

## SELF TEST

The following questions will help you measure your understanding of the material presented in this chapter. Read all the choices carefully because there might be more than one correct answer. Choose all the correct answers for each question.

The following test is typical of the questions and format of the OCA 12c examination for the topic “Retrieving Data Using the SQL SELECT Statement.” These questions often make use of the Human Resources schema.

### List the Capabilities of SQL SELECT Statements

1. Which query creates a projection of the DEPARTMENT\_NAME and LOCATION\_ID columns from the DEPARTMENTS table? (Choose the best answer.)
  - A. SELECT DISTINCT DEPARTMENT\_NAME, LOCATION\_ID  
FROM DEPARTMENTS;
  - B. SELECT DEPARTMENT\_NAME, LOCATION\_ID  
FROM DEPARTMENTS;
  - C. SELECT DEPT\_NAME, LOC\_ID  
FROM DEPT;
  - D. SELECT DEPARTMENT\_NAME AS “LOCATION\_ID”  
FROM DEPARTMENTS;
2. After describing the EMPLOYEES table, you discover that the SALARY column has a data type of NUMBER(8,2). Which SALARY value(s) will not be permitted in this column? (Choose all that apply.)
  - A. SALARY=12345678
  - B. SALARY=123456.78
  - C. SALARY=12345.678
  - D. SALARY=123456
  - E. SALARY=12.34
3. After describing the JOB\_HISTORY table, you discover that the START\_DATE and END\_DATE columns have a data type of DATE. Consider the expression END\_DATE-START\_DATE. (Choose two correct statements.)
  - A. A value of DATE data type is returned.
  - B. A value of type NUMBER is returned.
  - C. A value of type VARCHAR2 is returned.
  - D. The expression is invalid since arithmetic cannot be performed on columns with DATE data types.
  - E. The expression represents the days between the END\_DATE and START\_DATE less one day.

4. The DEPARTMENTS table contains a DEPARTMENT\_NAME column with data type VARCHAR2(30). (Choose two true statements about this column.)
  - A. This column can store character data up to a maximum of 30 characters.
  - B. This column must store character data that is at least 30 characters long.
  - C. The VARCHAR2 data type is replaced by the CHAR data type.
  - D. This column can store data in a column with data type VARCHAR2(50) provided that the contents are at most 30 characters long.

### Execute a Basic SELECT Statement

5. Which statement reports on unique JOB\_ID values from the EMPLOYEES table? (Choose all that apply.)
  - A. SELECT JOB\_ID FROM EMPLOYEES;
  - B. SELECT UNIQUE JOB\_ID FROM EMPLOYEES;
  - C. SELECT DISTINCT JOB\_ID, EMPLOYEE\_ID FROM EMPLOYEES;
  - D. SELECT DISTINCT JOB\_ID FROM EMPLOYEES;
6. Choose the two illegal statements. The two correct statements produce identical results. The two illegal statements will cause an error to be raised:
  - A. SELECT DEPARTMENT\_ID | | ' represents the ' | |  
DEPARTMENT\_NAME | | ' Department' as "Department Info"  
FROM DEPARTMENTS;
  - B. SELECT DEPARTMENT\_ID | | ' represents the | |  
DEPARTMENT\_NAME | | ' Department' as "Department Info"  
FROM DEPARTMENTS;
  - C. select department\_id | | ' represents the ' | | department\_name | |  
' Department' "Department Info"  
from departments;
  - D. SELECT DEPARTMENT\_ID represents the DEPARTMENT\_NAME Department as  
"Department Info"  
FROM DEPARTMENTS;
7. Which expressions do not return NULL values? (Choose all that apply.)
  - A. select ((10 + 20) \* 50) + null from dual;
  - B. select 'this is a ' | | null | | 'test with nulls' from dual;
  - C. select null/0 from dual;
  - D. select null | | 'test' | | null as "Test" from dual;

8. Choose the correct syntax to return all columns and rows of data from the EMPLOYEES table.
- A. select all from employees;
  - B. select employee\_id, first\_name, last\_name, first\_name, department\_id from employees;
  - C. select % from employees;
  - D. select \* from employees;
  - E. select \*.\* from employees;
9. The following character literal expression is selected from the DUAL table:  
SELECT 'Coda's favorite fetch toy is his orange ring' FROM DUAL;  
(Choose the result that is returned.)
- A. An error would be returned due to the presence of two adjacent quotes
  - B. Coda's favorite fetch toy is his orange ring
  - C. Coda"s favorite fetch toy is his orange ring
  - D. Coda"s favorite fetch toy is his orange ring'
10. There are four rows of data in the REGIONS table. Consider the following SQL statement:  
SELECT '6 \* 6' "Area" FROM REGIONS;  
How many rows of results are returned and what value is returned by the Area column?  
(Choose the best answer.)
- A. 1 row returned, Area column contains value 36
  - B. 4 rows returned, Area column contains value 36 for all 4 rows
  - C. 1 row returned, Area column contains value 6 \* 6
  - D. 4 rows returned, Area column contains value 6 \* 6 for all 4 rows
  - E. A syntax error is returned.

## LAB QUESTION

In this chapter you worked through examples in the Human Resources schema. Oracle provides a number of example schemas for you to experiment with and to learn different concepts from. For the practical exercises, you will be using the Order Entry, or OE, schema. The solutions for these exercises will be provided later using SQL Developer. Using SQL Developer or SQL\*Plus, connect to the OE schema and complete the following tasks.

- 1. Obtain structural information for the PRODUCT\_INFORMATION and ORDERS tables.
- 2. Select the unique SALES\_REP\_ID values from the ORDERS table. How many different sales representatives have been assigned to orders in the ORDERS table?

3. Create a results set based on the ORDERS table that includes the ORDER\_ID, ORDER\_DATE, and ORDER\_TOTAL columns. Notice how the ORDER\_DATE output is formatted differently from the START\_DATE and END\_DATE columns in the HR.JOB\_HISTORY table.
4. The PRODUCT\_INFORMATION table stores data regarding the products available for sale in a fictitious IT hardware store. Produce a set of results that will be useful for a salesperson. Extract product information in the format <PRODUCT\_NAME> with code: <PRODUCT\_ID> has status of: <PRODUCT\_STATUS>. Alias the expression as "Product." The results should provide the LIST\_PRICE, the MIN\_PRICE, the difference between LIST\_PRICE, and MIN\_PRICE aliased as "Max Actual Savings", along with an additional expression that takes the difference between LIST\_PRICE and MIN\_PRICE and divides it by the LIST\_PRICE and then multiplies the total by 100. This last expression should be aliased as "Max Discount %".
5. Calculate the surface area of the earth using the DUAL table. Alias this expression as "Earth's Area". The formula for calculating the area of a sphere is:  $4\pi r^2$ . Assume, for this example, that the earth is a simple sphere with a radius of 3,958.759 miles and that  $\pi$  is 22/7.

## SELF TEST ANSWERS

### List the Capabilities of SQL SELECT Statements

1. ☒ **B.** A projection is an intentional restriction of the columns returned from a table.  
☒ **A, C, and D** are incorrect. **A** is eliminated since the question has nothing to do with duplicates, distinctiveness, or uniqueness of data. **C** incorrectly selects nonexistent columns called DEPT\_NAME and LOC\_ID from a nonexistent table called DEPT. **D** returns just one of the requested columns: DEPARTMENT\_NAME. Instead of additionally projecting the LOCATION\_ID column from the DEPARTMENTS table, it attempts to alias the DEPARTMENT\_NAME column as LOCATION\_ID.
2. ☒ **A.** Columns with NUMBER(8,2) data type can store, at most, eight digits, of which, at most, six digits are to the left of the decimal point. Although **A** is the correct answer, note that since the question is phrased in the negative, these values are NOT allowed to be stored in such a column. **A** is not allowed because it contains eight whole number digits, but the data type is constrained to store six whole number digits and two fractional digits.  
☒ **B, C, D, and E** are incorrect, as they can legitimately be stored in this data type. **C** is allowed since the fractional portion is rounded to two decimal places. **D** shows that numbers with no fractional part are legitimate values for this column, as long as the number of digits in the whole number portion does not exceed six digits.
3. ☒ **B and E.** The result of arithmetic between two date values represents a certain number of days.  
☒ **A, C, and D** are incorrect. It is a common mistake to expect the result of arithmetic between two date values to be a date as well, so **A** may seem plausible, but it is false.
4. ☒ **A and D.** The scale of the VARCHAR2 data type, specified in brackets, determines its maximum capacity for storing character data as mentioned by **A**. If a data value that is at most 30 characters long is stored in any data type, it can also be stored in this column as stated by **D**.  
☒ **B and C** are incorrect. **B** is incorrect because it is possible to store character data of any length up to 30 characters in this column. **C** is false, since the CHAR data type exists in parallel with the VARCHAR2 data type.

### Execute a Basic SELECT Statement

5. ☒ **D.** Unique JOB\_ID values are projected from the EMPLOYEES table by applying the DISTINCT keyword to just the JOB\_ID column.  
☒ **A, B, and C** are incorrect, since **A** returns an unrestricted list of JOB\_ID values including duplicates, **B** makes use of the UNIQUE keyword in the incorrect context, and **C** selects the distinct combination of JOB\_ID and EMPLOYEE\_ID values. This has the effect of returning

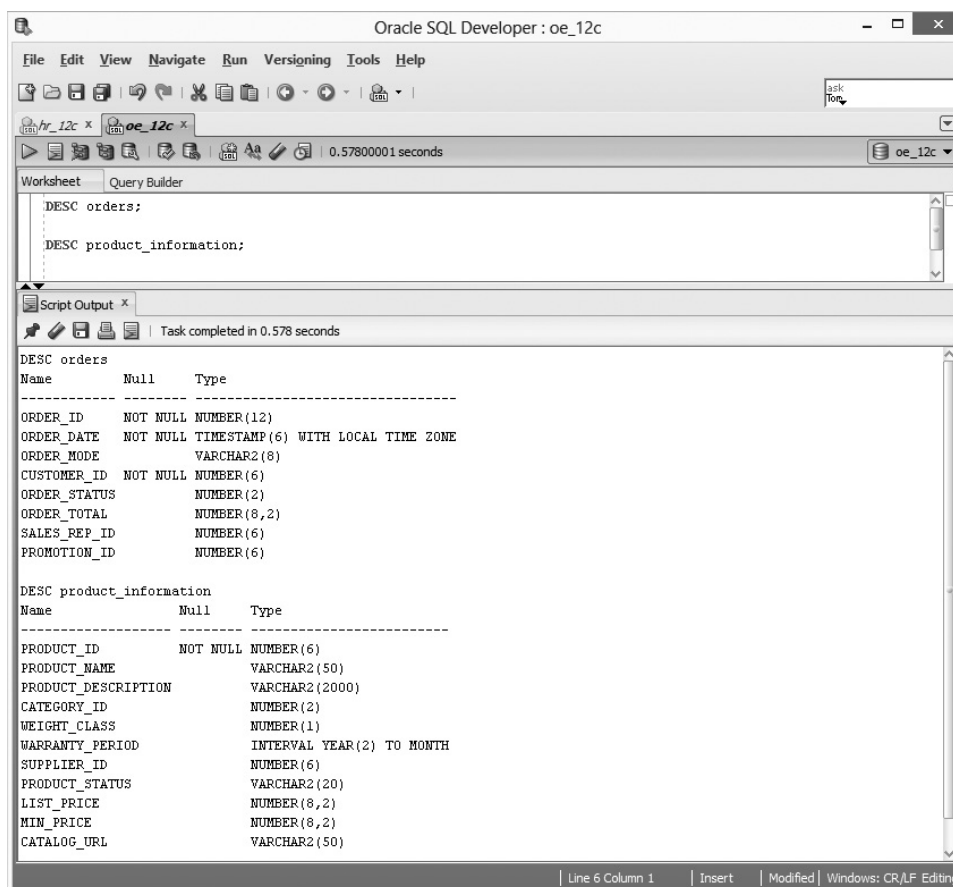
all the rows from the EMPLOYEES table since the EMPLOYEE\_ID column contains unique values for each employee record. Additionally, **C** returns two columns, which is not what was originally requested.

6. ☒ **B** and **D**. **B** and **D** represent the two illegal statements that will return syntax errors if they are executed. This is a tricky question because it asks for the illegal statements and not the legal statements. **B** is illegal because it is missing a single quote enclosing the character literal "represents the". **D** is illegal because it does not make use of single quotes to enclose its character literals.  
☒ **A** and **C** are incorrect, as they are the legal statements. **A** and **C** appear to be different since the case of the SQL statements are different and **A** uses the alias keyword AS, whereas **C** just leaves a space between the expression and the alias. Yet both **A** and **C** produce identical results.
7. ☒ **B** and **D**. **B** and **D** do not return null values since character expressions are not affected in the same way by null values as arithmetic expressions. **B** and **D** ignore the presence of null values in their expressions and return the remaining character literals.  
☒ **A** and **C** are incorrect. They return null values because any arithmetic expression that involves a null will return a null.
8. ☒ **D**. An asterisk is the SQL operator that implies that all columns must be selected from a table.  
☒ **A**, **B**, **C**, and **E** are incorrect. **A** uses the ALL reserved word but is missing any column specification and will, therefore, generate an error. **B** selects some columns but not all columns and, therefore, does not answer the question. **C** and **E** make use of illegal selection operators.
9. ☒ **B**. The key to identifying the correct result lies in understanding the role of the single quotation marks. The entire literal is enclosed by a pair of quotes to avoid the generation of an error. The two adjacent quotes are necessary to delimit the single quote that appears in literal **B**.  
☒ **A**, **C**, and **D** are incorrect. **A** is eliminated since no error is returned. **C** inaccurately returns two adjacent quotes in the literal expression and **D** returns a literal with all the quotes still present. The Oracle server removes the quotes used as character delimiters after processing the literal.
10. ☒ **D**. The literal expression '6 \* 6' is selected once for each row of data in the REGIONS table.  
☒ **A**, **B**, **C**, and **E** are incorrect. **A** returns one row instead of four and calculates the product 6 \* 6. The enclosing quote operators render 6 \* 6 a character literal and not a numeric literal that can be calculated. **B** correctly returns four rows but incorrectly evaluates the character literal as a numeric literal. **C** incorrectly returns one row instead of four and **E** is incorrect, because the given SQL statement can be executed.

## LAB ANSWER

The assumption is made that an Oracle database is available for you to practice on. The database administrator (DBA) in your organization may assist you with installing and setting this up. In order for any client tool such as SQL\*Plus or SQL Developer to connect to the database, a listener process should be running and the database must be opened. Additionally, you may have to request that the HR and OE schema accounts be unlocked and that the passwords be reset. If these sample schemas are not present, it is a simple matter to get the DBA to run the scripts, which are installed when the database is installed, to create them. Connect to the OE schema using either SQL\*Plus or SQL Developer.

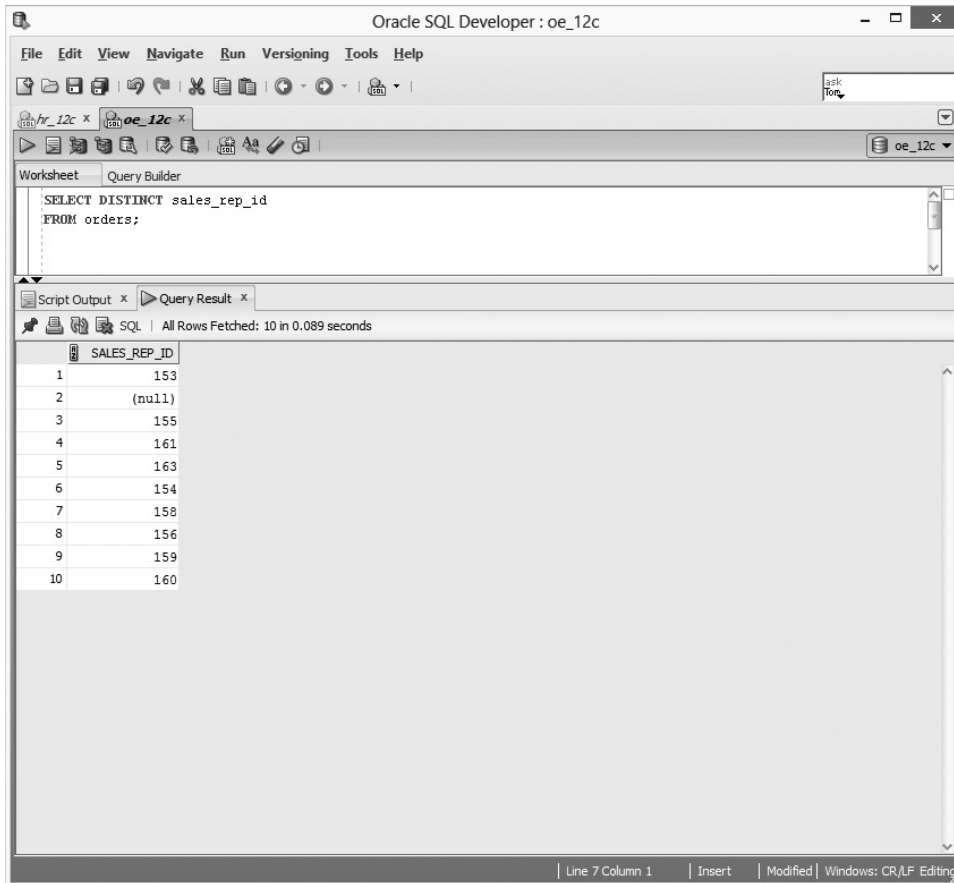
1. The DESCRIBE command gives us the structural description of a table. The following illustration shows these two tables being described:



2. The request for unique values usually involves using the DISTINCT keyword as part of your SELECT statement. The two components of the statement involve the SELECT clause and the FROM clause. You were asked for unique SALES\_REP\_ID values FROM the ORDERS table. It is simple to translate this request into the following SELECT statement:

```
SELECT DISTINCT sales_rep_id
FROM orders;
```

From the results in the illustration, you can answer the original question: There are nine different sales representatives responsible for orders listed in the ORDERS table, but there is at least one order that contains null values in their SALES\_REP\_ID fields.



The screenshot shows the Oracle SQL Developer interface. The 'Worksheet' tab is active, displaying the following SQL query:

```
SELECT DISTINCT sales_rep_id
FROM orders;
```

The 'Query Result' tab is also visible, showing the results of the query. The status bar indicates 'All Rows Fetched: 10 in 0.089 seconds'.

	SALES_REP_ID
1	153
2	(null)
3	155
4	161
5	163
6	154
7	158
8	156
9	159
10	160

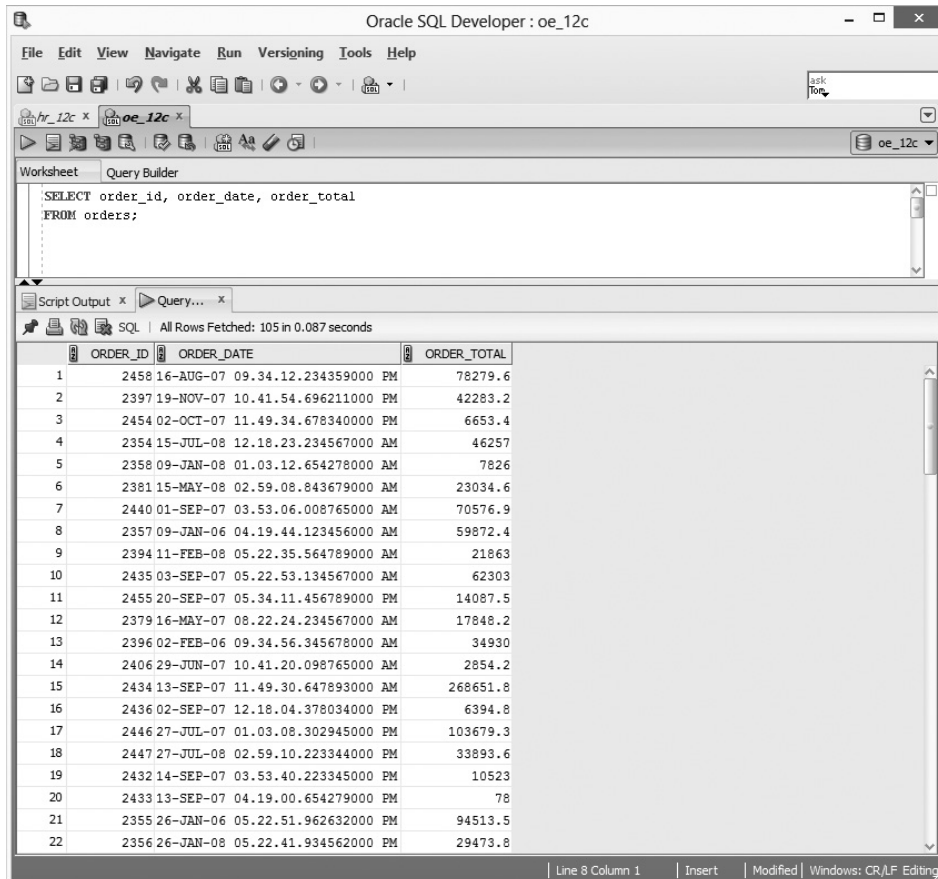
3. When asked to create a results set, it translates to SELECT one or more columns from a table. In this case, your SELECT clause is constructed from the three columns requested. There is no



request for unique values, so there is no need to consider the DISTINCT keyword. The FROM clause need only include the ORDERS table to build the following SELECT statement:

```
SELECT order_id, order_date, order_total
FROM orders;
```

Consider the output in the following illustration, specifically the ORDER\_DATE column. This column contains the day, month, year, hours, minutes, seconds, and fractional seconds up to six decimal places or accurate up to a millionth of a second. The description of the ORDERS table exposes ORDER\_DATE as a TIMESTAMP(6) with LOCAL TIMEZONE column. This means that the data in this column can be stored with fractional precision up to six decimal places and that the data is time zone-aware. Basically, data may be worked on by people in different time zones. So Oracle provides a data type that normalizes the local time to the database time zone to avoid confusion. Compared to the START\_DATE and END\_DATE columns in the HR.JOB\_HISTORY table, the ORDER\_DATE column data type is far more sophisticated. Essentially, though, both these data types store date and time information but to differing degrees of precision.



	ORDER_ID	ORDER_DATE	ORDER_TOTAL
1	2458	16-AUG-07 09.34.12.234359000 PM	78279.6
2	2397	19-NOV-07 10.41.54.696211000 PM	42283.2
3	2454	02-OCT-07 11.49.34.678340000 PM	6653.4
4	2354	15-JUL-08 12.18.23.234567000 AM	46257
5	2358	09-JAN-08 01.03.12.654278000 AM	7826
6	2381	15-MAY-08 02.59.08.843679000 AM	23034.6
7	2440	01-SEP-07 03.53.06.008765000 AM	70576.9
8	2357	09-JAN-06 04.19.44.123456000 AM	59872.4
9	2394	11-FEB-08 05.22.35.564789000 AM	21863
10	2435	03-SEP-07 05.22.53.134567000 AM	62303
11	2455	20-SEP-07 05.34.11.456789000 PM	14087.5
12	2379	16-MAY-07 08.22.24.234567000 AM	17848.2
13	2396	02-FEB-06 09.34.56.345678000 AM	34930
14	2406	29-JUN-07 10.41.20.098765000 AM	2854.2
15	2434	13-SEP-07 11.49.30.647893000 AM	268651.8
16	2436	02-SEP-07 12.18.04.378034000 PM	6394.8
17	2446	27-JUL-07 01.03.08.302945000 PM	103679.3
18	2447	27-JUL-08 02.59.10.223344000 PM	33893.6
19	2432	14-SEP-07 03.53.40.223345000 PM	10523
20	2433	13-SEP-07 04.19.00.654279000 PM	78
21	2355	26-JAN-06 05.22.51.962632000 PM	94513.5
22	2356	26-JAN-08 05.22.41.934562000 PM	29473.8

4. The SELECT clause to answer this question should contain an expression aliased as “Product” made up of concatenations of character literals with the PRODUCT\_NAME, PRODUCT\_ID, and PRODUCT\_STATUS columns. Additionally, the SELECT clause must contain the LIST\_PRICE and MIN\_PRICE columns and two further arithmetic expressions aliased as “Max Actual Savings” and “Max Discount %”. The FROM clause need only include the PRODUCT\_INFORMATION table. Proceed by constructing each of the three expressions in turn and put them all together. The “Product” expression could be derived with the following SELECT statement:

```
SELECT product_name||' with code: '||product_id||' has status  
of: '||product_status AS "Product"
```

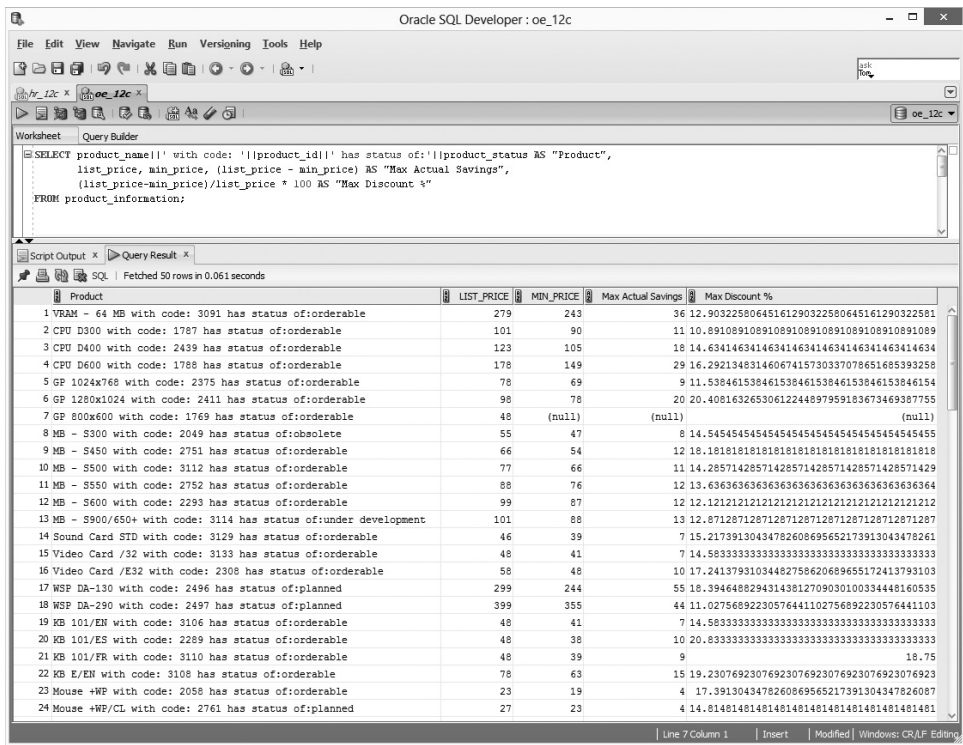
The “Max Actual Savings” expression could be derived with the following SELECT statement:

```
SELECT list_price - min_price AS "Max Actual Savings"
```

The “Max Discount %” expression takes the calculation for “Max Actual Savings”, divides this amount by the LIST\_PRICE, and multiplies it by 100. It could be derived with the following SELECT statement:

```
SELECT ((list_price-min_price)/list_price) * 100 AS "Max Discount %"
```

These three expressions, along with the two regular columns, form the SELECT clause executed against the PRODUCT\_INFORMATION table as shown next:



- 5. The versatile DUAL table clearly forms the FROM clause. The SELECT clause is more interesting, since no actual columns are being selected, just an arithmetic expression. A possible SELECT statement to derive this calculation could be:

```
SELECT (4 * (22/7) * (3958.759 * 3958.759)) AS "Earth's Area"
FROM dual;
```

This calculation approximates that planet Earth’s surface area is 197,016,573 square miles.