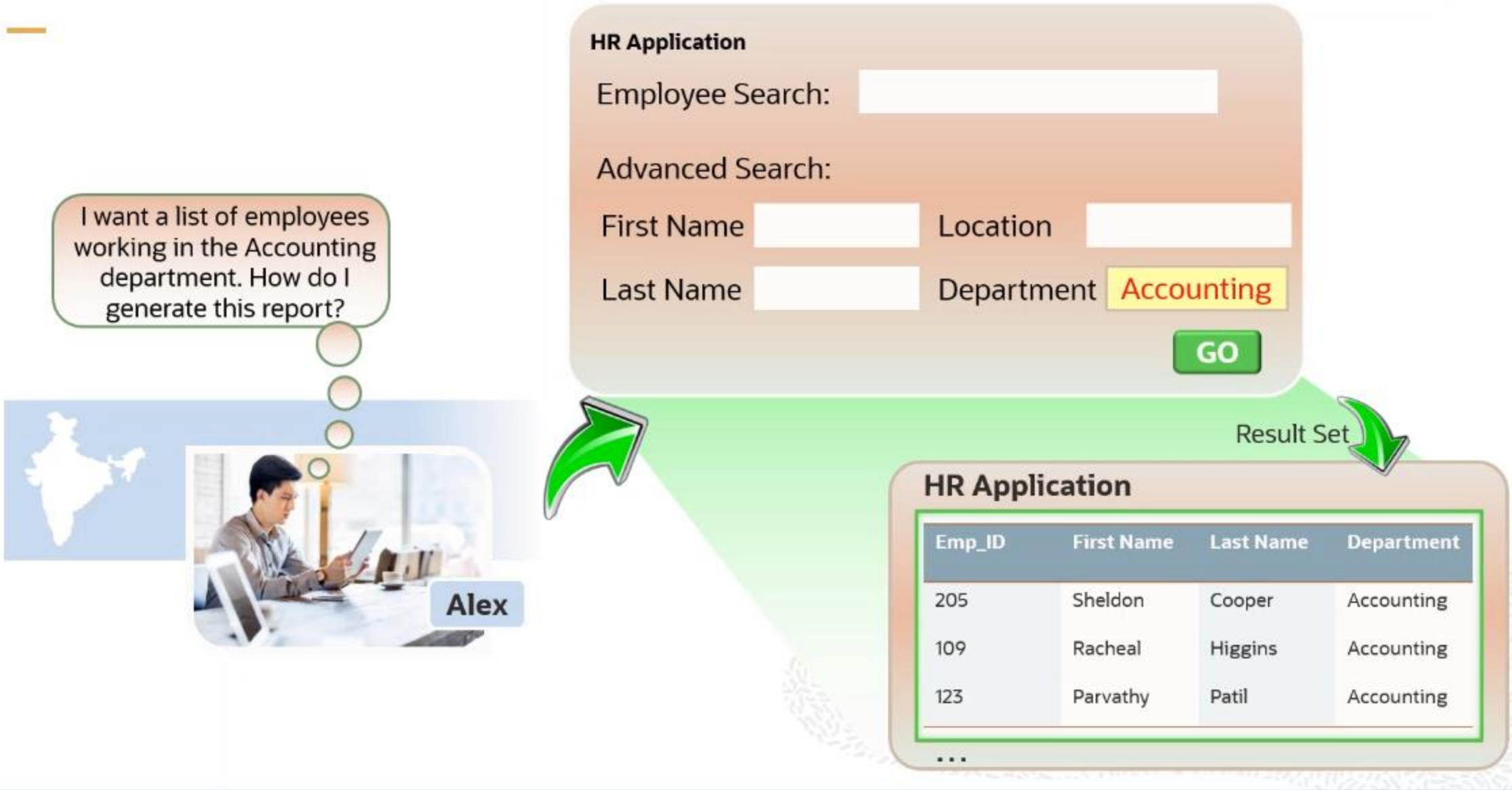
Retrieving Data Using SQL SELECT Statement

Objectives

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

- List the capabilities of SQL `SELECT` statements
- Execute a basic `SELECT` statement

HR Application Scenario



Writing SQL Statements

- SQL statements are not case-sensitive.
- SQL statements can be entered on one or more lines.
- Keywords cannot be abbreviated or split across lines.
- Clauses are usually placed on separate lines.
- Indents are used to enhance readability.

Basic SELECT Statement

- SELECT identifies the columns to be displayed.
- FROM identifies the table containing those columns.

```
SELECT   *|{[DISTINCT] column [alias],...}
FROM     table;
```

Selecting from a table

Selecting All Columns

Oracle SQL Developer:

```
SELECT *
FROM   departments;
```

	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping	124	1500
4	60	IT	103	1400
5	80	Sales	149	2500
6	90	Executive	100	1700
7	110	Accounting	205	1700
8	190	Contracting	(null)	1700

MySQL Workbench:

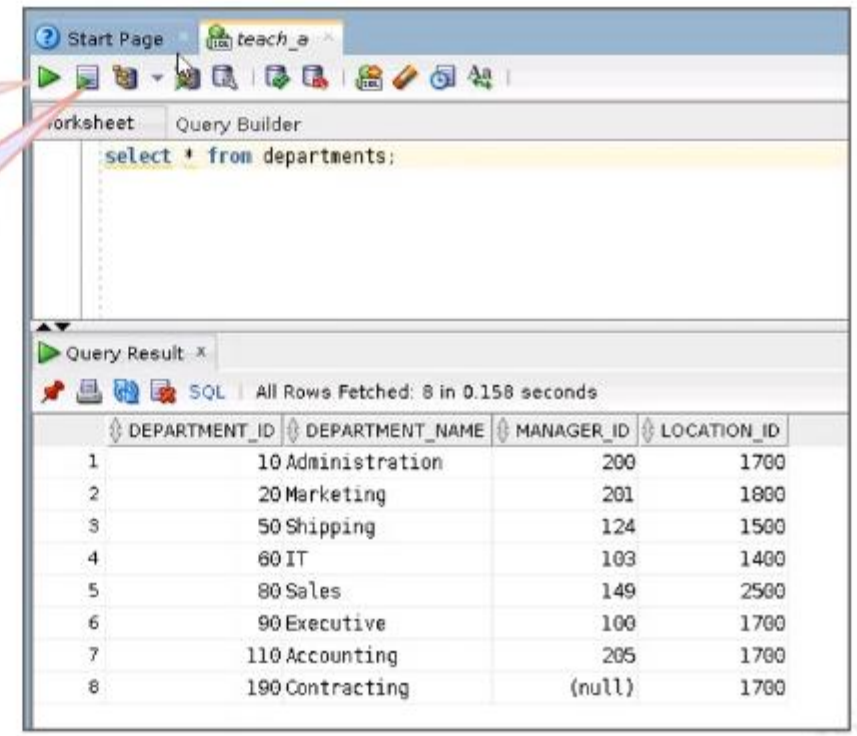
#	department_id	department_name	manager_id	location_id
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping	124	1500
4	60	IT	103	1400
5	80	Sales	149	2500
6	90	Executive	100	1700
7	110	Accounting	205	1700
8	190	Contracting	NULL	1700
*	NULL	NULL	NULL	NULL

Executing SQL Statements with Oracle SQL Developer and SQL*Plus

Execute statement

Run script

SQL Developer



	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping	124	1500
4	60	IT	103	1400
5	80	Sales	149	2500
6	90	Executive	100	1700
7	110	Accounting	205	1700
8	190	Contracting	(null)	1700

SQL * Plus

```
SQL> select * from departments;

DEPARTMENT_ID DEPARTMENT_NAME                MANAGER_ID LOCATION_ID
------------- ------------------------------ ---------- -----------
           10 Administration                        200        1700
           20 Marketing                             201        1800
           50 Shipping                              124        1500
           60 IT                                    103        1400
           80 Sales                                 149        2500
           90 Executive                             100        1700
          110 Accounting                            205        1700
          190 Contracting                                      1700

8 rows selected.

SQL>
```

Selecting All Columns

Oracle SQL Developer:

```
SELECT *
FROM   departments;
```

	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
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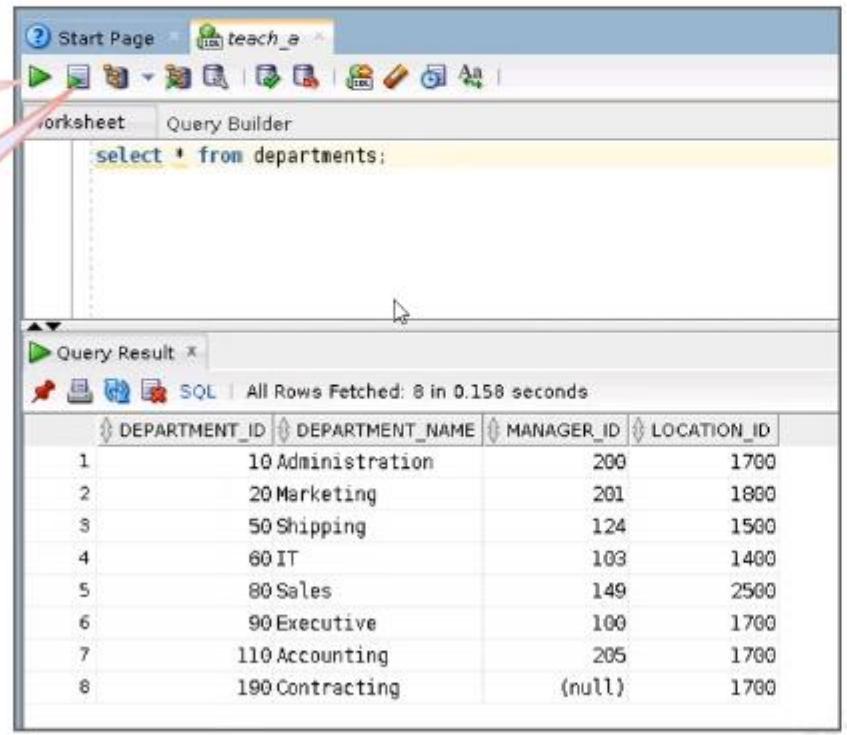

	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping	124	1500
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5	80	Sales	149	2500
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SQL * Plus

```
SQL> select * from departments;

DEPARTMENT_ID DEPARTMENT_NAME                MANAGER_ID LOCATION_ID
------------- ------------------------------ ---------- -----------
           10 Administration                        200        1700
           20 Marketing                             201        1800
           50 Shipping                              124        1500
           60 IT                                    103        1400
           80 Sales                                 149        2500
           90 Executive                             100        1700
          110 Accounting                            205        1700
          190 Contracting                                      1700

8 rows selected.

SQL>
```

Selecting Specific Columns

Oracle SQL Developer:

```
SELECT department_id, location_id
FROM   departments;
```

	DEPARTMENT_ID	LOCATION_ID
1	10	1700
2	20	1800
3	50	1500
4	60	1400
5	80	2500
6	90	1700
7	110	1700
8	190	1700

Selecting from `dual` with Oracle Database

- `dual` is a table automatically created by Oracle Database.
- `dual` has one column called `DUMMY`, of data type `VARCHAR(1)`, and contains one row with a value `X`.

```
SELECT *
FROM   dual;
```

	DUMMY
1	X

```
SELECT SYSDATE
FROM   dual;
```

	SYSDATE
1	25-JUN-18

Arithmetic Expressions

You can create expressions with number and date data by using arithmetic operators.

Operator	Description
+	Add
-	Subtract
*	Multiply
/	Divide

Using Arithmetic Operators

```
SELECT last_name, salary, salary + 300
FROM   employees;
```

	LAST_NAME	SALARY	SALARY+300
1	King	24000	24300
2	Kochhar	17000	17300
3	De Haan	17000	17300
4	Hunold	9000	9300
5	Ernst	6000	6300
6	Lorentz	4200	4500
7	Mourgos	5800	6100
8	Rajs	3500	3800
9	Davies	3100	3400
10	Matos	2600	2900

...

Operator Precedence

```
SELECT last_name, salary, 12*salary+100
FROM   employees;
```

	LAST_NAME	SALARY	12*SALARY+100
1	King	24000	288100
2	Kochhar	17000	204100
3	De Haan	17000	204100
4	Hunold	9000	108100

...

```
SELECT last_name, salary, 12*(salary+100)
FROM   employees;
```

	LAST_NAME	SALARY	12*(SALARY+100)
1	King	24000	289200
2	Kochhar	17000	205200
3	De Haan	17000	205200
4	Hunold	9000	109200

...

Defining a Null Value

- Null is a value that is unavailable, unassigned, unknown, or inapplicable.
- Null is not the same as zero or a blank space.

```
SELECT last_name, job_id, salary, commission_pct
FROM   employees;
```

	LAST_NAME	JOB_ID	SALARY	COMMISSION_PCT
1	King	AD_PRES	24000	(null)
2	Kochhar	AD_VP	17000	(null)
3	De Haan	AD_VP	17000	(null)
...				
12	Zlotkey	SA_MAN	10500	0.2
13	Abel	SA_REP	11000	0.3
14	Taylor	SA_REP	8600	0.2
15	Grant	SA_REP	7000	0.15
...				
18	Fay	MK_REP	6000	(null)
19	Higgins	AC_MGR	12008	(null)
20	Gietz	AC_ACCOUNT	8300	(null)

Null Values in Arithmetic Expressions

Arithmetic expressions containing a null value evaluate to null.

```
SELECT last_name, 12*salary*commission_pct
FROM   employees;
```

	LAST_NAME	12*SALARY*COMMISSION_PCT
1	King	(null)
2	Kochhar	(null)
3	De Haan	(null)

...

12	Zlotkey	25200
13	Abel	39600
14	Taylor	20640
15	Grant	12600

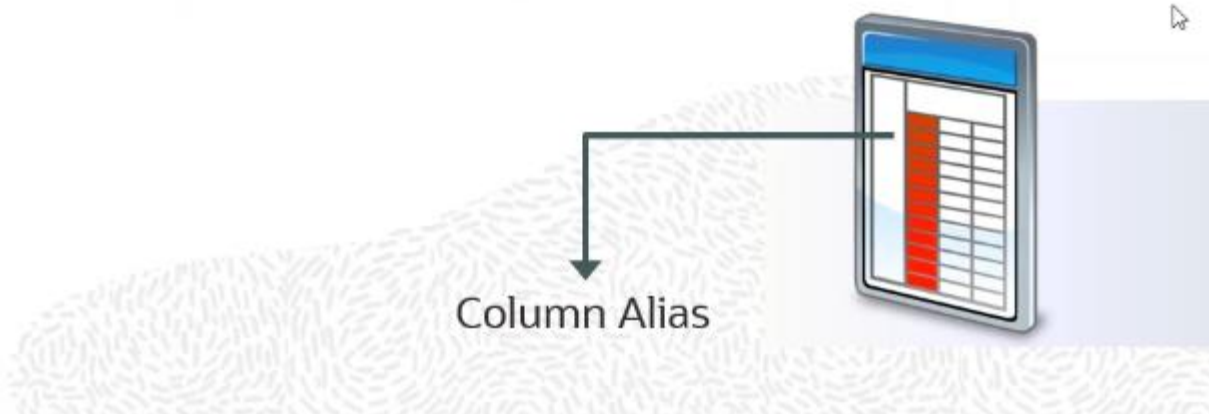
...

17	Hartstein	(null)
18	Fay	(null)
19	Higgins	(null)
20	Gietz	(null)

Defining a Column Alias

A column alias:

- Renames a column heading
- Is useful with calculations
- Immediately follows the column name (there can also be the optional AS keyword between the column name and the alias)
- Requires double quotation marks if it contains spaces or special characters. In Oracle, it requires double quotation marks if it is case-sensitive



Using Column Aliases

```
SELECT last_name AS name, commission_pct comm
FROM   employees;
```

	NAME	COMM
1	King	(null)
2	Kochhar	(null)
3	De Haan	(null)
4	Hunold	(null)

```
SELECT last_name "Name" , salary*12 "Annual Salary"
FROM   employees;
```

	Name	Annual Salary
1	King	288000
2	Kochhar	204000
3	De Haan	204000
4	Hunold	108000

...

Concatenation Operator in Oracle

The concatenation operator:

- Links columns or character strings to other columns
- Is represented by two vertical bars (||)
- Creates a resultant column that is a character expression

```
SELECT    last_name||job_id AS "Employees"
FROM employees;
```

	Employees
1	AbelSA_REP
2	DaviesST_CLERK
3	De HaanAD_VP
4	ErnstIT_PROG
5	FayMK_REP
6	GietzAC_ACCOUNT
7	GrantSA_REP
8	HartsteinMK_MAN

...

Literal Character Strings

- A literal is a character, a number, or a date that is included in the `SELECT` statement.
- Date and character literal values must be enclosed within single quotation marks.
- Each character string is output once for each row returned.

Using Literal Character Strings in Oracle

```
SELECT last_name ||' is a '||job_id
       AS "Employee Details"
FROM   employees;
```

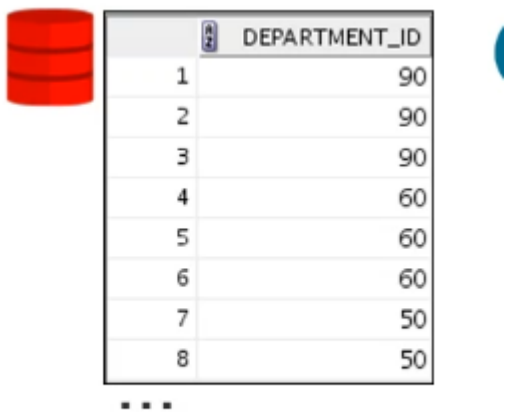
Employee Details
1 Abel is a SA_REP
2 Davies is a ST_CLERK
3 De Haan is a AD_VP
4 Ernst is a IT_PROG
5 Fay is a MK_REP
6 Gietz is a AC_ACCOUNT
7 Grant is a SA_REP
8 Hartstein is a MK_MAN
9 Higgins is a AC_MGR
10 Hunold is a IT_PROG
11 King is a AD_PRES

Duplicate Rows

The default display of queries is all rows, including duplicate rows.

1

```
SELECT department_id
FROM   employees;
```

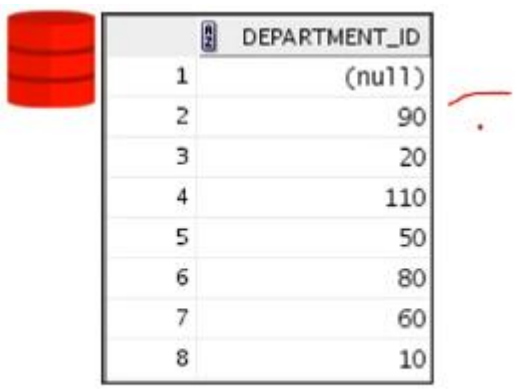


	DEPARTMENT_ID
1	90
2	90
3	90
4	60
5	60
6	60
7	50
8	50

...

2

```
SELECT DISTINCT department_id
FROM   employees;
```



	DEPARTMENT_ID
1	(null)
2	90
3	20
4	110
5	50
6	80
7	60
8	10

Displaying Table Structure by Using the DESCRIBE Command

Syntax:

```
DESCRIBE tablename
```

Example:

```
DESCRIBE employees
```

```
DESCRIBE Employees
Name           Null     Type
-------------- -------- ------------
EMPLOYEE_ID    NOT NULL NUMBER(6)
FIRST_NAME              VARCHAR2(20)
LAST_NAME      NOT NULL VARCHAR2(25)
EMAIL          NOT NULL VARCHAR2(25)
PHONE_NUMBER            VARCHAR2(20)
HIRE_DATE      NOT NULL DATE
JOB_ID         NOT NULL VARCHAR2(10)
SALARY                  NUMBER(8,2)
COMMISSION_PCT          NUMBER(2,2)
MANAGER_ID              NUMBER(6)
DEPARTMENT_ID           NUMBER(4)
```

Summary

In this lesson, you should have learned how to write a `SELECT` statement that:

- Returns all rows and columns from a table
- Returns specified columns from a table
- Uses column aliases to display more descriptive column headings
- Describes the structure of a table

Displaying Table Structure by Using Oracle SQL Developer

- Use the `DESCRIBE` command to display the structure of a table.
- Alternatively, select the table in the Connections tree and use the Columns tab to view the table structure.