



Using Conversion Functions and Conditional Expressions

Objectives

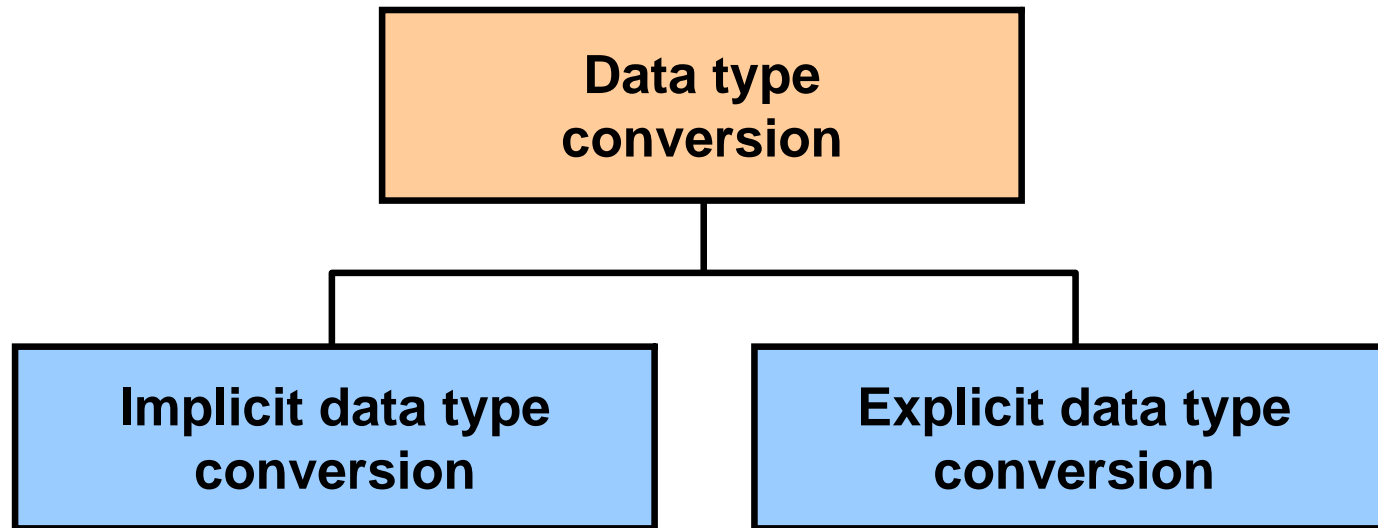
After completing this lesson, you should be able to do the following:

- Describe various types of conversion functions that are available in SQL
- Use the `TO_CHAR`, `TO_NUMBER`, and `TO_DATE` conversion functions
- Apply conditional expressions in a `SELECT` statement

Lesson Agenda

- Implicit and explicit data type conversion
- TO_CHAR, TO_DATE, TO_NUMBER functions
- Nesting functions
- General functions:
 - NVL
 - NVL2
 - NULLIF
 - COALESCE
- Conditional expressions:
 - CASE
 - DECODE

Conversion Functions



Implicit Data Type Conversion

In expressions, the Oracle server can automatically convert the following:

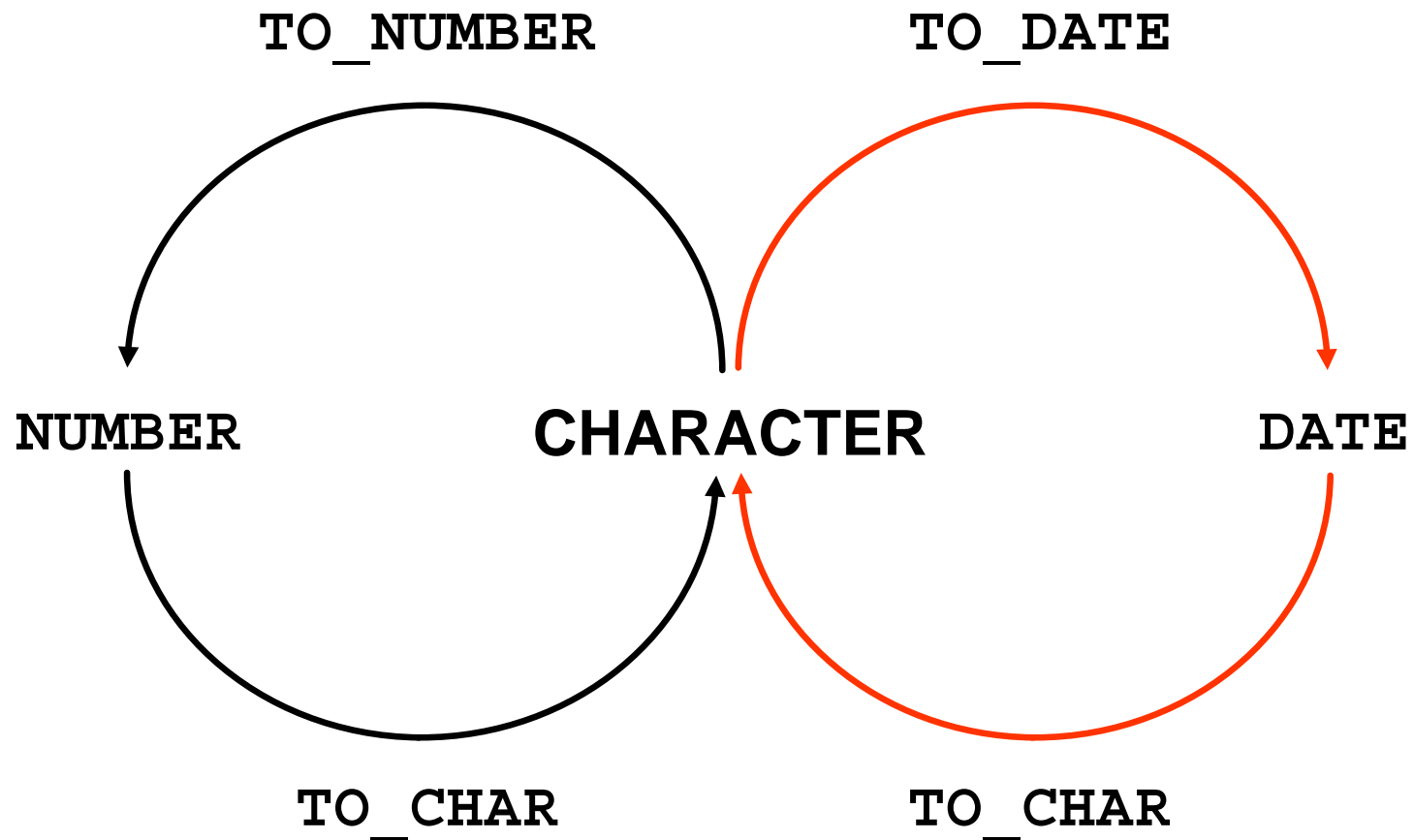
From	To
VARCHAR2 or CHAR	NUMBER
VARCHAR2 or CHAR	DATE

Implicit Data Type Conversion

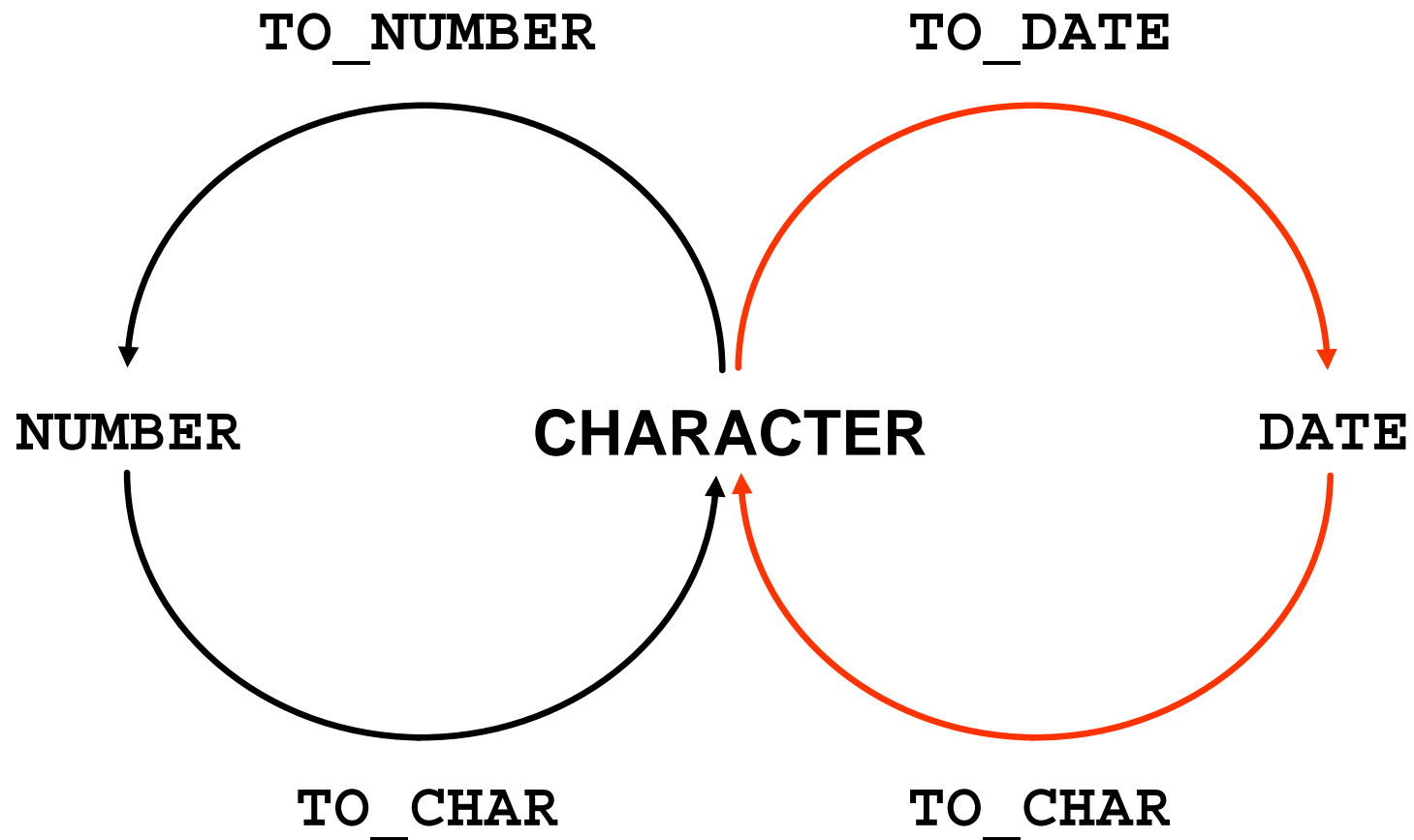
For expression evaluation, the Oracle server can automatically convert the following:

From	To
NUMBER	VARCHAR2 or CHAR
DATE	VARCHAR2 or CHAR

Explicit Data Type Conversion



Explicit Data Type Conversion



Lesson Agenda

- Implicit and explicit data type conversion
- **TO_CHAR, TO_DATE, TO_NUMBER functions**
- Nesting functions
- General functions:
 - NVL
 - NVL2
 - NULLIF
 - COALESCE
- Conditional expressions:
 - CASE
 - DECODE

Using the TO_CHAR Function with Dates

```
TO_CHAR(date, 'format_model')  

```

The format model:

- Must be enclosed with single quotation marks
- Is case-sensitive
- Can include any valid date format element
- Has an `fm` element to remove padded blanks or suppress leading zeros
- Is separated from the date value by a comma

Elements of the Date Format Model

Element	Result
YYYY	Full year in numbers
YEAR	Year spelled out (in English)
MM	Two-digit value for the month
MONTH	Full name of the month
MON	Three-letter abbreviation of the month
DY	Three-letter abbreviation of the day of the week
DAY	Full name of the day of the week
DD	Numeric day of the month

Elements of the Date Format Model

- Time elements format the time portion of the date:

HH24:MI:SS AM	15:45:32 PM
---------------	-------------

- Add character strings by enclosing them with double quotation marks:

DD "of" MONTH	12 of OCTOBER
---------------	---------------

- Number suffixes spell out numbers:

ddspth	fourteenth
--------	------------

Using the TO_CHAR Function with Dates

```
SELECT last_name,  
       TO_CHAR(hire_date, 'fmDD Month YYYY')  
       AS HIREDATE  
FROM   employees;
```

	LAST_NAME	HIREDATE
1	King	17 June 1987
2	Kochhar	21 September 1989
3	De Haan	13 January 1993
4	Hunold	3 January 1990
5	Ernst	21 May 1991
6	Lorentz	7 February 1999
7	Mourgos	16 November 1999
8	Rajs	17 October 1995
9	Davies	29 January 1997
10	Matos	15 March 1998
...		
19	Higgins	7 June 1994
20	Gietz	7 June 1994

Using the TO_CHAR Function with Numbers

```
TO_CHAR(number, 'format_model') 
```

These are some of the format elements that you can use with the TO_CHAR function to display a number value as a character:

Element	Result
9	Represents a number
0	Forces a zero to be displayed
\$	Places a floating dollar sign
L	Uses the floating local currency symbol
.	Prints a decimal point
,	Prints a comma as a thousands indicator

Using the TO_CHAR Function with Numbers

```
SELECT TO_CHAR(salary, '$99,999.00') SALARY  
FROM   employees  
WHERE  last_name = 'Ernst';
```

	SALARY
1	\$6,000.00

Using the TO_NUMBER and TO_DATE Functions

- Convert a character string to a number format using the TO_NUMBER function:

```
TO_NUMBER(char[, 'format_model'])
```

- Convert a character string to a date format using the TO_DATE function:

```
TO_DATE(char[, 'format_model'])
```

- These functions have an `fx` modifier. This modifier specifies the exact match for the character argument and date format model of a TO_DATE function.

Using the TO_CHAR and TO_DATE Function with RR Date Format

To find employees hired before 1990, use the RR date format, which produces the same results whether the command is run in 1999 or now:

```
SELECT last_name, TO_CHAR(hire_date, 'DD-Mon-YYYY')
FROM employees
WHERE hire_date < TO_DATE('01-Jan-90', 'DD-Mon-RR');
```

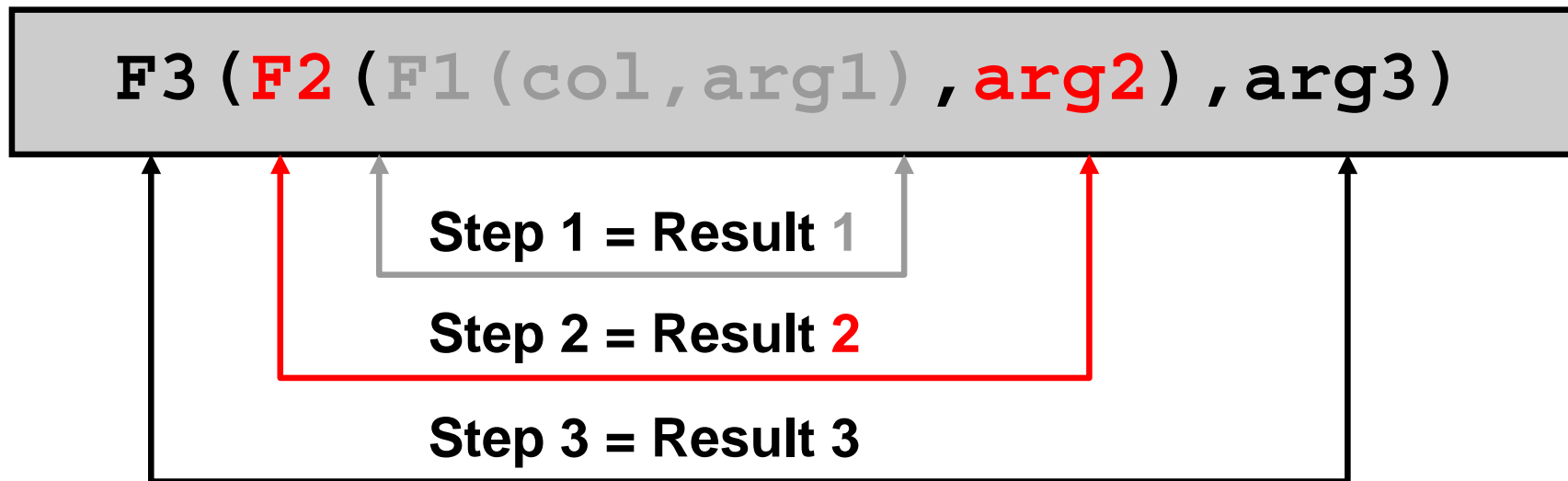
	LAST_NAME	TO_CHAR(HIRE_DATE,'DD-MON-YYYY')
1	King	17-Jun-1987
2	Kochhar	21-Sep-1989
3	Whalen	17-Sep-1987

Lesson Agenda

- Implicit and explicit data type conversion
- TO_CHAR, TO_DATE, TO_NUMBER functions
- **Nesting functions**
- General functions:
 - NVL
 - NVL2
 - NULLIF
 - COALESCE
- Conditional expressions:
 - CASE
 - DECODE

Nesting Functions

- Single-row functions can be nested to any level.
- Nested functions are evaluated from the deepest level to the least deep level.



Nesting Functions

```
SELECT last_name,  
       UPPER(CONCAT(SUBSTR (LAST_NAME, 1, 8), '_US'))  
FROM   employees  
WHERE  department_id = 60;
```

	LAST_NAME	UPPER(CONCAT(SUBSTR(LAST_NAME,1,8),'_US'))
1	Hunold	HUNOLD_US
2	Ernst	ERNST_US
3	Lorentz	LORENTZ_US

Lesson Agenda

- Implicit and explicit data type conversion
- TO_CHAR, TO_DATE, TO_NUMBER functions
- Nesting functions
- **General functions:**
 - NVL
 - NVL2
 - NULLIF
 - COALESCE
- Conditional expressions:
 - CASE
 - DECODE

General Functions

The following functions work with any data type and pertain to using nulls:

- `NVL (expr1, expr2)`
- `NVL2 (expr1, expr2, expr3)`
- `NULLIF (expr1, expr2)`
- `COALESCE (expr1, expr2, ..., exprn)`

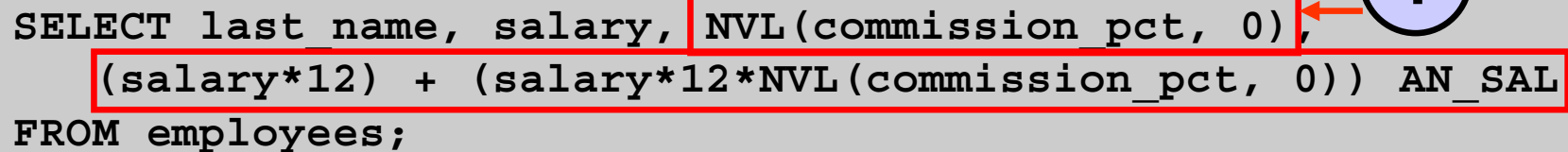
NVL Function

Converts a null value to an actual value:

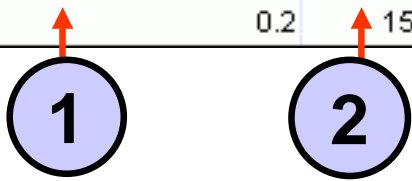
- Data types that can be used are date, character, and number.
- Data types must match:
 - `NVL(commission_pct, 0)`
 - `NVL(hire_date, '01-JAN-97')`
 - `NVL(job_id, 'No Job Yet')`

Using the NVL Function

```
SELECT last_name, salary, NVL(commission_pct, 0),  
       (salary*12) + (salary*12*NVL(commission_pct, 0)) AN_SAL  
FROM employees;
```



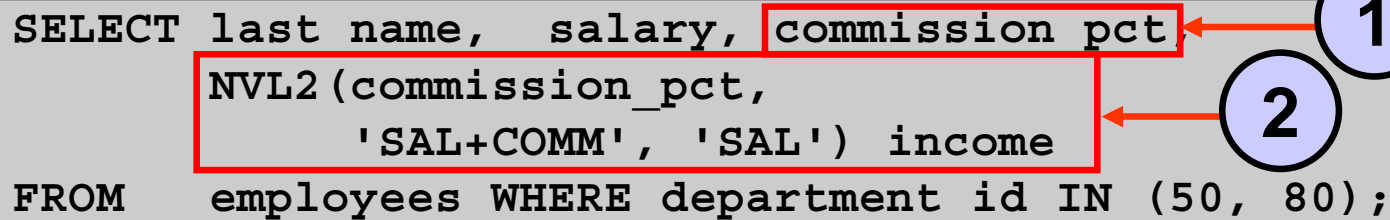
	LAST_NAME	SALARY	NVL(COMMISSION_PCT,0)	AN_SAL
1	King	24000	0	288000
2	Kochhar	17000	0	204000
3	De Haan	17000	0	204000
4	Hunold	9000	0	108000
5	Ernst	6000	0	72000
6	Lorentz	4200	0	50400
7	Mourgos	5800	0	69600
8	Rajs	3500	0	42000
9	Davies	3100	0	37200
10	Matos	2600	0	31200
11	Vargas	2500	0	30000
12	Zlotkey	10500	0.2	151200



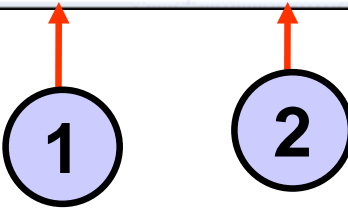
...

Using the NVL2 Function

```
SELECT last name, salary, commission_pct  
      NVL2(commission_pct,  
            'SAL+COMM', 'SAL') income  
FROM   employees WHERE department_id IN (50, 80);
```



	LAST_NAME	SALARY	COMMISSION_PCT	INCOME
1	Mourgos	5800	(null)	SAL
2	Rajs	3500	(null)	SAL
3	Davies	3100	(null)	SAL
4	Matos	2600	(null)	SAL
5	Vargas	2500	(null)	SAL
6	Zlotkey	10500	0.2	SAL+COMM
7	Abel	11000	0.3	SAL+COMM
8	Taylor	8600	0.2	SAL+COMM



Using the NULLIF Function

1

```
SELECT first_name, LENGTH(first_name) "expr1",  
       last_name,  LENGTH(last_name)  "expr2",  
       NULLIF(LENGTH(first_name), LENGTH(last_name)) result  
FROM employees;
```

2

3

	FIRST_NAME	expr1	LAST_NAME	expr2	RESULT
1	Ellen	5	Abel	4	5
2	Curtis	6	Davies	6	(null)
3	Lex	3	De Haan	7	3
4	Bruce	5	Ernst	5	(null)
5	Pat	3	Fay	3	(null)
6	William	7	Gietz	5	7
7	Kimberely	9	Grant	5	9

...

19	Jennifer	8	Whalen	6	8
20	Eleni	5	Zlotkey	7	5

1

2

3

Using the COALESCE Function

- The advantage of the COALESCE function over the NVL function is that the COALESCE function can take multiple alternate values.
- If the first expression is not null, the COALESCE function returns that expression; otherwise, it does a COALESCE of the remaining expressions.

Using the COALESCE Function

```
SELECT last name, employee id,  
COALESCE(TO_CHAR(commission_pct), TO_CHAR(manager_id),  
         'No commission and no manager')  
FROM employees;
```

	LAST_NAME	EMPLOYEE_ID	COALESCE(TO_CHAR(COM
1	King	100	No commission and no manager
2	Kochhar	101	100
3	De Haan	102	100
4	Hunold	103	102
5	Ernst	104	103
6	Lorentz	107	103
7	Mourgos	124	100
8	Rajs	141	124

...

12	Zlotkey	149	.2
13	Abel	174	.3
14	Taylor	176	.2
15	Grant	178	.15
16	Whalen	200	101

...

Lesson Agenda

- Implicit and explicit data type conversion
- TO_CHAR, TO_DATE, TO_NUMBER functions
- Nesting functions
- General functions:
 - NVL
 - NVL2
 - NULLIF
 - COALESCE
- Conditional expressions:
 - CASE
 - DECODE

Conditional Expressions

- Provide the use of the `IF-THEN-ELSE` logic within a SQL statement
- Use two methods:
 - `CASE` expression
 - `DECODE` function

CASE Expression

Facilitates conditional inquiries by doing the work of an IF-THEN-ELSE statement:

```
CASE expr WHEN comparison_expr1 THEN return_expr1  
      [WHEN comparison_expr2 THEN return_expr2  
      WHEN comparison_exprn THEN return_exprn  
      ELSE else_expr]  
END
```

Using the CASE Expression

Facilitates conditional inquiries by doing the work of an IF-THEN-ELSE statement:

```
SELECT last_name, job_id, salary,  
       CASE job_id WHEN 'IT_PROG' THEN 1.10*salary  
                   WHEN 'ST_CLERK' THEN 1.15*salary  
                   WHEN 'SA_REP' THEN 1.20*salary  
       ELSE salary END "REVISED_SALARY"  
FROM employees;
```

	LAST_NAME	JOB_ID	SALARY	REVISED_SALARY
...				
5	Ernst	IT_PROG	6000	6600
6	Lorentz	IT_PROG	4200	4620
7	Mourgos	ST_MAN	5800	5800
8	Rajs	ST_CLERK	3500	4025
9	Davies	ST_CLERK	3100	3565
...				
13	Abel	SA_REP	11000	13200
14	Taylor	SA_REP	8600	10320
...				

DECODE Function

Facilitates conditional inquiries by doing the work of a CASE expression or an IF-THEN-ELSE statement:

```
DECODE(col/expression, search1, result1  
      [, search2, result2, ...,]  
      [, default])
```

Using the DECODE Function

```
SELECT last name, job id, salary,  
       DECODE(job_id, 'IT_PROG', 1.10*salary,  
                 'ST_CLERK', 1.15*salary,  
                 'SA_REP', 1.20*salary,  
                 salary)  
       REVISED_SALARY  
FROM   employees;
```

	LAST_NAME	JOB_ID	SALARY	REVISED_SALARY
...				
6	Lorentz	IT_PROG	4200	4620
7	Mourgos	ST_MAN	5800	5800
8	Rajs	ST_CLERK	3500	4025
...				
13	Abel	SA_REP	11000	13200
14	Taylor	SA_REP	8600	10320
...				

Using the DECODE Function

Display the applicable tax rate for each employee in department 80:

```
SELECT last_name, salary,  
       DECODE (TRUNC(salary/2000, 0),  
               0, 0.00,  
               1, 0.09,  
               2, 0.20,  
               3, 0.30,  
               4, 0.40,  
               5, 0.42,  
               6, 0.44,  
               0.45) TAX_RATE  
FROM   employees  
WHERE  department_id = 80;
```

Quiz

The TO_NUMBER function converts either character strings or date values to a number in the format specified by the optional format model.

1. True
2. False

Summary

In this lesson, you should have learned how to:

- Alter date formats for display using functions
- Convert column data types using functions
- Use NVL functions
- Use IF-THEN-ELSE logic and other conditional expressions in a SELECT statement

Practice 4: Overview

This practice covers the following topics:

- Creating queries that use TO_CHAR, TO_DATE, and other DATE functions
- Creating queries that use conditional expressions such as DECODE and CASE