Table Creation and Management

CS 630 Database Management Systems

Professor Nardi

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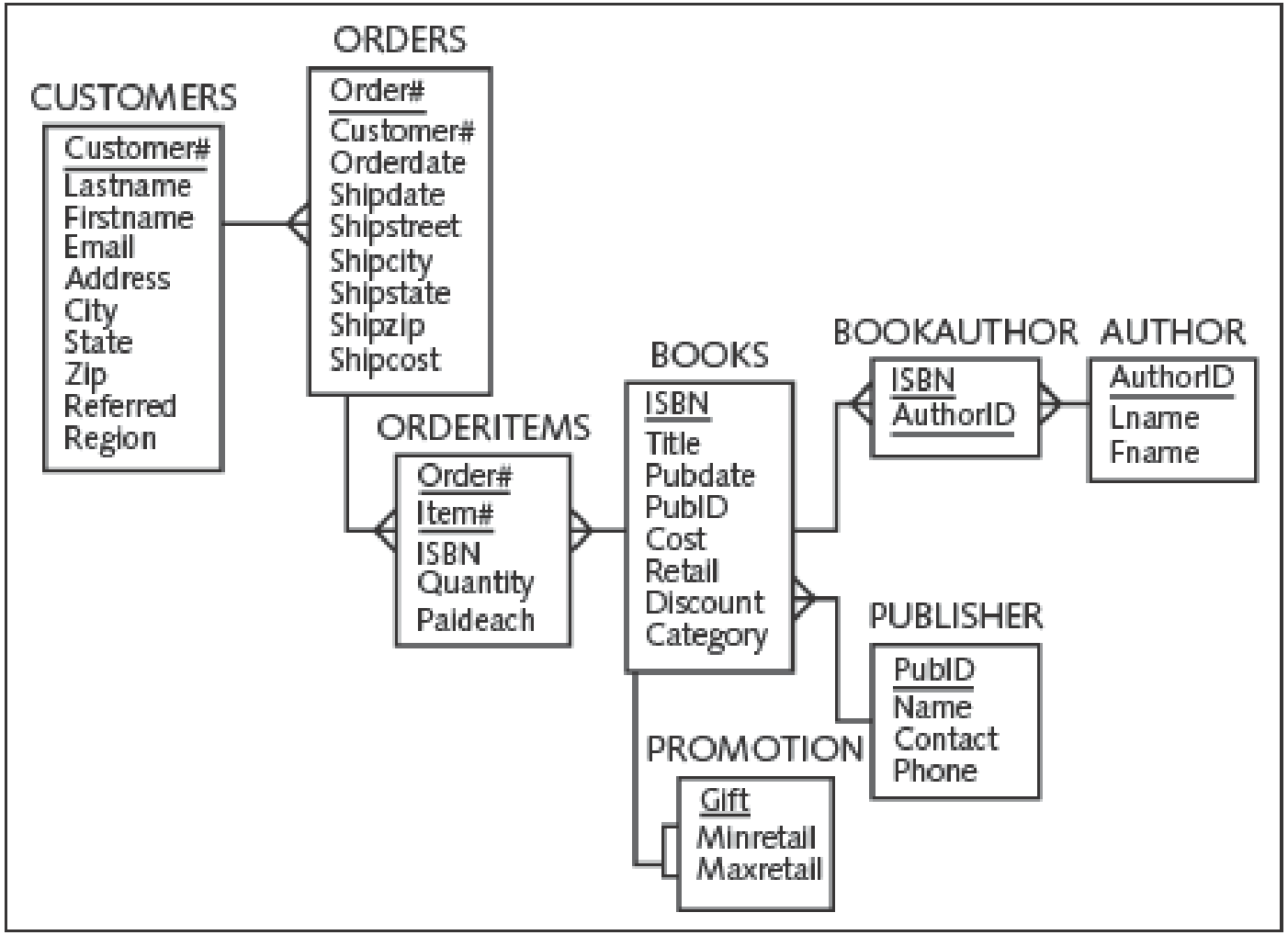
Normalized JustLee Books Database…



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Database Table…

- A Database Object…
- Stores Data for the Database…
- Consists of Columns and Rows…
- Created and Modified Through Data Definition Language (DDL) Commands…

Table Design – Table and Column Names…

- Can Contain a Maximum 30 Characters…
- NO Blank Spaces…
- Must Begin With a Letter…
- Can Contain Numbers, Underscore (_), and Number Sign (#)…
- Must Be Unique Within a Table…
- No Reserved Words Are Allowed…

Table Design – Field Types : VARCHAR2(n)…

- Variable Length CHARACTER Data…
- “n” Represents the Maximum Number of Characters Allowed..
- STANDARD Maximum Number of Characters CANNOT Exceed 4000 Characters…
- EXTENDED Maximum Number of Characters Cannot Exceed 32767 Characters…
- Minimum Number of Characters is 1…
- There is NO Default Size…
- For Example, VARCHAR2(5)
  - Can Hold Up to FIVE Letters, Numbers, or Symbols…
  - The Word “Joe” Will Only Use 3 of the Allotted 5 Characters…It Does Not Pad…
  - The Word “Nicholas” Will Generate an Error Because the Value Exceeds 5 Characters…

Table Design – Field Types : CHAR(n)…

- Fixed Length CHARACTER Data…
- “n” Represents the Length of the Field…
- Maximum Number of Characters CANNOT Exceed 2000 Characters…
- Default Size is ONE Character…
- For Example, CHAR(5)
  - Will ALWAYS Store FIVE Letters, Numbers, or Symbols…
  - The Word “Joe” Will Store the 3 Characters Given (i.e., J – O – E) and PAD the Field with TWO Spaces…
  - The Word “Nicholas” Will Generate an Error Because the Value Exceeds 5 Characters…

Table Design – Field Types : NUMBER (p,s)…

- Stores NUMERIC Data…
- “p” is the PRECISION of the Number…That Is, the Total Number of Numbers to the Left AND the Right of the Decimal Place…
- Maximum Number of Precision Cannot Exceed 38 Digits…
- “s” is the SCALE or the Number of Digits to the RIGHT of the Decimal…
- Numbers Defined With a Scale of 0 Are Considered to Be Integers…

Table Design – Field Types : NUMBER (p,s)…

- For Example, NUMBER(7,2)
  - Can Store a Numeric Value Up to 99999.99…
  - If You Could the Number of Digits, There are 7 in Total and 2 to the Right of the Decimal…
  - If No Precision or Scale is Specified, the Column Defaults to 38 Digits…
- For Example, NUMBER(5) or NUMBER(5,0)
  - Can Store an INTEGER Up to the Value 99999…

Table Design – Field Types : DATE…

- Stores Data and Time Between January 1, 4712 BC and December 31, 9999 AD…
- Uses 7 Bytes to Store the Century, the Year, the Month, the Day, the Hour, the Minute, and the Second…
- Standard Data Format for Both Input and Output is DD-MON-YY…
- You Can Use Other Formats (i.e., YYYY-MM-DD) By Changing the NLS_DATE_FORMAT…
- MUCH More on Dates Later…

Table Design – Field Types : Unicode Formats…

- Is a Character Encoding Format That Can Support Over One Million Characters (vs. ASCII Which Supports 128 or 256)…
- Allows You to Store Characters in Any Other Non-ASCII Language Sets…
- Used “Under the Covers” By Major Manufacturers Whether You Utilize It or Not…
- Oracle Supports Unicode Via NCHAR and NVARCHAR…

Create a Table…

- Column Definition List Must Be Enclosed in Parentheses…
- Datatype Must Be Specified For Each Column…
- Maximum of 1,000 Columns…

```
CREATE TABLE [ schema. ] tablename
 ( columnname datatype [ DEFAULT value ]
 [ , columnname datatype [ DEFAULT value ]] );
```

Sample CREATE TABLE…

- Notice the “Virtual Column”…
- Virtual Columns Are Defined Using Create But Their Values Are NOT Stored in the Table…
- Values Are Derived at the Time They Are Accessed…

```
CREATE TABLE ACCTMANAGER
(
    AM_ID        CHAR(4),
    AM_NME_FST     VARCHAR2(12),
    AM_NME_LST     VARCHAR2(12),
    AM_ENT_DTE  DATE DEFAULT SYSDATE,
    AM_SAL     NUMBER(8,2),
    AM_COM_RTE     NUMBER(7,2) DEFAULT 0,
    AM_TOT_COM  AS (AM_SAL + AM_COM_RTE),
    AM_REG     CHAR(2)
);
```

Virtual Column

```
CREATE TABLE succeeded.
```

Success Message

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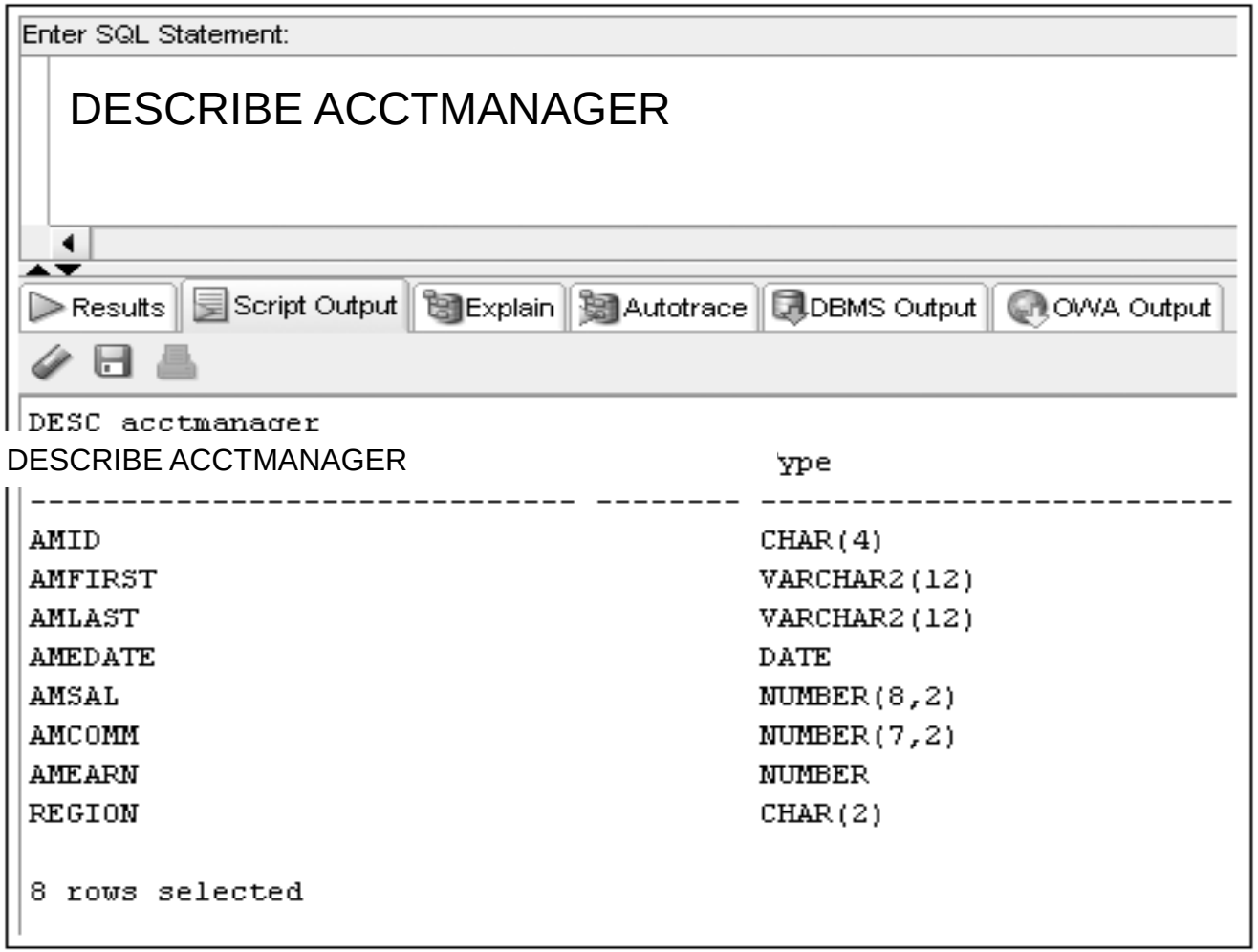
Viewing Tables in Your Database…

- Data Dictionary is a Typical Component of a DBMS That Maintains Information About Database Objects…
- Query the Data Dictionary to Verify the Tables That Exist in the Schema…
- USER_TABLES Data Dictionary Object Maintains Information On All the Tables in the Schema…
- DESCRIBE Displays the Structure of a Specified Table…

Example of Viewing Tables in Your Database…



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Invisible Columns…

- Columns Defined as Invisible Are NOT Available to Be Used in SQL…
- Used Typically to Provide Flexibility of Testing the Impacts of Adding New Fields to a Database…
- Used to Store Data That Is Not Generally Available to All Users…
- Can Be Changed to Visible (and Vice Versa) at Any Time…

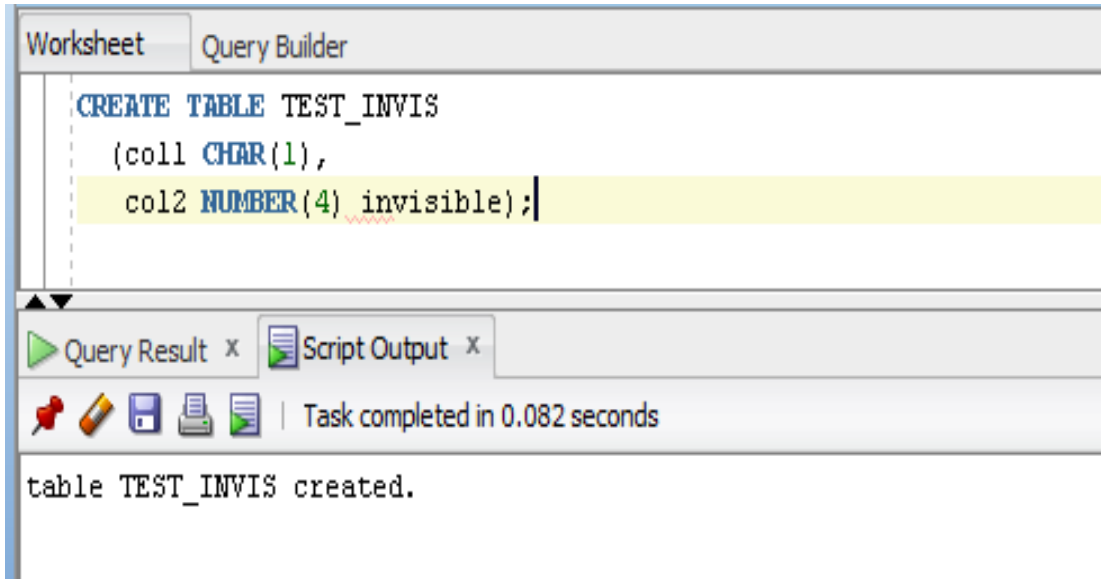

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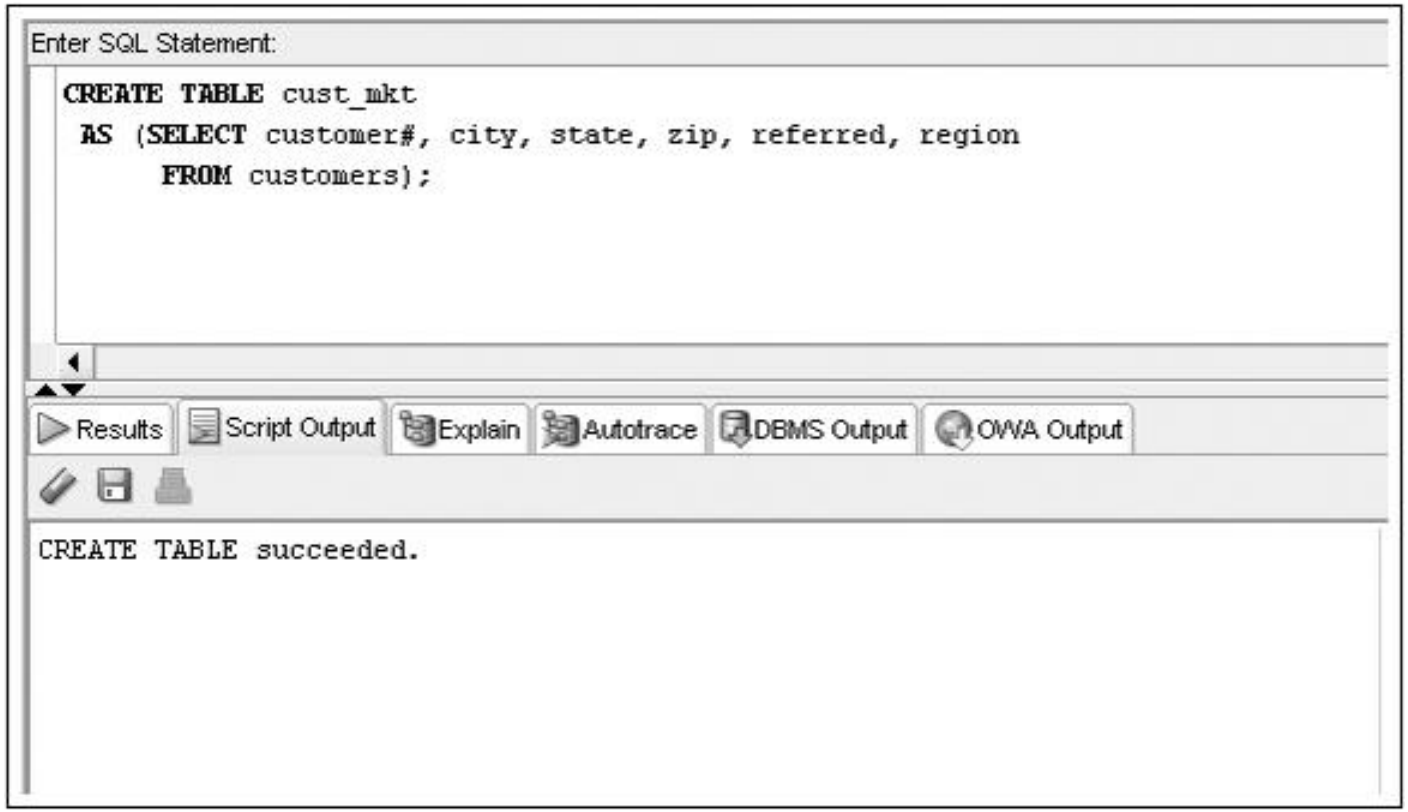
Table Creation Through Subqueries…

- Use Subqueries to Retrieve Data From an Existing Table…
- Requires Use of AS Keyword…
- New Column Names Can Be Assigned…
- More On This Later…



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Modifying Existing Tables…

- Accomplished Through the ALTER TABLE Command…
- Use an ADD Clause to Add a Column…
- Use a MODIFY Clause to Change a Column…
- Use a DROP COLUMN to Drop a Column…
- Always Use DESC After an Alter to Validate the Change Was Made Correctly…

```
ALTER TABLE tablename
ADD|MODIFY|DROP COLUMN| columnname [definition];
```

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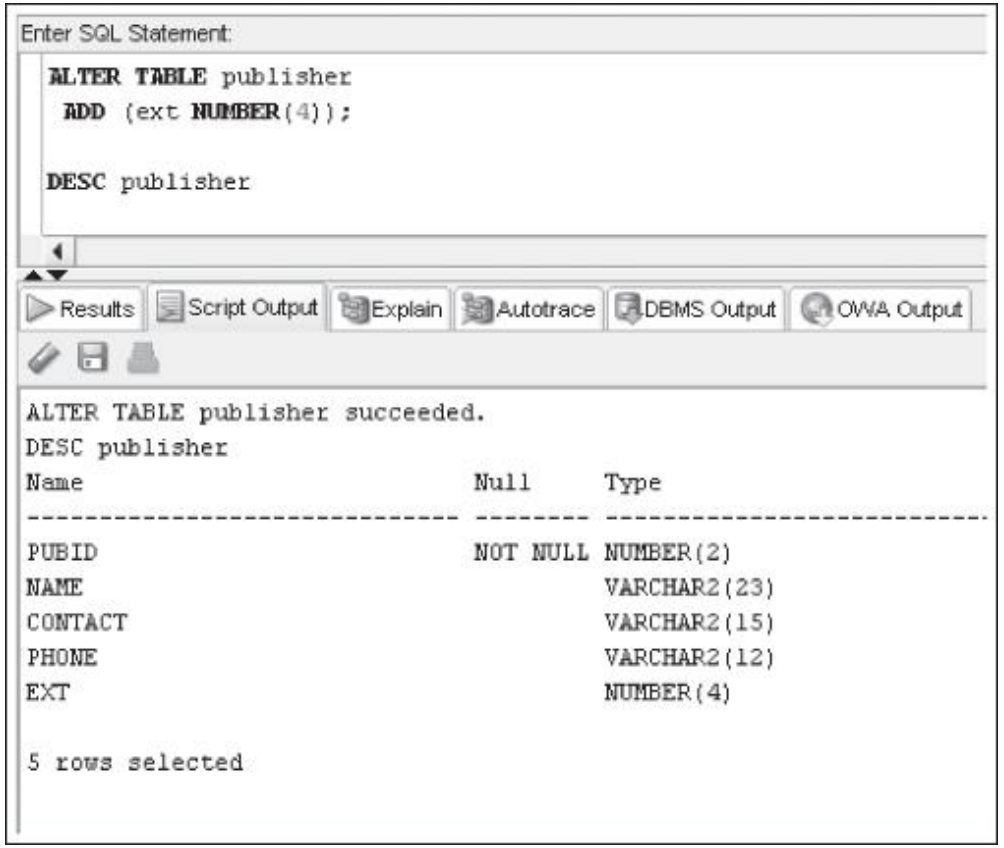
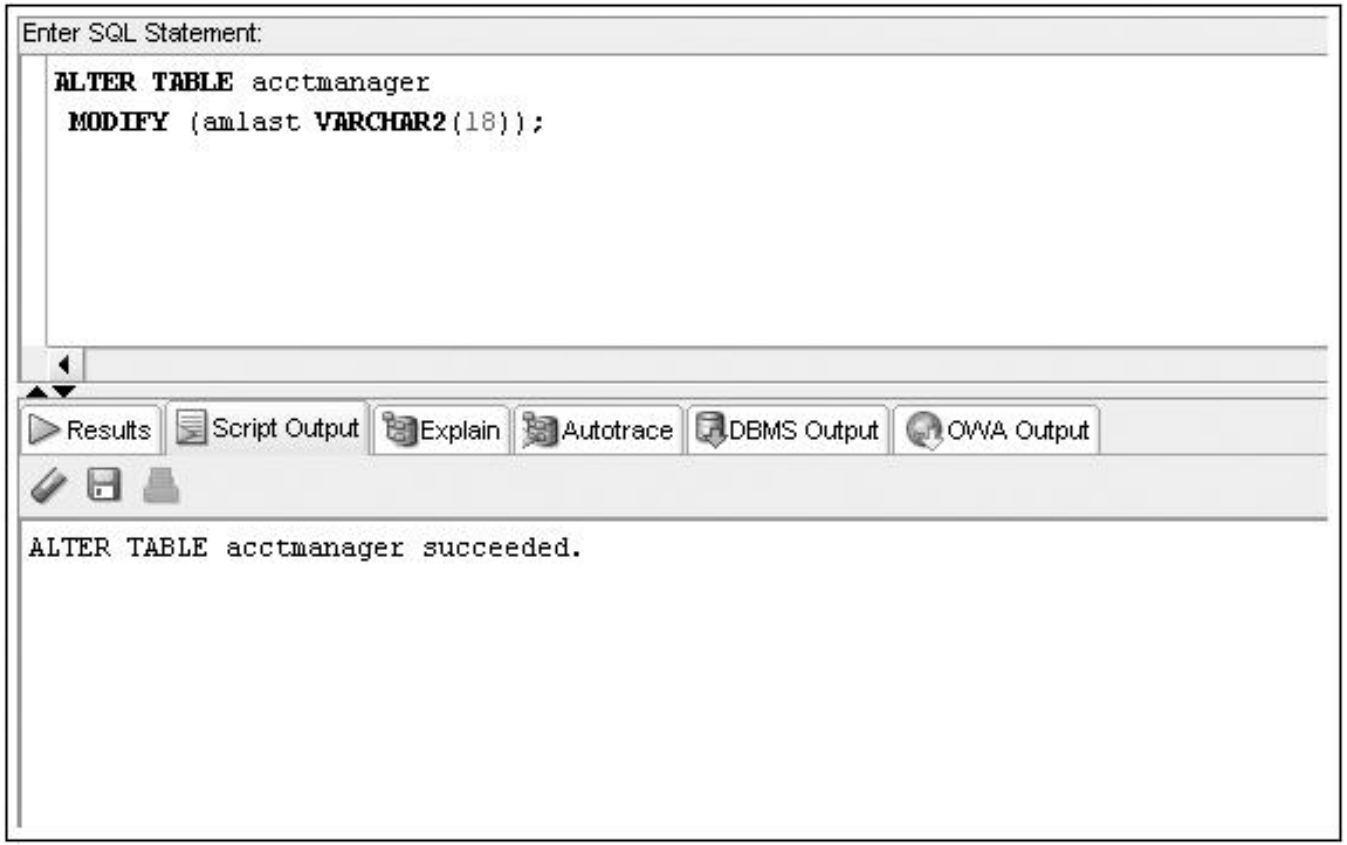
ALTER TABLE : ADD and MODIFY…





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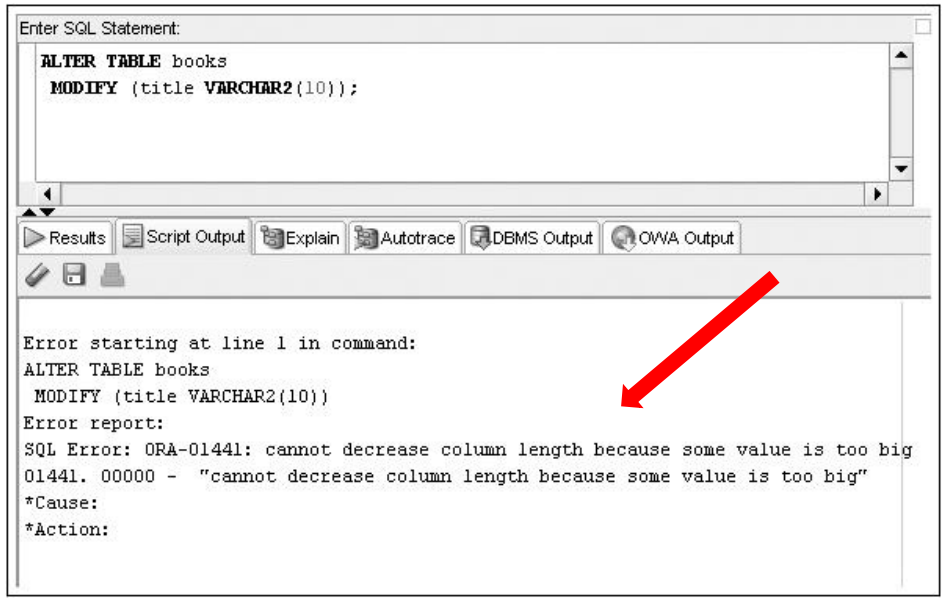
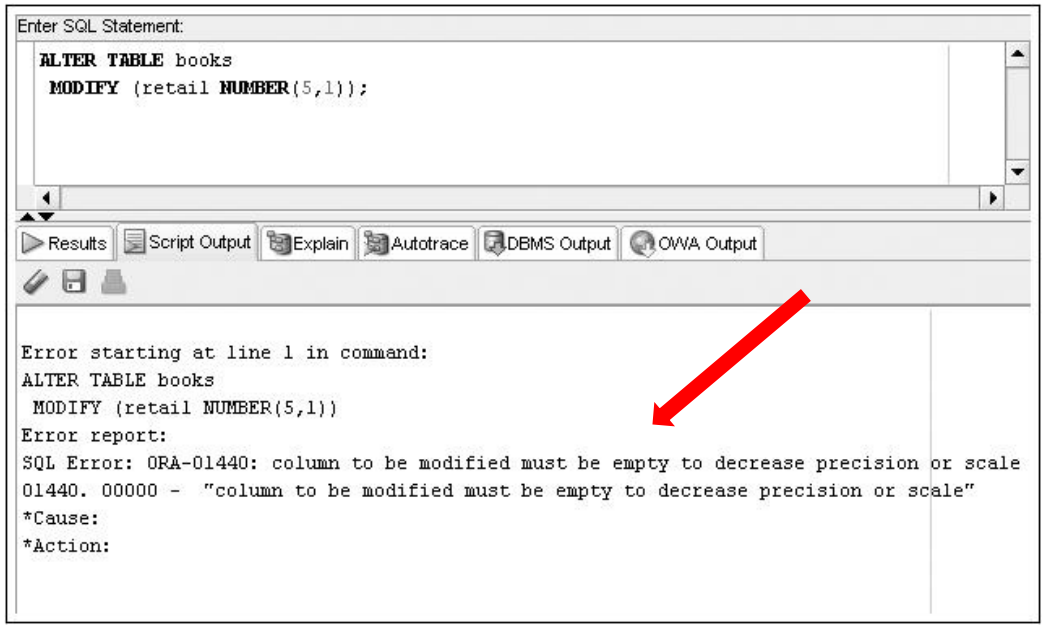
Important Note On MODIFY…

- DBMS Will Not Allow a MODIFY Condition That Jeopardizes the Integrity of the Data…
- Column Must Be As Wide As the Data Already in the Table…
- Adding or Changing Default Data Does NOT Affect Existing Data…





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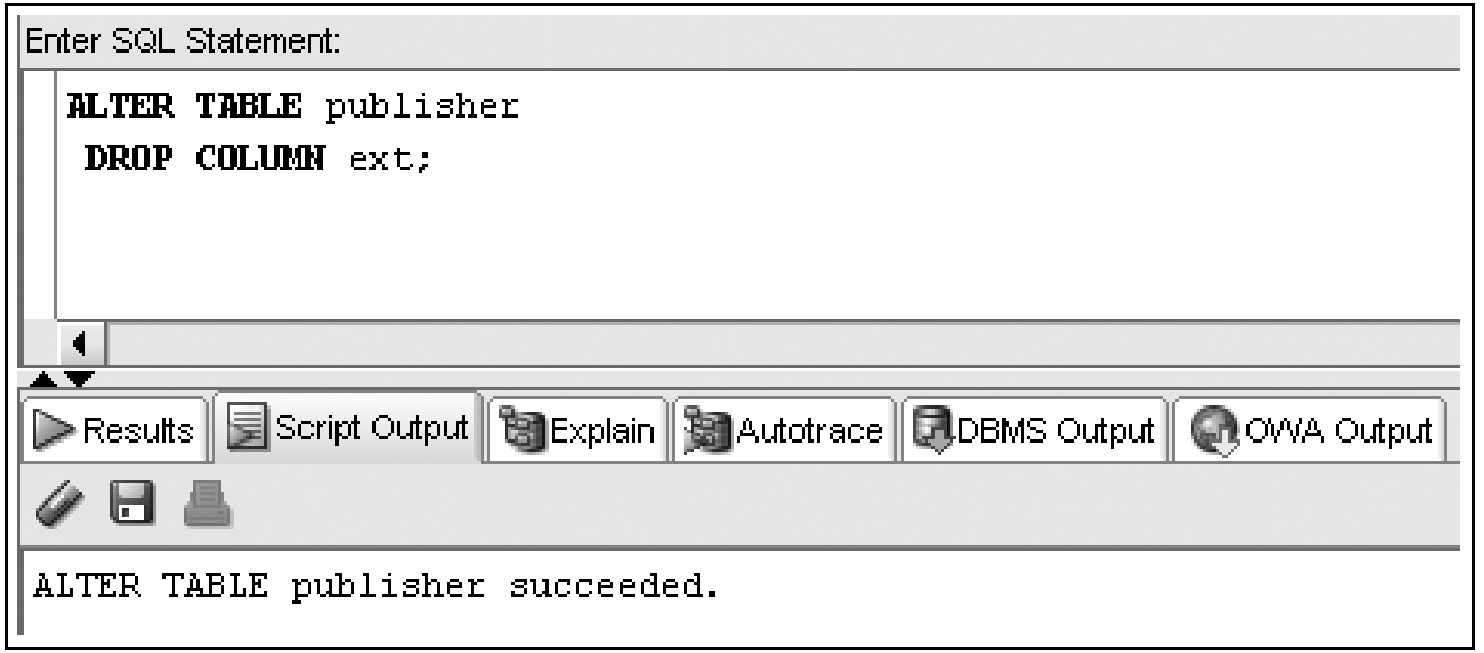
ALTER TABLE : DROP COLUMN…

- Can Only Reference One Column Per Execution…
- Deletion Is PERMANENT…
- Cannot Delete Last Remaining Column in a Table…
- Think About Using INVISIBLE First…Test Results…Then DROP…



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ALTER TABLE : SET UNUSED…

- Process of Dropping a Column From a Large Table Can Be Time and Resource Consuming…
- Typically, Drop the Column Logically First Using SET UNUSED…During Off-Peak Hours Drop the Unused Column Physically…

```
ALTER TABLE tablename
SET UNUSED (columnname);
     OR
ALTER TABLE tablename
SET UNUSED COLUMN columnname;
```

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

Renaming a Table…

- Use RENAME…TO When Renaming a Table…
- Old Name is No Longer Valid…YOU CANNOT ROLLBACK A RENAME STATEMENT…
- When Renaming a Table, Oracle Automatically Transfers Indexes, Constraints, and Grants on the Old Table to the New One…
- It Also Invalidates All Objects That Depend on the Renamed Table (i.e., Views, Stored Procedures, Function, Synonyms)…

Enter SQL Statement:

```
RENAME cust_mkt TO cust_mkt_092009;
```

Truncating and Deleting a Table…

- TRUNCATE : Rows Are Deleted…Structure Remains…
- Use DROP to Delete the Table Structure AND the Contents…
- Using DROP With the PURGE Clause Drops the Table and Reclaims the Space…
- Using DROP Without the PURGE Clause Allows You to Roll Back or Recover the Table From the Recycle Bin…
- Can Also Use DELETE to Remove Small Tables With Few Rows…

Enter SQL Statement:

```
TRUNCATE TABLE cust_mkt_092009;
```

Enter SQL Statement:

```
DROP TABLE cust_mkt_092009;
```

```
DROP TABLE cust_mktg_092009 PURGE;
```

Recovering a Table…

- Dropped Tables in the Recycle Bin Are Given a Different Name…
- Find the New Name of the Table…Use FLASHBACK to Restore the Table…

1

```
Enter SQL Statement:
TRUNCATE TABLE cust_mkt_092009;
```

ORIGINAL NAME

2

```
Enter SQL Statement:
DROP TABLE cust_mkt_092009;
```

DROP Without Purge Option

3

```
Enter SQL Statement:
SELECT object_name, original_name
 FROM recyclebin;
```

Results | Script Output | Explain | Autotrace | DBMS Output | OWA Output

Results:

	OBJECT_NAME	ORIGINAL_NAME
1	BIN$XBQID3hTTAWl+u+p5mhqhQ==$0	CUST_MKT_092009

NEW NAME ORIGINAL NAME

4

```
Enter SQL Statement:
FLASHBACK TABLE cust_mkt_092009
 TO BEFORE DROP;
```

ORIGINAL NAME

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Questions…

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