9

Creating and Managing Tables

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Schedule:	Timing	Topic
	30 minutes	Lecture
	20 minutes	Practice
	50 minutes	Total

Objectives

After completing this lesson, you should be able to do the following:

- **Describe the main database objects**
- **Create tables**
- **Describe the data types that can be used when specifying column definition**
- **Alter table definitions**
- **Drop, rename, and truncate tables**

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Lesson Aim

In this lesson, you learn about tables, the main database objects, and their relationships to each other. You also learn how to create, alter, and drop tables.

Database Objects

Object	Description
Table	Basic unit of storage; composed of rows and columns
View	Logically represents subsets of data from one or more tables
Sequence	Numeric value generator
Index	Improves the performance of some queries
Synonym	Gives alternative names to objects

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Database Objects

An Oracle database can contain multiple data structures. Each structure should be outlined in the database design so that it can be created during the build stage of database development.

- Table: Stores data
- View: Subset of data from one or more tables
- Sequence: Numeric value generator
- Index: Improves the performance of some queries
- Synonym: Gives alternative names to objects

Oracle9*i* Table Structures

- Tables can be created at any time, even while users are using the database.
- You do not need to specify the size of any table. The size is ultimately defined by the amount of space allocated to the database as a whole. It is important, however, to estimate how much space a table will use over time.
- Table structure can be modified online.

Note: More database objects are available but are not covered in this course.

Instructor Note

Tables can have up to 1,000 columns and must conform to standard database object-naming conventions.

Column definitions can be omitted when using the AS subquery clause. Tables are created without data unless a query is specified. Rows are usually added by using `INSERT` statements.

Naming Rules

Table names and column names:

- **Must begin with a letter**
- **Must be 1–30 characters long**
- **Must contain only A–Z, a–z, 0–9, _, $, and #**
- **Must not duplicate the name of another object owned by the same user**
- **Must not be an Oracle server reserved word**

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Naming Rules

Name database tables and columns according to the standard rules for naming any Oracle database object:

- Table names and column names must begin with a letter and be 1–30 characters long.
- Names must contain only the characters A–Z, a–z, 0–9, _ (underscore), $, and # (legal characters, but their use is discouraged).
- Names must not duplicate the name of another object owned by the same Oracle server user.
- Names must not be an Oracle server reserved word.

Naming Guidelines

Use descriptive names for tables and other database objects.

Note: Names are case insensitive. For example, `EMPLOYEES` is treated as the same name as `eMPloyees` or `eMpLOYEES`.

For more information, see *Oracle9i SQL Reference*,"Object Names and Qualifiers."

The CREATE TABLE Statement

- **You must have:**
  - **CREATE TABLE privilege**
  - **A storage area**

```
CREATE TABLE [schema.]table
             (column datatype [DEFAULT expr][, ...]);
```

- **You specify:**
  - **Table name**
  - **Column name, column data type, and column size**

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The CREATE TABLE Statement

Create tables to store data by executing the SQL CREATE TABLE statement. This statement is one of the data definition language (DDL) statements, that are covered in subsequent lessons. DDL statements are a subset of SQL statements used to create, modify, or remove Oracle9*i* database structures. These statements have an immediate effect on the database, and they also record information in the data dictionary.

To create a table, a user must have the CREATE TABLE privilege and a storage area in which to create objects. The database administrator uses data control language (DCL) statements, which are covered in a later lesson, to grant privileges to users.

In the syntax:

schema	is the same as the owner's name
table	is the name of the table
DEFAULT *expr*	specifies a default value if a value is omitted in the INSERT statement
column	is the name of the column
datatype	is the column's data type and length

Instructor Note

Please read the Instructor note on page 9-37

Referencing Another User's Tables

- **Tables belonging to other users are not in the user's schema.**
- **You should use the owner's name as a prefix to those tables.**

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Referencing Another User's Tables

A *schema* is a collection of objects. Schema objects are the logical structures that directly refer to the data in a database. Schema objects include tables, views, synonyms, sequences, stored procedures, indexes, clusters, and database links.

If a table does not belong to the user, the owner's name must be prefixed to the table. For example, if there is a schema named USER_B, and USER_B has an EMPLOYEES table, then specify the following to retrieve data from that table:

```
SELECT *
FROM   user_b.employees;
```

The DEFAULT Option

- **Specify a default value for a column during an insert.**

```
... hire_date DATE DEFAULT SYSDATE, ...
```

- **Literal values, expressions, or SQL functions are legal values.**
- **Another column's name or a pseudocolumn are illegal values.**
- **The default data type must match the column data type.**

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The DEFAULT Option

A column can be given a default value by using the DEFAULT option. This option prevents null values from entering the columns if a row is inserted without a value for the column. The default value can be a literal, an expression, or a SQL function, such as SYSDATE and USER, but the value cannot be the name of another column or a pseudocolumn, such as NEXTVAL or CURRVAL. The default expression must match the data type of the column.

Note: CURRVAL and NEXTVAL are explained later.

Instructor Note

Here is an example for a pseudocolumn. For each row returned by a query, the ROWNUM pseudocolumn returns a number indicating the order in which Oracle server selects the row from a table or set of joined rows. The first row selected has a ROWNUM of 1, the second has 2, and so on.

The default value works with the DEFAULT keyword for INSERT and UPDATE statements discussed in the "Manipulating Data" lesson.

Creating Tables

- **Create the table.**

```
CREATE TABLE dept
            (deptno NUMBER(2),
             dname  VARCHAR2(14),
             loc    VARCHAR2(13));
Table created.
```

- **Confirm table creation.**

```
DESCRIBE dept
```

Name	Null?	Type
DEPTNO		NUMBER(2)
DNAME		VARCHAR2(14)
LOC		VARCHAR2(13)

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Creating Tables

The example on the slide creates the DEPT table, with three columns: DEPTNO, DNAME, and LOC. It further confirms the creation of the table by issuing the DESCRIBE command.

Since creating a table is a DDL statement, an automatic commit takes place when this statement is executed.

Instructor Note

Explain that additional syntax for CREATE TABLE could include constraints and so on. For more information on the CREATE TABLE syntax, refer to: *Oracle9i SQL Reference,* "CREATE TABLE."

Tables in the Oracle Database

- **User Tables:**
  - **Are a collection of tables created and maintained by the user**
  - **Contain user information**
- **Data Dictionary:**
  - **Is a collection of tables created and maintained by the Oracle Server**
  - **Contain database information**

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Tables in the Oracle Database

User tables are tables created by the user, such as EMPLOYEES. There is another collection of tables and views in the Oracle database known as the *data dictionary*. This collection is created and maintained by the Oracle server and contains information about the database.

All data dictionary tables are owned by the SYS user. The base tables are rarely accessed by the user because the information in them is not easy to understand. Therefore, users typically access data dictionary views because the information is presented in a format that is easier to understand. Information stored in the data dictionary includes names of the Oracle server users, privileges granted to users, database object names, table constraints, and auditing information.

There are four categories of data dictionary views; each category has a distinct prefix that reflects its intended use.

Prefix	Description
USER_	These views contain information about objects owned by the user
ALL_	These views contain information about all of the tables (object tables and relational tables) accessible to the user.
DBA_	These views are restricted views, which can be accessed only by people who have been assigned the DBA role.
V$	These views are dynamic performance views, database server performance, memory, and locking.

Querying the Data Dictionary

- See the names of tables owned by the user.

```
SELECT table_name
FROM   user_tables ;
```

- View distinct object types owned by the user.

```
SELECT DISTINCT object_type
FROM   user_objects ;
```

- View tables, views, synonyms, and sequences owned by the user.

```
SELECT *
FROM   user_catalog ;
```

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Querying the Data Dictionary

You can query the data dictionary tables to view various database objects owned by you. The data dictionary tables frequently used are these:

- USER_TABLES
- USER_OBJECTS
- USER_CATALOG

Note: USER_CATALOG has a synonym called CAT. You can use this synonym instead of USER_CATALOG in SQL statements.

```
SELECT  *
FROM    CAT;
```

Data Types

Data Type	Description
VARCHAR2(*size*)	Variable-length character data
CHAR(*size*)	Fixed-length character data
NUMBER(*p,s*)	Variable-length numeric data
DATE	Date and time values
LONG	Variable-length character data up to 2 gigabytes
CLOB	Character data up to 4 gigabytes
RAW and LONG RAW	Raw binary data
BLOB	Binary data up to 4 gigabytes
BFILE	Binary data stored in an external file; up to 4 gigabytes
ROWID	A 64 base number system representing the unique address of a row in its table.

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Data Types

Data type	Description
VARCHAR2(*size*)	Variable-length character data (a maximum *size* must be specified: Minimum *size* is 1; maximum *size* is 4000)
CHAR [(*size*)]	Fixed-length character data of length *size* bytes (default and minimum *size* is 1; maximum *size* is 2000)
NUMBER [(*p,s*)]	Number having precision *p* and scale *s* (The precision is the total number of decimal digits, and the scale is the number of digits to the right of the decimal point; the precision can range from 1 to 38 and the scale can range from -84 to 127)
DATE	Date and time values to the nearest second between January 1, 4712 B.C., and December 31, 9999 A.D.
LONG	Variable-length character data up to 2 gigabytes
CLOB	Character data up to 4 gigabytes

Data type	Description
RAW(*size*)	Raw binary data of length *size* (a maximum *size* must be specified. maximum *size* is 2000)
LONG RAW	Raw binary data of variable length up to 2 gigabytes
BLOB	Binary data up to 4 gigabytes
BFILE	Binary data stored in an external file; up to 4 gigabytes
ROWID	A 64 base number system representing the unique address of a row in its table.

- A LONG column is not copied when a table is created using a subquery.
- A LONG column cannot be included in a GROUP BY or an ORDER BY clause.
- Only one LONG column can be used per table.
- No constraints can be defined on a LONG column.
- You may want to use a CLOB column rather than a LONG column.

Instructor Note

Oracle8 introduced large object (LOB) data types that can store large and unstructured data such as text, image, video, and spatial data, up to 4 gigabytes in size. In Oracle9*i*, LONG columns can be easily migrated to LOB columns. Refer students to *Oracle9i Migration Release 9.0.1 Guide.*

Instructor Note (for page 9-13)

The date and time data types shown on the next page are new to release Oracle9*i*.

DateTime Data Types

Datetime enhancements with Oracle9*i*:

- **New Datetime data types have been introduced.**
- **New data type storage is available.**
- **Enhancements have been made to time zones and local time zone.**

Data Type	Description
`TIMESTAMP`	Date with fractional seconds
`INTERVAL YEAR TO MONTH`	Stored as an interval of years and months
`INTERVAL DAY TO SECOND`	Stored as an interval of days to hours minutes and seconds

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Other DateTime Data Types

Data Type	Description
`TIMESTAMP`	Allows the time to be stored as a date with fractional seconds. There are several variations of the data type.
`INTERVAL YEAR TO MONTH`	Allows time to be stored as an interval of years and months. Used to represent the difference between two datetime values, where the only significant portions are the year and month.
`INTERVAL DAY TO SECOND`	Allows time to be stored as an interval of days to hours, minutes, and seconds. Useful in representing the precise difference between two datetime values.

DateTime Data Types

- The TIMESTAMP data type is an extension of the DATE data type.
- It stores the year, month, and day of the DATE data type, plus hour, minute, and second values as well as the fractional second value.
- The TIMESTAMP data type is specified as follows:

```
TIMESTAMP[(fractional_seconds_precision)]
```

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DateTime Data Types

The fractional_seconds_precision optionally specifies the number of digits in the fractional part of the SECOND datetime field and can be a number in the range 0 to 9. The default is 6.

Example

```
CREATE TABLE new_employees
(employee_id NUMBER,
 first_name VARCHAR2(15),
 last_name VARCHAR2(15),
 ...
 start_date TIMESTAMP(7),
 ...);
```

In the preceding example, we are creating a table NEW_EMPLOYEES with a column start_date with a data type of TIMESTAMP. The precision of '7' indicates the fractional seconds precision which if not specified defaults to '6'.

Assume that two rows are inserted into the NEW_EMPLOYEES table. The output shows the differences in the display. (A DATE data type defaults to display the format of DD-MON-RR):

```
SELECT start_date
FROM   new_employees;

17-JUN-87 12.00.00.000000 AM
21-SEP-89 12.00.00.000000 AM
```

TIMESTAMP WITH TIME ZONE Data Type

- **TIMESTAMP WITH TIME ZONE is a variant of TIMESTAMP that includes a time zone displacement in its value.**
- **The time zone displacement is the difference, in hours and minutes, between local time and UTC.**

```
TIMESTAMP[(fractional_seconds_precision)]
WITH TIME ZONE
```

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Datetime Data Types

UTC stands for Coordinated Universal Time—formerly Greenwich Mean Time. Two `TIMESTAMP WITH TIME ZONE` values are considered identical if they represent the same instant in UTC, regardless of the `TIME ZONE` offsets stored in the data.

Because `TIMESTAMP WITH TIME ZONE` can also store time zone information, it is particularly suited for recording date information that must be gathered or coordinated across geographic regions.

For example,

```
TIMESTAMP '1999-04-15 8:00:00 -8:00'
```

is the same as

```
TIMESTAMP '1999-04-15 11:00:00 -5:00'
```

That is, 8:00 a.m. Pacific Standard Time is the same as 11:00 a.m. Eastern Standard Time.

This can also be specified as

```
TIMESTAMP '1999-04-15 8:00:00 US/Pacific'
```

Note: `fractional_seconds_precision` optionally specifies the number of digits in the fractional part of the `SECOND` datetime field and can be a number in the range 0 to 9. The default is 6.

TIMESTAMP WITH LOCAL TIME Data Type

- **TIMESTAMP WITH LOCAL TIME ZONE is another variant of TIMESTAMP that includes a time zone displacement in its value.**
- **Data stored in the database is normalized to the database time zone.**
- **The time zone displacement is not stored as part of the column data; Oracle returns the data in the users' local session time zone.**
- **TIMESTAMP WITH LOCAL TIME ZONE data type is specified as follows:**

```
TIMESTAMP[(fractional_seconds_precision)]
WITH LOCAL TIME ZONE
```

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DateTime Data Types

Unlike TIMESTAMP WITH TIME ZONE, you can specify columns of type TIMESTAMP WITH LOCAL TIME ZONE as part of a primary or unique key. The time zone displacement is the difference (in hours and minutes) between local time and UTC. There is no literal for TIMESTAMP WITH LOCAL TIME ZONE.

Note: fractional_seconds_precision optionally specifies the number of digits in the fractional part of the SECOND datetime field and can be a number in the range 0 to 9. The default is 6.

Example

```
CREATE TABLE time_example
 (order_date TIMESTAMP WITH LOCAL TIME ZONE);

INSERT INTO time_example VALUES('15-NOV-00 09:34:28 AM');

SELECT *
FROM   time_example;

order_date
---------------------------
15-NOV-00 09.34.28.000000 AM
```

The TIMESTAMP WITH LOCAL TIME ZONE type is appropriate for two-tier applications where you want to display dates and times using the time zone of the client system.

INTERVAL YEAR TO MONTH Data Type

- **INTERVAL YEAR TO MONTH stores a period of time using the YEAR and MONTH datetime fields.**

```
INTERVAL YEAR [(year_precision)] TO MONTH
```

```
INTERVAL '123-2' YEAR(3) TO MONTH
Indicates an interval of 123 years, 2 months.

INTERVAL '123' YEAR(3)
Indicates an interval of 123 years 0 months.

INTERVAL '300' MONTH(3)
Indicates an interval of 300 months.

INTERVAL '123' YEAR
Returns an error, because the default precision is 2,
and '123' has 3 digits.
```

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INTERVAL YEAR TO MONTH Data Type

INTERVAL YEAR TO MONTH stores a period of time using the YEAR and MONTH datetime fields.

Use INTERVAL YEAR TO MONTH to represent the difference between two datetime values, where the only significant portions are the year and month. For example, you might use this value to set a reminder for a date 120 months in the future, or check whether 6 months have elapsed since a particular date.

Specify INTERVAL YEAR TO MONTH as follows:

```
INTERVAL YEAR [(year_precision)] TO MONTH
```

In the syntax:

year_precision is the number of digits in the YEAR datetime field. The default value of year_precision is 2.

Example

```
CREATE TABLE time_example2
(loan_duration INTERVAL YEAR (3) TO MONTH);

INSERT INTO time_example2 (loan_duration)
VALUES (INTERVAL '120' MONTH(3));

SELECT TO_CHAR( sysdate+loan_duration, 'dd-mon-yyyy')
FROM   time_example2;            --today's date is 26-Sep-2001
```

TO_CHAR(SYS
26-sep-2011

INTERVAL DAY TO SECOND Data Type

- **INTERVAL DAY TO SECOND stores a period of time in terms of days, hours, minutes, and seconds.**

```
INTERVAL DAY [(day_precision)]
   TO SECOND [(fractional_seconds_precision)]
```

```
INTERVAL '4 5:12:10.222' DAY TO SECOND(3)
Indicates 4 days, 5 hours, 12 minutes, 10 seconds,
and 222 thousandths of a second.INTERVAL '123' YEAR(3).

INTERVAL '7' DAY
Indicates 7 days.

INTERVAL '180' DAY(3)
Indicates 180 days.
```

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INTERVAL DAY TO SECOND Data Type

INTERVAL DAY TO SECOND stores a period of time in terms of days, hours, minutes, and seconds.

Use INTERVAL DAY TO SECOND to represent the precise difference between two datetime values. For example, you might use this value to set a reminder for a time 36 hours in the future, or to record the time between the start and end of a race. To represent long spans of time, including multiple years, with high precision, you can use a large value for the days portion.

Specify INTERVAL DAY TO SECOND as follows:

```
INTERVAL DAY [(day_precision)]
TO SECOND [(fractional_seconds_precision)]
```

In the syntax:

day_precision	is the number of digits in the DAY datetime field. Accepted values are 0 to 9. The default is 2.
fractional_seconds_precision	is the number of digits in the fractional part of the SECOND datetime field. Accepted values are 0 to 9. The default is 6.

INTERVAL DAY TO SECOND Data Type

- **INTERVAL DAY TO SECOND stores a period of time in terms of days, hours, minutes, and seconds.**

```
INTERVAL '4 5:12:10.222' DAY TO SECOND(3)
Indicates 4 days, 5 hours, 12 minutes, 10 seconds,
and 222 thousandths of a second.

INTERVAL '4 5:12' DAY TO MINUTE
Indicates 4 days, 5 hours and 12 minutes.

INTERVAL '400 5' DAY(3) TO HOUR
Indicates 400 days 5 hours.

INTERVAL '11:12:10.2222222' HOUR TO SECOND(7)
indicates 11 hours, 12 minutes, and 10.2222222 seconds.
```

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INTERVAL DAY TO SECOND Data Type

Example

```
CREATE TABLE time_example3
(day_duration INTERVAL DAY (3) TO SECOND);

INSERT INTO time_example3 (day_duration)
VALUES (INTERVAL '180' DAY(3));

SELECT sysdate + day_duration "Half Year"
FROM   time_example3;        --today's date is 26-Sep-2001
```

Half Year
25-MAR-02

Creating a Table by Using a Subquery Syntax

- **Create a table and insert rows by combining the `CREATE TABLE` statement and the `AS subquery` option.**

```
CREATE TABLE table
       [(column, column...)]
AS subquery;
```

- **Match the number of specified columns to the number of subquery columns.**
- **Define columns with column names and default values.**

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Creating a Table from Rows in Another Table

A second method for creating a table is to apply the AS *subquery* clause, which both creates the table and inserts rows returned from the subquery.

In the syntax:

table	is the name of the table
column	is the name of the column, default value, and integrity constraint
subquery	is the SELECT statement that defines the set of rows to be inserted into the new table

Guidelines

- The table is created with the specified column names, and the rows retrieved by the SELECT statement are inserted into the table.
- The column definition can contain only the column name and default value.
- If column specifications are given, the number of columns must equal the number of columns in the subquery SELECT list.
- If no column specifications are given, the column names of the table are the same as the column names in the subquery.
- The integrity rules are not passed onto the new table, only the column data type definitions.

Creating a Table by Using a Subquery

```
CREATE TABLE dept80
  AS
    SELECT  employee_id, last_name,
            salary*12 ANNSAL,
            hire_date
    FROM    employees
    WHERE   department_id = 80;
Table created.
```

```
 DESCRIBE dept80
```

Name	Null?	Type
EMPLOYEE_ID		NUMBER(6)
LAST_NAME	NOT NULL	VARCHAR2(25)
ANNSAL		NUMBER
HIRE_DATE	NOT NULL	DATE

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Creating a Table from Rows in Another Table (continued)

The slide example creates a table named DEPT80, which contains details of all the employees working in department 80. Notice that the data for the DEPT80 table comes from the EMPLOYEES table.

You can verify the existence of a database table and check column definitions by using the *i*SQL*Plus DESCRIBE command.

Be sure to give a column alias when selecting an expression. The expression SALARY*12 is given the alias ANNSAL. Without the alias, this error is generated:

```
ERROR at line 3:
ORA-00998: must name this expression with a column alias
```

Instructor Note

To create a table with the same structure as an existing table, but without the data from the existing table, use a subquery with a WHERE clause that always evaluates as false. For example:

```
 CREATE TABLE COPY_TABLE AS
(SELECT *
 FROM   employees
 WHERE  1 = 2);
```

The ALTER TABLE Statement

Use the ALTER TABLE statement to:

- **Add a new column**
- **Modify an existing column**
- **Define a default value for the new column**
- **Drop a column**

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The ALTER TABLE Statement

After you create a table, you may need to change the table structure because: you omitted a column, your column definition needs to be changed, or you need to remove columns. You can do this by using the ALTER TABLE statement.

The ALTER TABLE Statement

Use the ALTER TABLE statement to add, modify, or drop columns.

```
ALTER TABLE table
ADD         (column datatype [DEFAULT expr]
            [, column datatype]...);
```

```
ALTER TABLE table
MODIFY      (column datatype [DEFAULT expr]
            [, column datatype]...);
```

```
ALTER TABLE table
DROP       (column);
```

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The ALTER TABLE Statement (continued)

You can add, modify, and drop columns to a table by using the ALTER TABLE statement.

In the syntax:

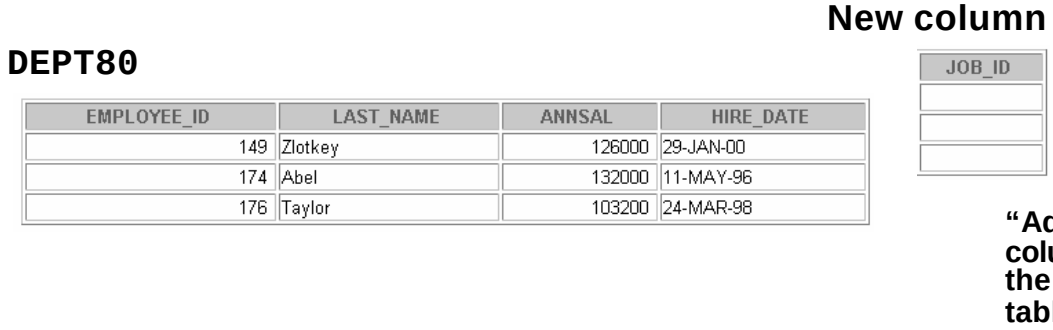
table	is the name of the table
ADD|MODIFY|DROP	is the type of modification
column	is the name of the new column
datatype	is the data type and length of the new column
DEFAULT *expr*	specifies the default value for a new column

Note: The slide gives the abridged syntax for ALTER TABLE. More about ALTER TABLE is covered in a subsequent lesson.

Instructor Note

In Oracle8*i* and later, there are new options for the ALTER TABLE command, including the ability to drop a column from a table, which are covered later in this lesson.

Adding a Column



Adding a Column

The graphic adds the `JOB_ID` column to the `DEPT80` table. Notice that the new column becomes the last column in the table.

Adding a Column

- **You use the ADD clause to add columns.**

```
ALTER TABLE dept80
ADD         (job_id VARCHAR2(9));
Table altered.
```

- **The new column becomes the last column.**

EMPLOYEE_ID	LAST_NAME	ANNSAL	HIRE_DATE	JOB_ID
149	Zlotkey	126000	29-JAN-00	
174	Abel	132000	11-MAY-96	
176	Taylor	103200	24-MAR-98	

Guidelines for Adding a Column

- You can add or modify columns.
- You cannot specify where the column is to appear. The new column becomes the last column.

The example on the slide adds a column named `JOB_ID` to the `DEPT80` table. The `JOB_ID` column becomes the last column in the table.

Note: If a table already contains rows when a column is added, then the new column is initially null for all the rows.

Modifying a Column

- **You can change a column's data type, size, and default value.**

```
ALTER TABLE   dept80
MODIFY        (last_name VARCHAR2(30));
Table altered.
```

- **A change to the default value affects only subsequent insertions to the table.**

Modifying a Column

You can modify a column definition by using the ALTER TABLE statement with the MODIFY clause. Column modification can include changes to a column's data type, size, and default value.

Guidelines

- You can increase the width or precision of a numeric column.
- You can increase the width of numeric or character columns.
- You can decrease the width of a column only if the column contains only null values or if the table has no rows.
- You can change the data type only if the column contains null values.
- You can convert a CHAR column to the VARCHAR2 data type or convert a VARCHAR2 column to the CHAR data type only if the column contains null values or if you do not change the size.
- A change to the default value of a column affects only subsequent insertions to the table.

Dropping a Column

Use the DROP COLUMN clause to drop columns you no longer need from the table.

```
ALTER TABLE  dept80
DROP COLUMN  job_id;
Table altered.
```

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Dropping a Column

You can drop a column from a table by using the ALTER TABLE statement with the DROP COLUMN clause. This is a feature available in Oracle8*i* and later.

Guidelines

- The column may or may not contain data.
- Using the ALTER TABLE statement, only one column can be dropped at a time.
- The table must have at least one column remaining in it after it is altered.
- Once a column is dropped, it cannot be recovered.

Instructor Note

When a column is dropped from a table, any other columns in that table that are marked with the SET UNUSED option are dropped too.

The SET UNUSED Option

- You use the SET UNUSED option to mark one or more columns as unused.
- You use the DROP UNUSED COLUMNS option to remove the columns that are marked as unused.

```
ALTER TABLE   table
SET   UNUSED (column);
OR
ALTER TABLE  table
SET   UNUSED COLUMN column;
```

```
ALTER TABLE table
DROP  UNUSED COLUMNS;
```

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The SET UNUSED Option

The SET UNUSED option marks one or more columns as unused so that they can be dropped when the demand on system resources is lower. This is a feature available in Oracle8*i* and later. Specifying this clause does not actually remove the target columns from each row in the table (that is, it does not restore the disk space used by these columns). Therefore, the response time is faster than if you executed the DROP clause. Unused columns are treated as if they were dropped, even though their column data remains in the table's rows. After a column has been marked as unused, you have no access to that column. A SELECT * query will not retrieve data from unused columns. In addition, the names and types of columns marked unused will not be displayed during a DESCRIBE, and you can add to the table a new column with the same name as an unused column. SET UNUSED information is stored in the USER_UNUSED_COL_TABS dictionary view.

The DROP UNUSED COLUMNS Option

DROP UNUSED COLUMNS removes from the table all columns currently marked as unused. You can use this statement when you want to reclaim the extra disk space from unused columns in the table. If the table contains no unused columns, the statement returns with no errors.

```
ALTER TABLE  dept80
SET   UNUSED (last_name);
Table altered.

ALTER TABLE  dept80
DROP  UNUSED COLUMNS;
Table altered.
```

Dropping a Table

- **All data and structure in the table is deleted.**
- **Any pending transactions are committed.**
- **All indexes are dropped.**
- **You *cannot* roll back the `DROP TABLE` statement.**

```
DROP TABLE dept80;
Table dropped.
```

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Dropping a Table

The `DROP TABLE` statement removes the definition of an Oracle table. When you drop a table, the database loses all the data in the table and all the indexes associated with it.

Syntax

```
DROP TABLE table
```

In the syntax:

table is the name of the table

Guidelines

- All data is deleted from the table.
- Any views and synonyms remain but are invalid.
- Any pending transactions are committed.
- Only the creator of the table or a user with the `DROP ANY TABLE` privilege can remove a table.

Note: The `DROP TABLE` statement, once executed, is irreversible. The Oracle server does not question the action when you issue the `DROP TABLE` statement. If you own that table or have a high-level privilege, then the table is immediately removed. As with all DDL statements, `DROP TABLE` is committed automatically.

Changing the Name of an Object

- **To change the name of a table, view, sequence, or synonym, you execute the RENAME statement.**

```
RENAME dept TO detail_dept;
Table renamed.
```

- **You must be the owner of the object.**

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Renaming a Table

Additional DDL statements include the RENAME statement, which is used to rename a table, view, sequence, or a synonym.

Syntax

```
RENAME    old_name  TO  new_name;
```

In the syntax:

old_name	is the old name of the table, view, sequence, or synonym.
new_name	is the new name of the table, view, sequence, or synonym.

You must be the owner of the object that you rename.

Truncating a Table

- **The TRUNCATE TABLE statement:**
  - **Removes all rows from a table**
  - **Releases the storage space used by that table**

```
TRUNCATE TABLE detail_dept;
Table truncated.
```

- **You cannot roll back row removal when using TRUNCATE.**
- **Alternatively, you can remove rows by using the DELETE statement.**

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Truncating a Table

Another DDL statement is the TRUNCATE TABLE statement, which is used to remove all rows from a table and to release the storage space used by that table. When using the TRUNCATE TABLE statement, you cannot roll back row removal.

Syntax

```
TRUNCATE  TABLE  table;
```

In the syntax:

table	is the name of the table

You must be the owner of the table or have DELETE TABLE system privileges to truncate a table.

The DELETE statement can also remove all rows from a table, but it does not release storage space. The TRUNCATE command is faster. Removing rows with the TRUNCATE statement is faster than removing them with the DELETE statement for the following reasons:

- The TRUNCATE statement is a data definition language (DDL) statement and generates no rollback information.
- Truncating a table does not fire the delete triggers of the table.
- If the table is the parent of a referential integrity constraint, you cannot truncate the table. Disable the constraint before issuing the TRUNCATE statement.

Adding Comments to a Table

- You can add comments to a table or column by using the COMMENT statement.

```
COMMENT ON TABLE employees
IS 'Employee Information';
Comment created.
```

- Comments can be viewed through the data dictionary views:
  - ALL_COL_COMMENTS
  - USER_COL_COMMENTS
  - ALL_TAB_COMMENTS
  - USER_TAB_COMMENTS

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Adding a Comment to a Table

You can add a comment of up to 2,000 bytes about a column, table, view, or snapshot by using the COMMENT statement. The comment is stored in the data dictionary and can be viewed in one of the following data dictionary views in the COMMENTS column:

- ALL_COL_COMMENTS
- USER_COL_COMMENTS
- ALL_TAB_COMMENTS
- USER_TAB_COMMENTS

Syntax

```
COMMENT ON TABLE table | COLUMN table.column
  IS 'text';
```

In the syntax:

table	is the name of the table
column	is the name of the column in a table
text	is the text of the comment

You can drop a comment from the database by setting it to empty string (''):

```
COMMENT ON TABLE  employees IS ' ';
```

Summary

In this lesson, you should have learned how to use DDL statements to create, alter, drop, and rename tables.

Statement	Description
CREATE TABLE	Creates a table
ALTER TABLE	Modifies table structures
DROP TABLE	Removes the rows and table structure
RENAME	Changes the name of a table, view, sequence, or synonym
TRUNCATE	Removes all rows from a table and releases the storage space
COMMENT	Adds comments to a table or view

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Summary

In this lesson, you should have learned how to use DDL commands to create, alter, drop, and rename tables. You also learned how to truncate a table and add comments to a table.

CREATE TABLE

- Create a table.
- Create a table based on another table by using a subquery.

ALTER TABLE

- Modify table structures.
- Change column widths, change column data types, and add columns.

DROP TABLE

- Remove rows and a table structure.
- Once executed, this statement cannot be rolled back.

RENAME

- Rename a table, view, sequence, or synonym.

TRUNCATE

- Remove all rows from a table and release the storage space used by the table.
- The DELETE statement removes only rows.

COMMENT

- Add a comment to a table or a column.
- Query the data dictionary to view the comment.

Practice 9 Overview

This practice covers the following topics:

- **Creating new tables**
- **Creating a new table by using the `CREATE TABLE AS` syntax**
- **Modifying column definitions**
- **Verifying that the tables exist**
- **Adding comments to tables**
- **Dropping tables**
- **Altering tables**

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Practice 9 Overview

Create new tables by using the CREATE TABLE statement. Confirm that the new table was added to the database. Create the syntax in the command file, and then execute the command file to create the table.

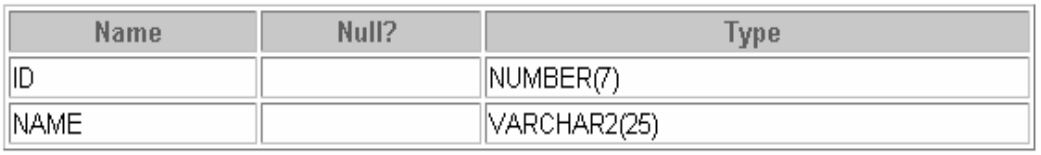
Instructor Note

Explain what a table instance chart is. Tell students how to interpret a table instance chart. Explain that they need to look out for the entries in the Column Name, Data Type, and Length fields. The other entries are optional, and if these entries exist, they are constraints that need to be incorporated as a part of the table definition.

Point out to students that the practices are based on the tables that they are creating exclusively for this lesson. They need to be careful not to alter the other tables in the schema.

1. Create the DEPT table based on the following table instance chart. Place the syntax in a script called lab9_1.sql, then execute the statement in the script to create the table. Confirm that the table is created.

Column Name	ID	NAME
Key Type		
Nulls/Unique		
FK Table		
FK Column		
Data type	NUMBER	VARCHAR2
Length	7	25

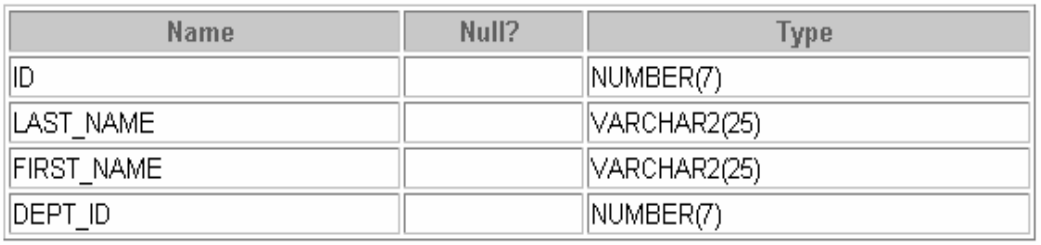
2. 

Name	Null?	Type
ID		NUMBER(7)
NAME		VARCHAR2(25)

s that you need.

3. Create the EMP table based on the following table instance chart. Place the syntax in a script called lab9_3.sql, and then execute the statement in the script to create the table. Confirm that the table is created.

Column Name	ID	LAST_NAME	FIRST_NAME	DEPT_ID
Key Type				
Nulls/Unique				
FK Table				
FK Column				
Data type	NUMBER	VARCHAR2	VARCHAR2	NUMBER
Length	7	25	25	7



Name	Null?	Type
ID		NUMBER(7)
LAST_NAME		VARCHAR2(25)
FIRST_NAME		VARCHAR2(25)
DEPT_ID		NUMBER(7)

Practice 9 (continued)

4. Modify the EMP table to allow for longer employee last names. Confirm your modification.

Name	Null?	Type
ID		NUMBER(7)
LAST_NAME		VARCHAR2(50)
FIRST_NAME		VARCHAR2(25)
DEPT_ID		NUMBER(7)

5. Confirm that both the DEPT and EMP tables are stored in the data dictionary. (*Hint:* USER_TABLES)

TABLE_NAME
DEPT
EMP

6. Create the EMP EMPLOYEES2 table based on the structure of the EMP EMPLOYEES table. Include only the EMPLOYEE_ID, FIRST_NAME, LAST_NAME, SALARY, and DEPARTMENT_ID columns. Name the columns in your new table ID, FIRST_NAME, LAST_NAME, SALARY, and DEPT_ID, respectively.
7. Drop the EMP table.
8. Rename the EMPLOYEES2 table as EMP.
9. Add a comment to the DEPT and EMP table definitions describing the tables. Confirm your additions in the data dictionary.
10. Drop the FIRST_NAME column from the EMP table. Confirm your modification by checking the description of the table.
11. In the EMP table, mark the DEPT_ID column in the EMP table as UNUSED. Confirm your modification by checking the description of the table.
12. Drop all the UNUSED columns from the EMP table. Confirm your modification by checking the description of the table.

There is an option, CREATE GLOBAL TEMPORARY TABLE, that identifies a table as temporary and visible to all sessions. The data in a temporary table is visible only to the session that inserts data into the table.

A temporary table has a definition that persists like the definitions of regular tables, but it contains either session-specific or transaction-specific data. You specify whether the data is session- or transaction-specific with the ON COMMIT keywords. Temporary tables use temporary segments. Unlike permanent tables, temporary tables and their indexes do not automatically allocate a segment when they are created. Instead, segments are allocated when the first INSERT (or CREATE TABLE AS SELECT) statement is performed. This means that if a SELECT, UPDATE, or DELETE statement is performed before the first INSERT, then the table appears to be empty. You can perform DDL commands (ALTER TABLE, DROP TABLE, CREATE INDEX, and so on) on a temporary table only when no session is currently bound to it. A session gets bound to a temporary table when an INSERT is performed on it. The session gets unbound by a TRUNCATE, at session termination, or by doing a COMMIT or ABORT for a transaction-specific temporary table. Temporary segments are deallocated at the end of the transaction for transaction-specific temporary tables and at the end of the session for session-specific temporary tables.

For more information on temporary tables and CREATE TABLE, refer to *Oracle9i Concepts*, "Temporary Tables."