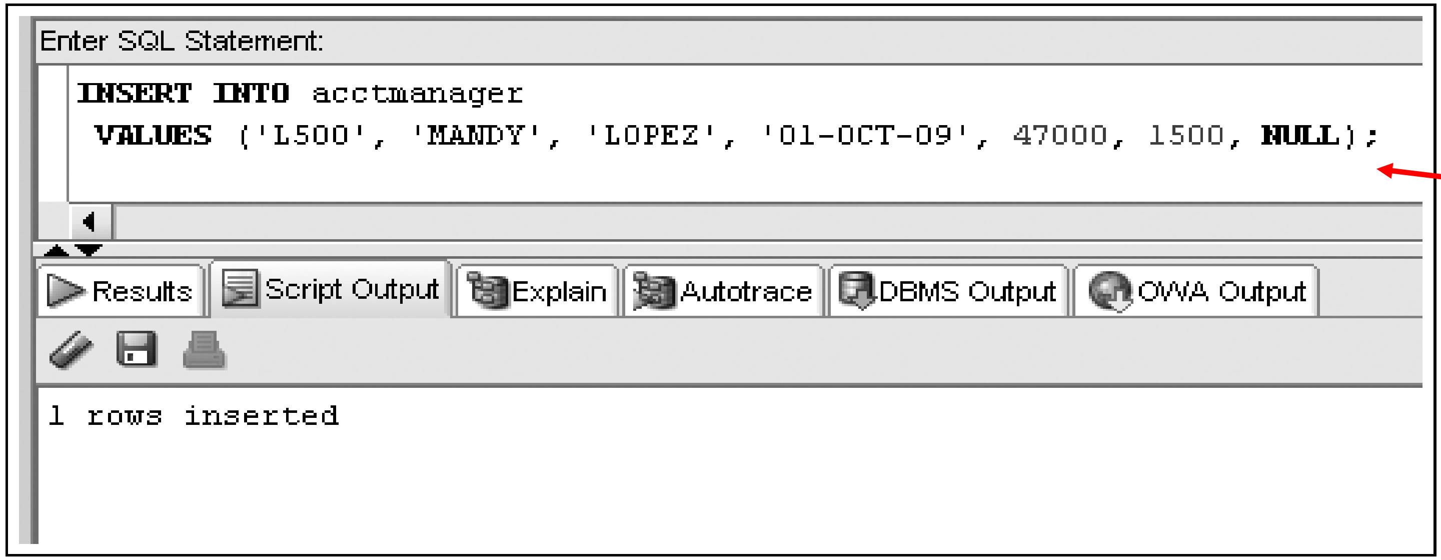
Why Use NULLS?...

- **AGAIN…NULL VALUE DOES NOT MEAN A ZERO OR AN EMPTY TEXT STRING…**
- Can Be Useful in Determining Whether or Not Data Has Been Entered for a Value…i.e., If Someone Does Not Have a Middle Name, the Field Can Be Null…If You Are Uncertain What Category Something Belongs to You Can Leave it NULL Until You Find Out…
- Numbers Can Be NULL…But Using NULLS in a Calculation Results in a NULL Value…
- Functions Can Be Used to Replace NULL Values With a 0 (Much More on That Later)…

Inserting NULL Values…

- Omit Column Name From INSERT INTO Clause Column List…
- Substitute Two Single Quotation Marks…
- Use NULL Keyword…



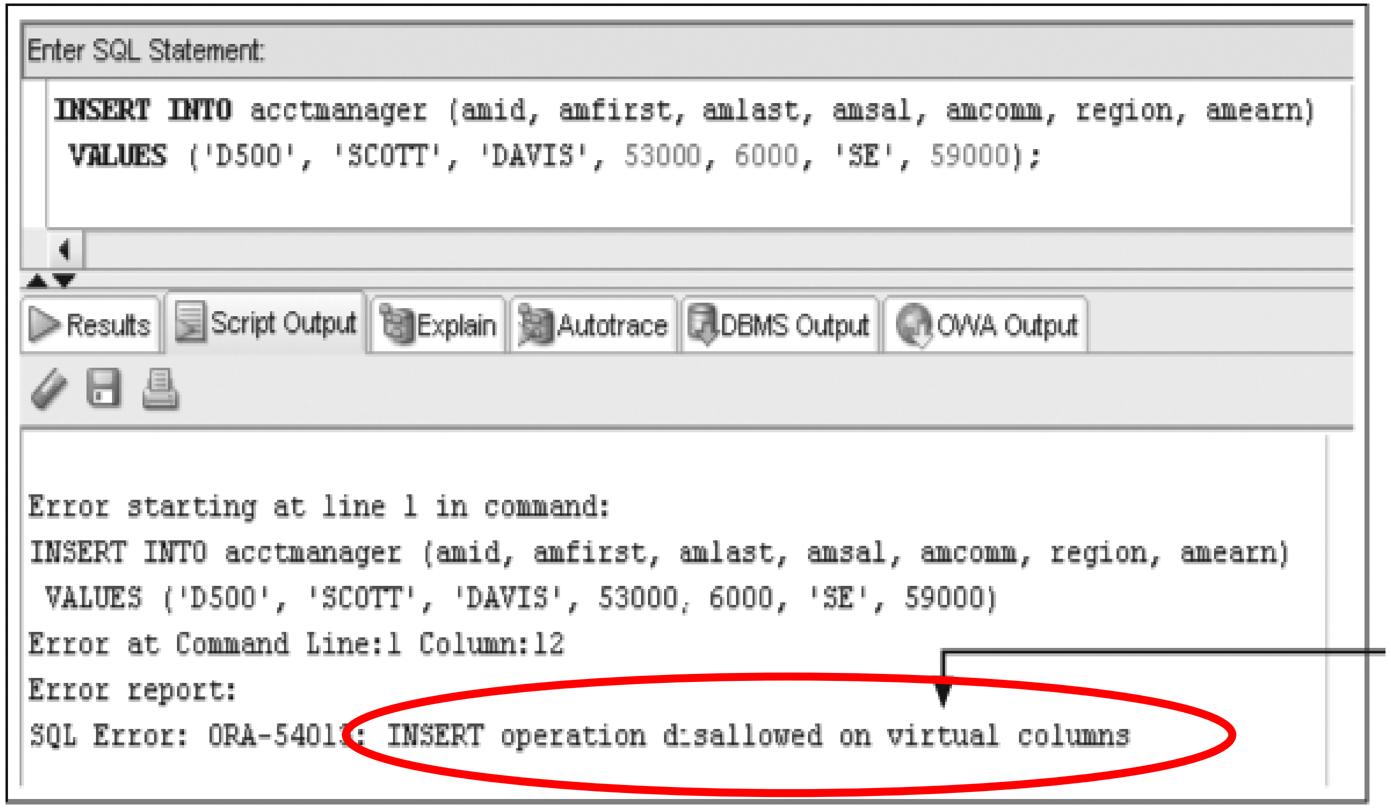
```
INSERT INTO acctmanager
 VALUES ('L500', 'MANDY', 'LOPEZ', '01-OCT-09', 47000, 1500, NULL);
```

```
1 rows inserted
```

NULL value input

Managing Virtual Column Input…

- INSERT Cannot Be Used With a Virtual Column…
- Remember…Virtual Columns Are Composed or Calculated Based on Values From Other Columns…



```
INSERT INTO acctmanager (amid, amfirst, amlast, amsal, amcomm, region, amearn)
 VALUES ('D500', 'SCOTT', 'DAVIS', 53000, 6000, 'SE', 59000);
```

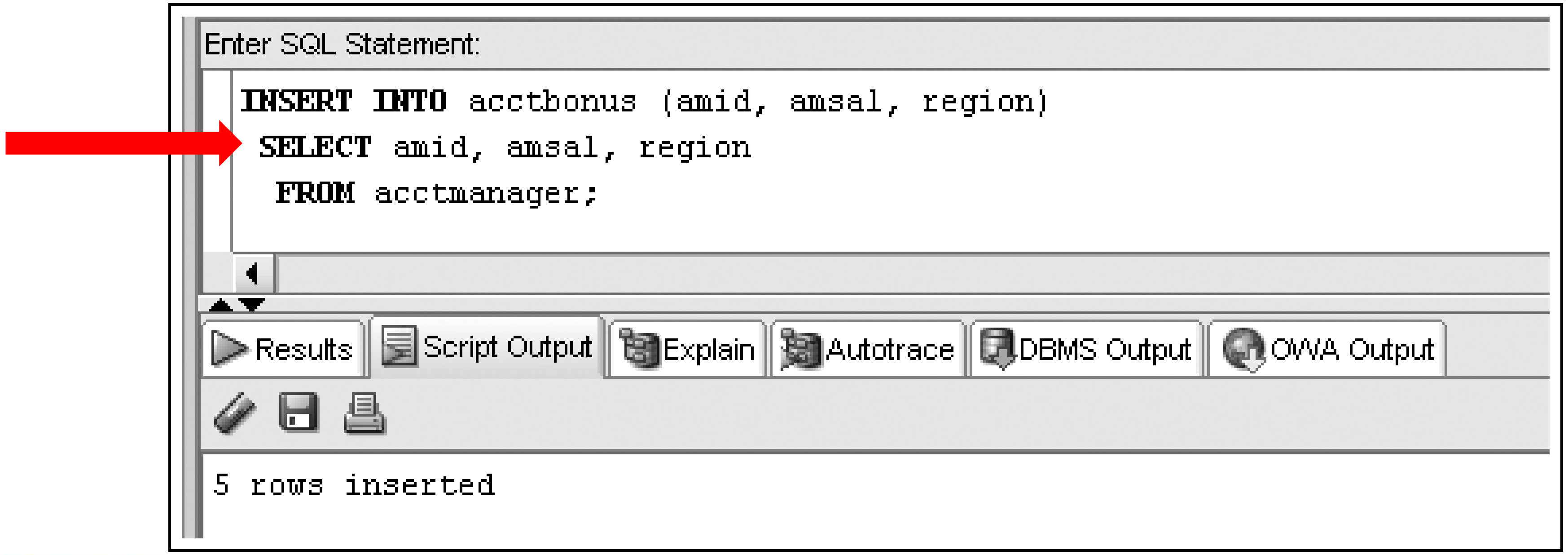
```
Error starting at line 1 in command:
INSERT INTO acctmanager (amid, amfirst, amlast, amsal, amcomm, region, amearn)
 VALUES ('D500', 'SCOTT', 'DAVIS', 53000, 6000, 'SE', 59000)
Error at Command Line:1 Column:12
Error report:
SQL Error: ORA-54013: INSERT operation disallowed on virtual columns
```

Constraint Violations…

- When You Add or Modify Table Data, the Data is Checked For Compliance With Any Applicable Constraints…
- Specifically…You Cannot INSERT Data for a FK Unless the Data Has Already Been Inserted in the PK Field…
- This Will Impact the Order in Which You CREATE, INSERT, and DELETE Data, Fields, and Tables…

Inserting Data from an Existing Table…

- Substitute Subquery For VALUES Clause…
- Will Take Data From One Table to Populate Another…



```
INSERT INTO acctbonus (amid, amsal, region)
 SELECT amid, amsal, region
  FROM acctmanager;
```

```
5 rows inserted
```

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Modifying Existing Rows…

- Modify Rows Using UPDATE Command…
- Use UPDATE Command to:
  - Add Values to an Existing Row (Replace NULL Values)…
  - Change Existing Values…

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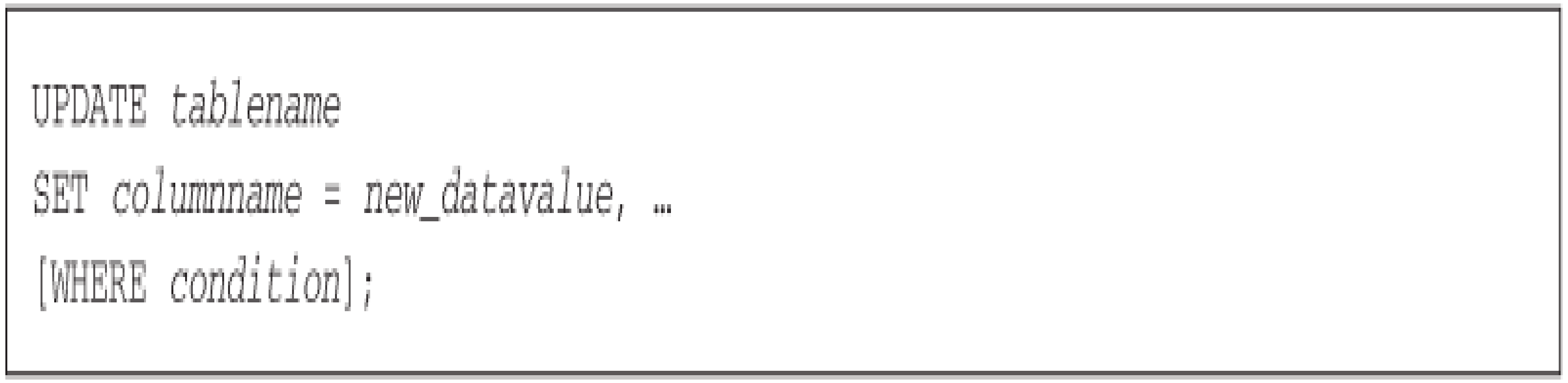
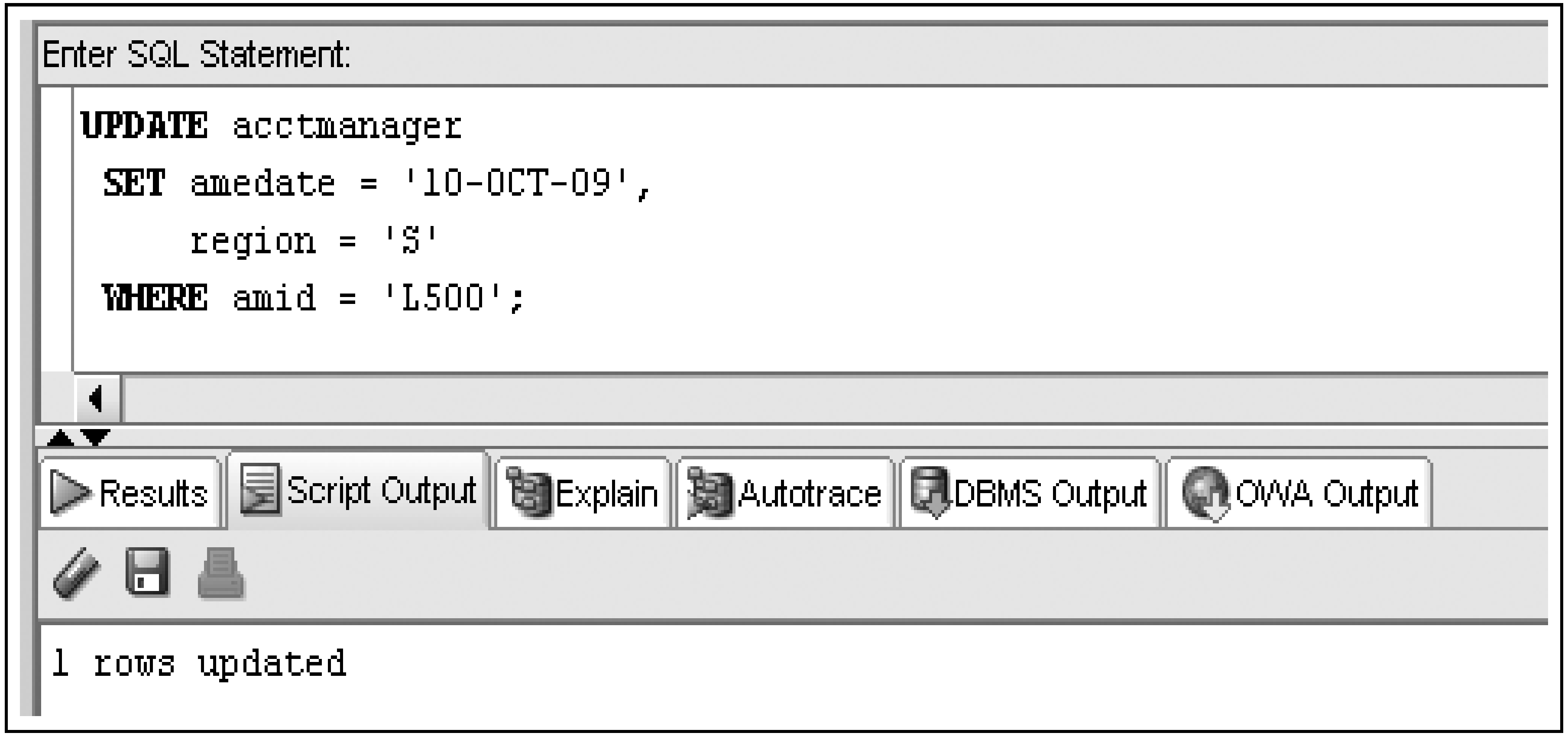
UPDATE Command…

- UPDATE Clause Identifies Table…
- SET Clause Identifies Column(s) Being Changed and New Value(s)…
- Optional WHERE Clause Specifies Row(s) to Be Changed…If Omitted, All Rows Will Be Updated!...



```
UPDATE tablename
SET columnname = new_datavalue, …
[WHERE condition];
```

UPDATE Command Example…



```
UPDATE acctmanager
 SET amedate = '10-OCT-09',
     region = 'S'
 WHERE amid = 'L500';
```

```
1 rows updated
```

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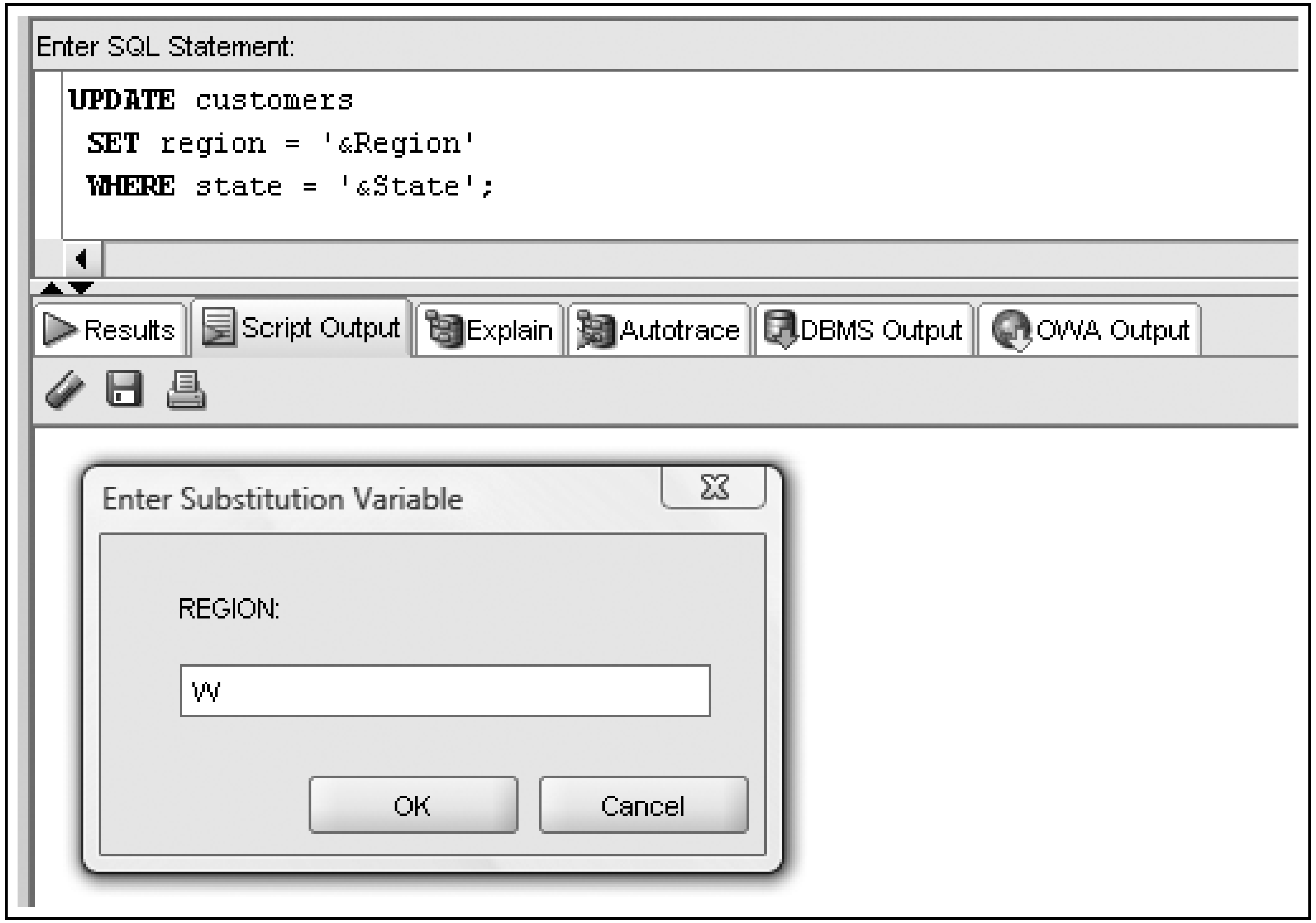
Substitution Variables…

- Key for Flexibility…
- Interaction Between User or Program, and the Database…
- Prompts User For Value…
- Identified By Ampersand (&) Preceding Variable Name…



```
UPDATE customers
 SET region = '&Region'
 WHERE state = '&State';
```

REGION: W

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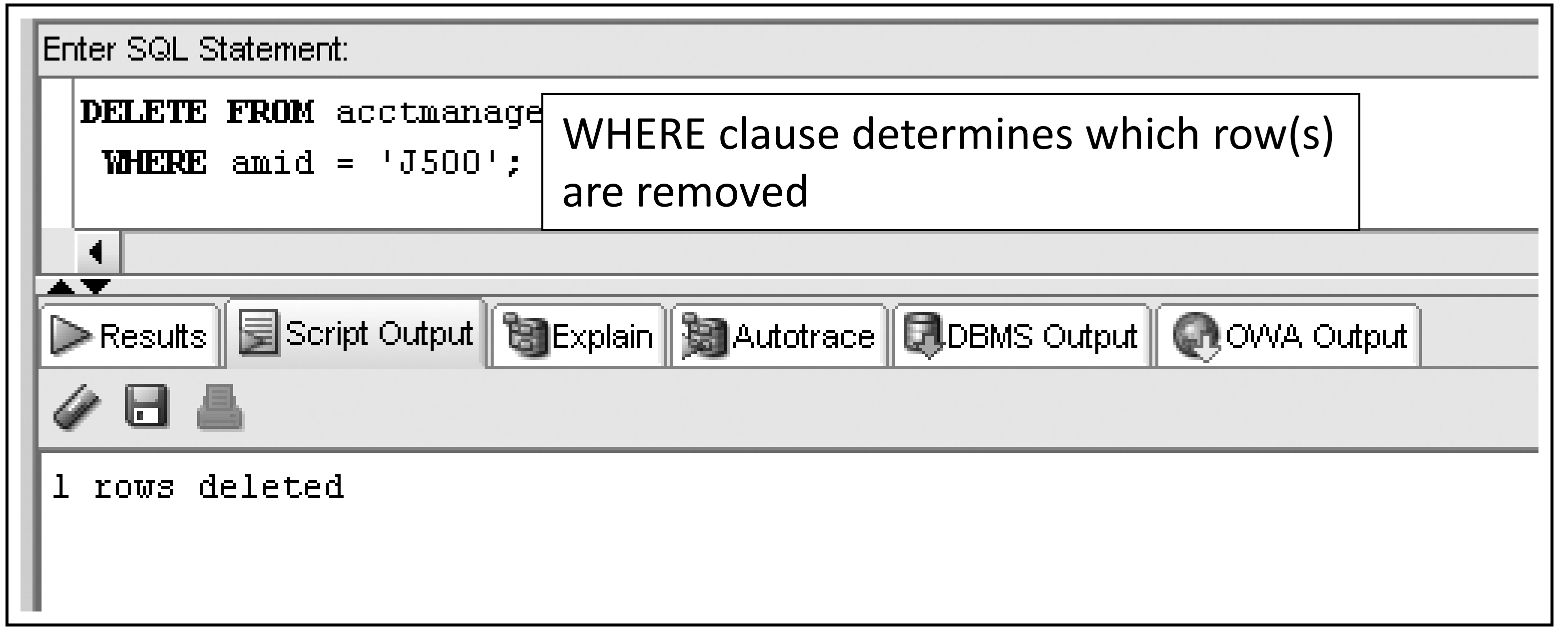
Deleting Rows…

- DELETE Command Removes a Row From a Table…
- Omitting WHERE Clause Removes ALL Rows (i.e., DELETE FROM acctmanager;)…



Enter SQL Statement:

```
DELETE FROM acctmanage
 WHERE amid = 'J500';
```

WHERE clause determines which row(s) are removed

```
1 rows deleted
```

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Transaction Control Statements…

- Results of Data Manipulation Language (DML) Are Not Permanently Updated to a Table Until Explicit or Implicit COMMIT Occurs…
- Transaction Control Statements Can:
  - Commit Data Through COMMIT Command…
  - Undo Data Changes Through ROLLBACK Command…

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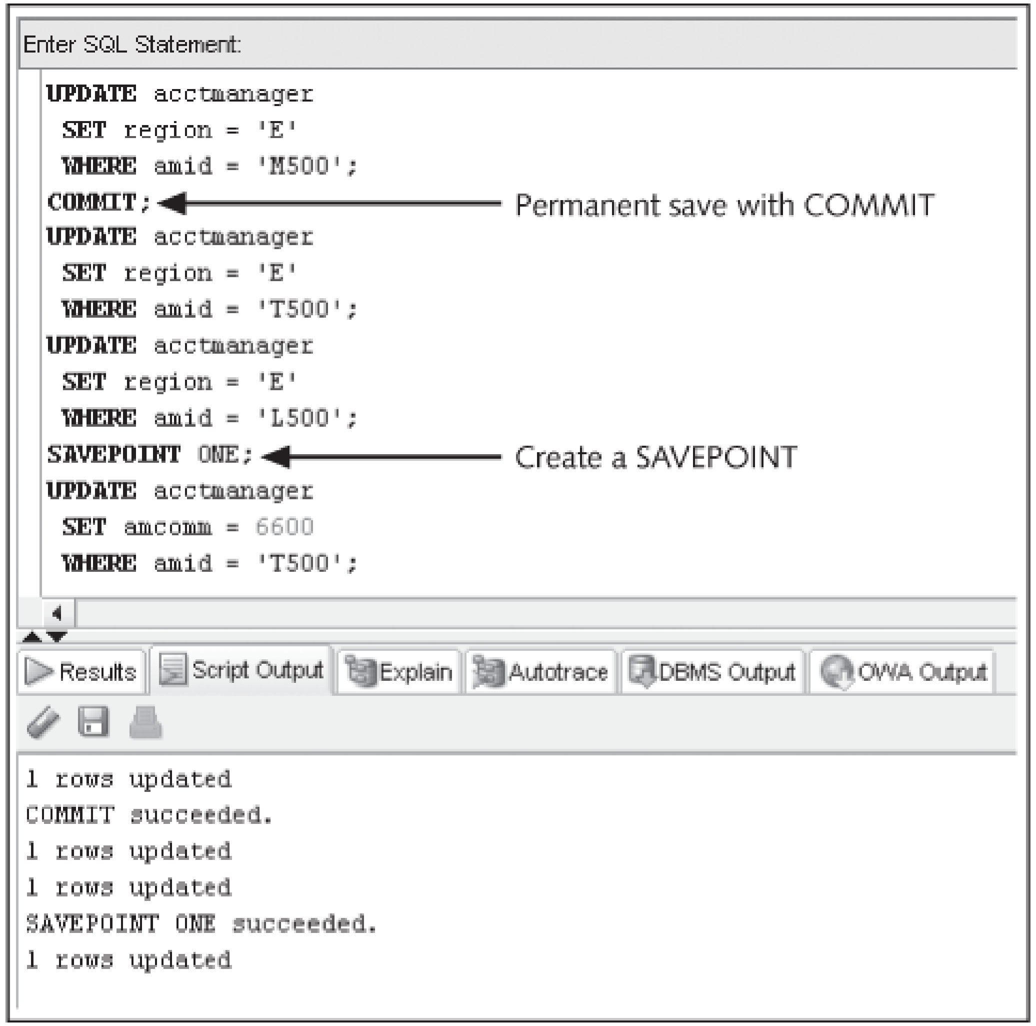
COMMIT Command…

- Explicit COMMIT Occurs By Executing COMMIT;
- Implicit COMMIT Occurs When DDL Command is Executed or User Properly Exits System…
- Permanently Updates Table(s) and Allows Other Users to View Changes…

ROLLBACK Command…

- Used to "Undo" Changes That Have Not Been Committed…
- Occurs When:
  - ROLLBACK; is Executed…
  - System Restarts After a Crash…
- SAVEPOINT Marks a Specific Spot Within the Transaction…
- Can ROLLBACK to a SAVEPOINT to Undo Part of the Transaction…

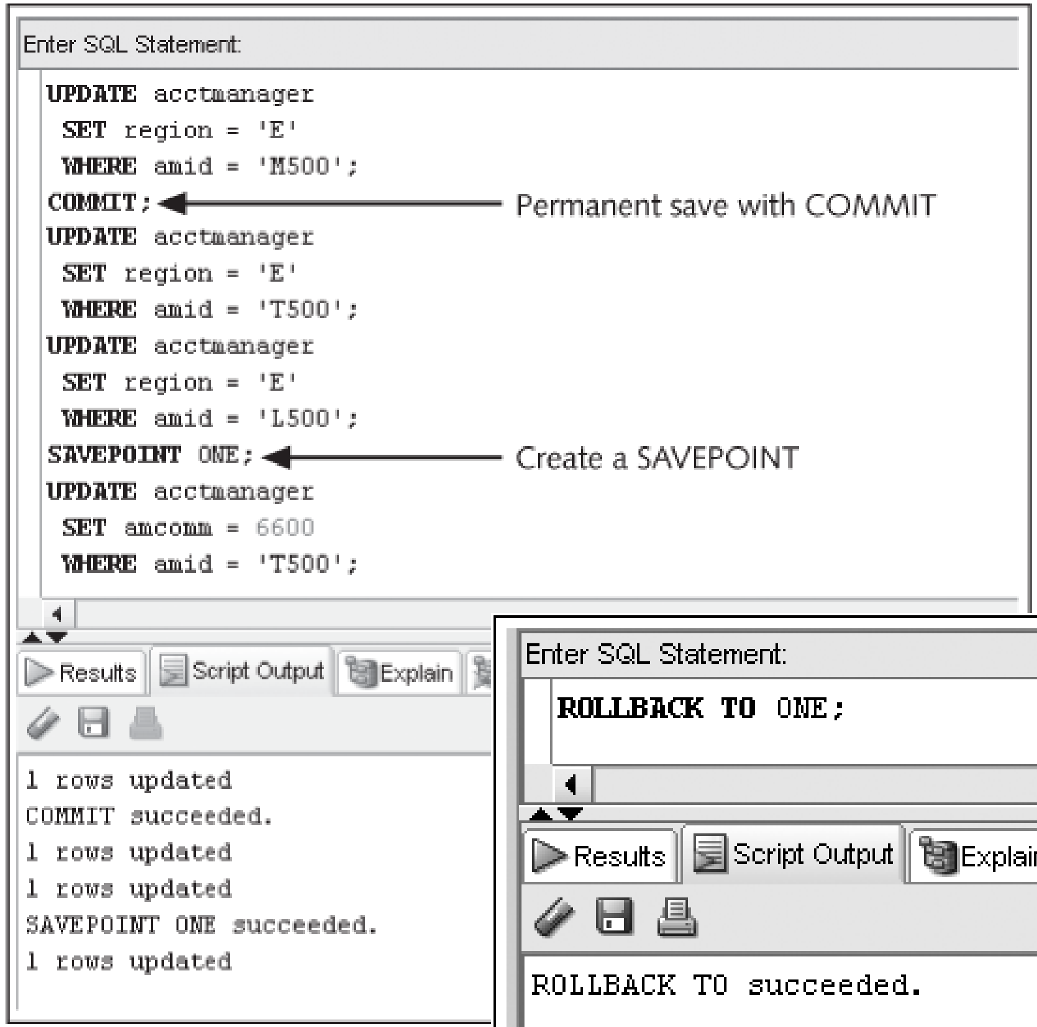
Transaction Control Example…



```
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'M500';
COMMIT;
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'T500';
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'L500';
SAVEPOINT ONE;
UPDATE acctmanager
 SET amcomm = 6600
 WHERE amid = 'T500';
```

```
1 rows updated
COMMIT succeeded.
1 rows updated
1 rows updated
SAVEPOINT ONE succeeded.
1 rows updated
```

Transaction Control Example…

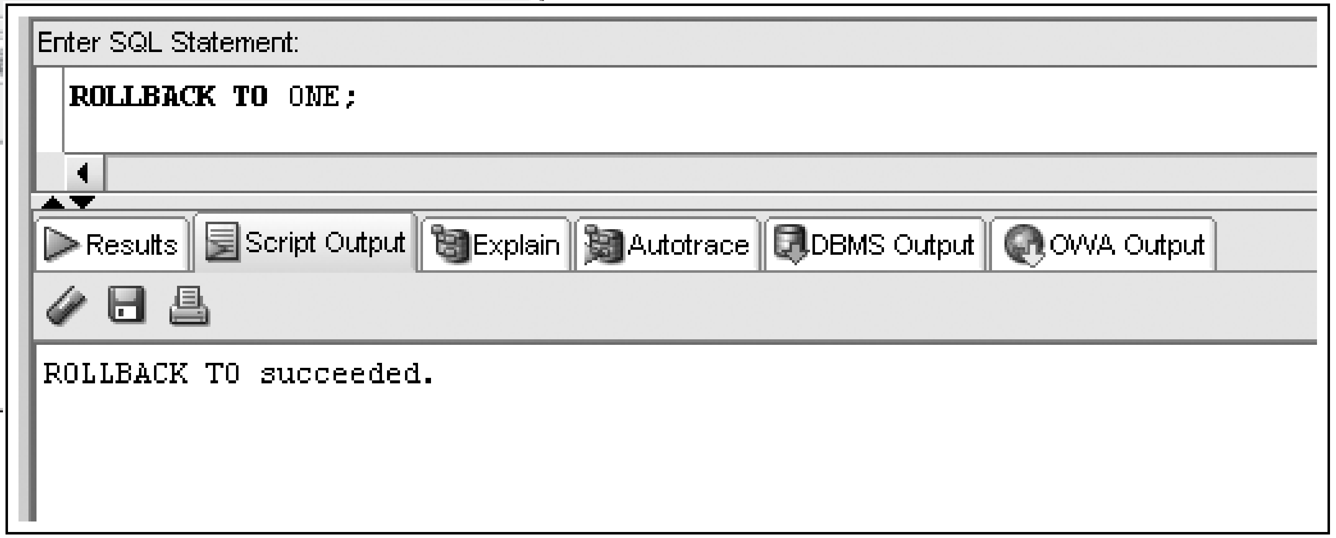


Enter SQL Statement:

```
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'M500';
COMMIT;
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'T500';
UPDATE acctmanager
 SET region = 'E'
 WHERE amid = 'L500';
SAVEPOINT ONE;
UPDATE acctmanager
 SET amcomm = 6600
 WHERE amid = 'T500';
```

```
1 rows updated
COMMIT succeeded.
1 rows updated
1 rows updated
SAVEPOINT ONE succeeded.
1 rows updated
```

Only Undo DML Actions After SAVEPOINT…



Enter SQL Statement:

```
ROLLBACK TO ONE;
```

```
ROLLBACK TO succeeded.
```

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Table Locks…

- Prevent Users From Changing Same Data or Objects…
- Two Types
  - Shared : Prevents DML Operations On a Portion of Table…
  - Exclusive : Locks Table Preventing Other Exclusive or Shared Locks…

LOCK TABLE Command Shared Lock…

- Locks Portion of Table Affected By DML Operation…
- Implicitly Occurs During UPDATE or DELETE Operations…
- Explicitly Occurs Through LOCK TABLE Command With SHARE MODE Option…
- Released When COMMIT (Implicit Or Explicit) or ROLLBACK Occurs…

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LOCK TABLE Command Exclusive Lock…

- Implicitly Locks Table For DDL Operations…CREATE or ALTER TABLE…
- Explicitly Locked Through LOCK TABLE Command With EXCLUSIVE MODE Option…
- Released After Execution of DDL Operation or After User Exits System…

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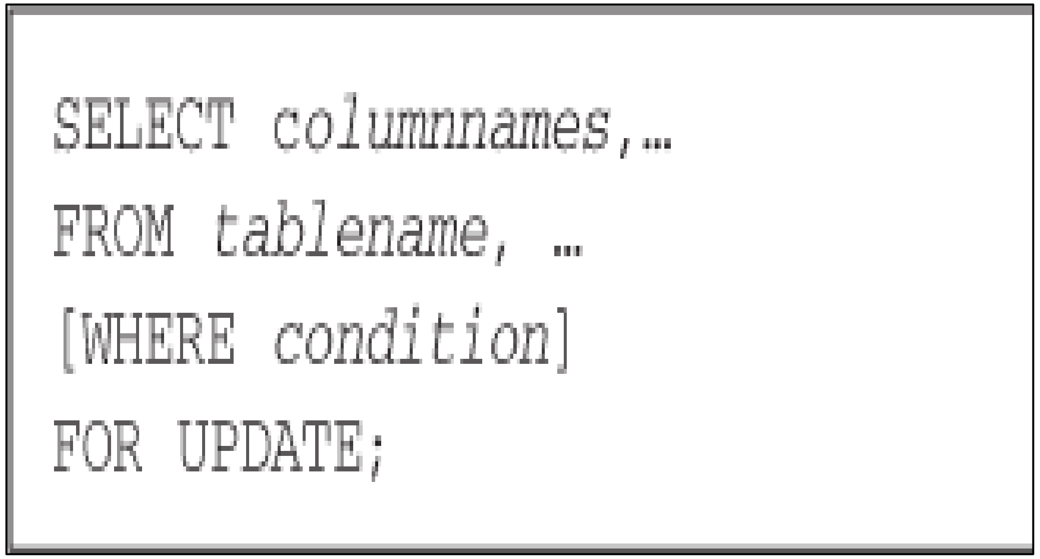
SELECT…FOR UPDATE Command…

- Creates Shared Lock On Retrieved Portion of Table…
- Prevents One User From Changing a Row While Another User is Selecting Rows to Be Changed…
- Released Through Implicit or Explicit Commit…



```
SELECT columnnames,…
FROM tablename, …
[WHERE condition]
FOR UPDATE;
```

Questions…

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