Session 4
The Data Definition Language (DDL)

- Jayendra Khatod

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

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

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**

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

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.**

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.**

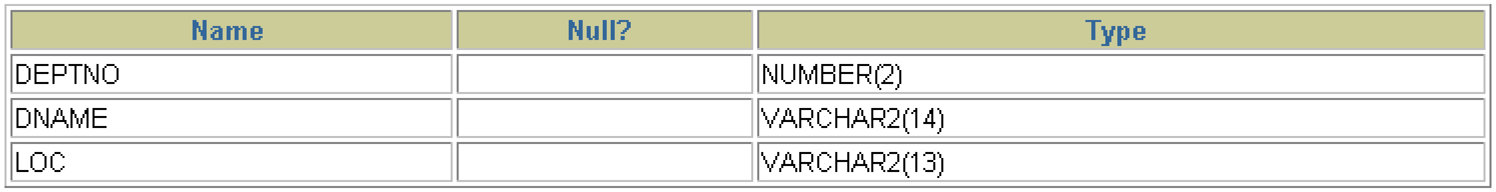
Creating Tables

- **Create the table**

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

- **Confirm table creatio.**

```
DESCRIBE dept
```



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

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**

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 ;
```

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

Data Types

Data Type	Description
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.

DateTime Data Types

Datetime enhancements fromOracle9*i* onwards:

- **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

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)]
```

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
```

TIMESTAMP WITH TIME ZONE Data Type (Continued.)

- **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.**

– **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
```

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.
```

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.
```

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.
```

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.**

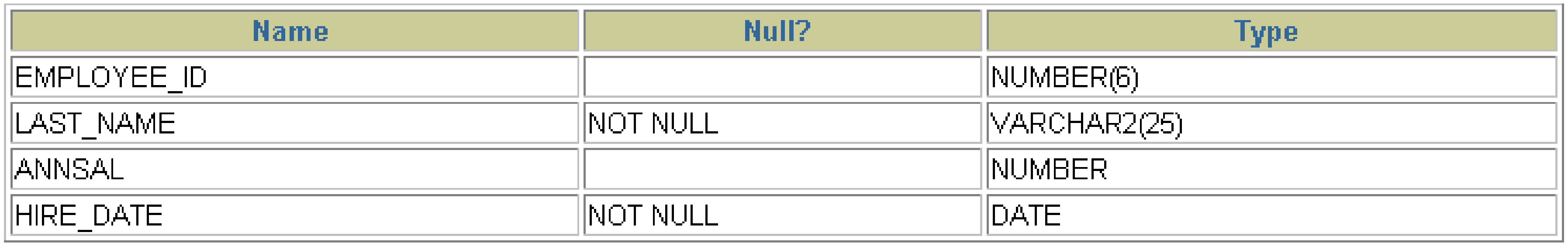
```
CREATE TABLE table
        [(column, column...)]
AS subquery;
```

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

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

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

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]...);
```

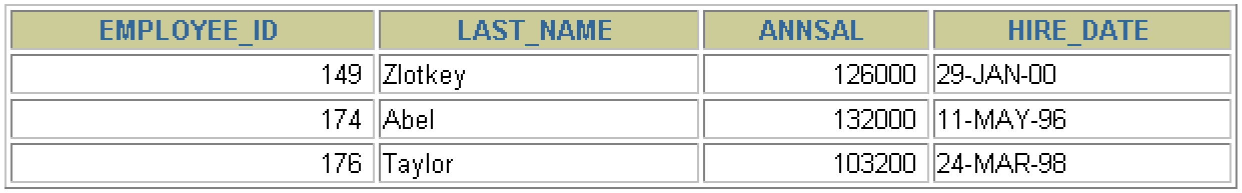
```
ALTER TABLE table
MODIFY      (column datatype [DEFAULT expr]
            [, column datatype]...);
```

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

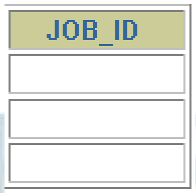
Adding a Column

New column

DEPT80



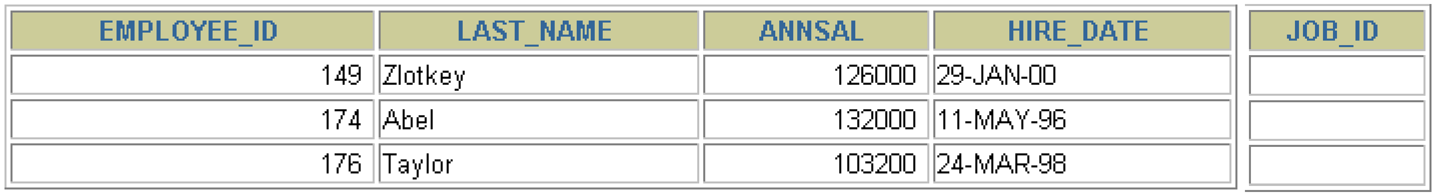
EMPLOYEE_ID	LAST_NAME	ANNSAL	HIRE_DATE
149	Zlotkey	126000	29-JAN-00
174	Abel	132000	11-MAY-96
176	Taylor	103200	24-MAR-98



JOB_ID

"Add a new column to the DEPT80 table."

DEPT80



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	

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	

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.**

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.
```

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;
```

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.
```

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.

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.

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

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

Thank You !