Database Programming with SQL
4-1: Case and Character Manipulation
Practice Activities

Objectives

- Select and apply single-row functions that perform case conversion and/or character manipulation
- Select and apply character case-manipulation functions LOWER, UPPER, and INITCAP in a SQL query
- Select and apply character-manipulation functions CONCAT, SUBSTR, LENGTH, INSTR, LPAD, RPAD, TRIM, and REPLACE in a SQL query
- Write flexible queries using substitution variables

Vocabulary

Identify the vocabulary word for each definition below.

	Dummy table used to view results from functions and calculations
	The arrangement of data for storage or display.
	Converts alpha character values to uppercase for the first letter of each word, all other letters in lowercase.
	Functions that accept character data as input and can return both character and numeric values.
	Removes all specified characters from either the beginning or the ending of a string.
	A symbol that represents a quantity or a relationship between quantities
	Functions that operate on single rows only and return one result per row
	Converts alpha characters to upper case
	Raw data entered into the computer
	Concatenates the first character value to the second character value; equivalent to concatenation operator (||).
	Data that is processed into information
	Converts alpha character values to lowercase.
	Pads the left side of a character, resulting in a right-justified value

	Returns specific characters from character value starting at a specific character position and going specified character positions long
	Replaces a sequence of characters in a string with another set of characters.
	Returns the numeric position of a named string.
	Returns the number of characters in the expression
	Pads the right-hand side of a character, resulting in a left- justified value.

Try It / Solve It

1. Using the three separate words “Oracle,” “Internet,” and “Academy,” use one command to produce the following output:

The Best Class
Oracle Internet Academy

2. Use the string “Oracle Internet Academy” to produce the following output:

The Net
net

3. What is the length of the string “Oracle Internet Academy”?

4. What’s the position of “I” in “Oracle Internet Academy”?

5. Starting with the string “Oracle Internet Academy”, pad the string to create ****Oracle****Internet****Academy****

6. Starting with the string “Oracle Internet Academy”, pad the string to produce: Oracle$$$Internet$$$Academy

7. Using the string ‘Oracle Internet Academy’, produce the output shown using the REPLACE function.

The Best Class
Oracle 2013-2014 Academy

8. List the order date and the order total from the Global Fast Foods F_ORDERS table. Name the order total as TOTAL, and fill in the empty spaces to the left of the order total with $.

```
SELECT order_date,
       LPAD(order_total, LENGTH(order_total) + 1, '$') AS TOTAL
FROM F_ORDERS;
```

ORDER_DATE	TOTAL
12/10/2002	$103.02

9. Write a query that will output a column called “ADDRESS” which has the following information: ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889. Use the Global Fast Foods F_CUSTOMERS table.

```
SELECT 'ZOE TWEE ' || '1009 OLIVER AVENUE BOSTON, MA 12889' AS ADDRESS
FROM F_CUSTOMERS;
```

ADDRESS
ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889
ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889

10. Write a query to return the first character of the first name concatenated to the last_name, the salary, and the department id for employees working in department 20. Give the first expression an alias of Name. Use the EMPLOYEES table. Change the query to use a substitution variable instead of the hard coded value 20 for department id. Run the query for department 30 and 50 without changing the original where-clause in your statement.

```
SELECT SUBSTR(first_name, 1, 1) || last_name AS "Name", Salary as "Salary", department_id as "Department ID"
FROM EMPLOYEES
WHERE department_id = :dept_id;
```

Name	Salary	Department ID
MHartstein	13000	20
PFay	3900	20
DSteiner	8600	20
LTAYLOR	4000	20
MStocks	3700	20
NSafwah	5000	20
ANewton	4900	20

Name	Salary	Department ID
KMourgos	5800	50
TRajs	3500	50
CDavies	3100	50
RMatos	2600	50
PVargas	2500	50
GBell	3500	50
THeiden	2600	50

No records for dept 30

11. Using a substitution variable for the department name, write a query listing department id, department name, and location id for departments located in the_department_of_your_choice. Use the DEPARTMENTS table. Note: All substitution variables in OAE are treated as character strings, so no quotes (‘ ‘) are needed.

```
SELECT department_id,
       department_name,
       location_id
FROM DEPARTMENTS
WHERE department_name = :dept_name;
```

DEPARTMENT_ID	DEPARTMENT_NAME	LOCATION_ID
60	IT	1400

12. Write a query that returns all the employee data depending on the month of their hire date. Use the EMPLOYEES table. The statement should return the month part of the hiredate which is then compared to an abbreviated month (JAN, FEB, MAR) passed into the query via a substitution variable.

```
SELECT *
FROM EMPLOYEES
WHERE TO_CHAR(hire_date, 'MON') = :month_abbr;
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID	BONUS
102	Lex	De Haan	LDEHAAN	515.123.4569	01/13/2008	AD_VP	17000	-	100	90	-
149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	01/29/2015	SA_MAN	10500	.2	100	80	1500
142	Curtis	Davies	CDAVIES	650.121.2994	01/29/2012	ST_CLERK	3100	-	124	50	-
103	Alexander	Hunold	AHUNOLD	590.423.4567	01/03/2005	IT_PROG	9000	-	102	60	-
228	Nabil	Safwah	NSAFWAH	720.863.0485	01/06/1997	MK_REP	5000	-	201	20	-

Database Programming with SQL
4-2: Number Functions
Practice Activities

Objectives

- Select and apply the single-row number functions ROUND, TRUNC, and MOD in a SQL query
- Distinguish between the results obtained when TRUNC is applied to a numeric value and ROUND is applied to a numeric value
- State the implications for business when applying TRUNC and ROUND to numeric values

Vocabulary

Identify the vocabulary word for each definition below.

TRUNC	Used to terminate the column, expression, or value to a specified number of decimal places
Number functions	These functions accept numeric input and return numeric values.
MOD	Returns the remainder of a division.
ROUND	Rounds the column, expression, or value to a set number of decimal places.

Try It / Solve It

1. Display Oracle database employee last_name and salary for employee_ids between 100 and 102. Include a third column that divides each salary by 1.55 and rounds the result to two decimal places.

```
SELECT last_name, salary,
       ROUND(salary / 1.55, 2) AS "Rounded Salary"
FROM employees
WHERE employee_id BETWEEN 100 AND 102;
```

LAST_NAME	SALARY	Rounded Salary
King	24000	15483.87
Kochhar	17000	10967.74
De Haan	17000	10967.74

2. Display employee last_name and salary for those employees who work in department 80. Give each of them a raise of 5.333% and truncate the result to two decimal places.

```
SELECT last_name,
       TRUNC(salary * 1.05333, 2) AS "Truncated Salary"
FROM employees
WHERE department_id = 80;
```

LAST_NAME	Truncated Salary
Zlotkey	11059.96
Abel	11586.63
Taylor	9058.63
Hooper	10111.96

3. Use a MOD number function to determine whether 38873 is an even number or an odd number.

```
SELECT MOD(38873, 2) AS "Odd or Even"
FROM DUAL;
```

Odd or Even
1

4. Use the DUAL table to process the following numbers:
   845.553 - round to one decimal place
   30695.348 - round to two decimal places
   30695.348 - round to -2 decimal places
   2.3454 - truncate the 454 from the decimal place

```
SELECT ROUND(845.553, 1) FROM DUAL;
SELECT ROUND(30695.348, 2) FROM DUAL;
SELECT ROUND(30695.348, -2) FROM DUAL;
SELECT TRUNC(2.3454, 1) FROM DUAL;
```

5. Divide each employee's salary by 3. Display only those employees' last names and salaries who earn a salary that is a multiple of 3.

```
SELECT last_name, salary
FROM employees
WHERE MOD(salary, 3) = 0;
```

6. Divide 34 by 8. Show only the remainder of the division. Name the output as EXAMPLE.

```
SELECT MOD(34, 8) AS "EXAMPLE"
FROM DUAL;
```

EXAMPLE
2

7. How would you like your paycheck – rounded or truncated? What if your paycheck was calculated to be $565.784 for the week, but you noticed that it was issued for $565.78. The loss of .004 cent would probably make very little difference to you. However, what if this was done to one thousand people, one hundred thousand people, or one million people! Would it make a difference then?How much of a difference?

```
SELECT 0.004 * 1000000 AS "Difference"
FROM DUAL;
```

Difference
4000

Database Programming with SQL
4-3: Date Functions
Practice Activities

Objectives

- Select and apply the single-row functions MONTHS_BETWEEN, ADD_MONTHS, NEXT_DAY, LAST_DAY, ROUND, and TRUNC that operate on date data
- Explain how date functions transform Oracle dates into date data or numeric values
- Demonstrate proper use of the arithmetic operators with dates
- Demonstrate the use of SYSDATE and date functions
- State the implications for world businesses to be able to easily manipulate data stored in date format

Vocabulary

Identify the vocabulary word for each definition below.

SYSDATE	A function that returns the current date and time of the database server.
ADD_MONTHS	Add calendar months to date
LAST_DAY	Last day of the month
NEXT_DAY	Next day of the date specified
MONTHS_BETWEEN	Number of months between due dates

Try It / Solve It

1. For DJs on Demand, display the number of months between the event_date of the Vigil wedding and today's date. Round to the nearest month.

```
SELECT ROUND(MONTHS_BETWEEN(SYSDATE, event_date)) AS "Months Between"
FROM events
WHERE event_name = 'Vigil wedding';
```

```
Months Between
245
```

2. Display the days between the start of last summer's school vacation break and the day school started this year. Assume 30.5 days per month. Name the output "Days."

3. Display the days between January 1 and December 31.

```
SELECT (TO_DATE('31-DEC', 'DD-MON') - TO_DATE('01-JAN', 'DD-MON')) AS "Days"
FROM DUAL;
```

4. Using one statement, round today's date to the nearest month and nearest year, and truncate it to the nearest month and nearest year. Use an alias for each column.

```
SELECT ROUND(SYSDATE, 'MONTH') AS "Rounded Month",
       ROUND(SYSDATE, 'YEAR') AS "Rounded Year",
       TRUNC(SYSDATE, 'MONTH') AS "Truncated Month",
       TRUNC(SYSDATE, 'YEAR') AS "Truncated Year"
FROM DUAL;
```

5. What is the last day of the month for June 2005? Use an alias for the output.

```
SELECT LAST_DAY(TO_DATE('01-JUN-2005', 'DD-MON-YYYY')) AS "Last Day"
FROM DUAL;
```

```
Last Day
06/30/2005
```

6. Display the number of years between the Global Fast Foods employee Bob Miller's birthday and today. Round to the nearest year.

```
SELECT ROUND(MONTHS_BETWEEN(SYSDATE, birth_date) / 12, 0) AS "Years"
FROM employees
WHERE first_name = 'Bob'
  and last_name = 'Miller';
```

7. Your next appointment with the dentist is six months from today. On what day will you go to the dentist? Name the output, "Appointment."

```
SELECT ADD_MONTHS(SYSDATE, 6) AS "Appointment"
FROM DUAL;
```

```
Appointment
04/02/2025
```

8. The teacher said you have until the last day of this month to turn in your research paper. What day will this be? Name the output, "Deadline."

```
SELECT LAST_DAY(SYSDATE) AS "Deadline"
FROM DUAL;
```

```
Deadline
10/31/2024
```

9. How many months between your birthday this year and January 1 next year?

```
SELECT MONTHS_BETWEEN(TO_DATE('01-JAN-2025', 'DD-MON-YYYY'), TO_DATE('12-NOV-1990', 'DD-MON-YYYY')) AS "Months"
FROM DUAL;
```

```
Months
409.645161290322580645161290322580645161
```

10. What's the date of the next Friday after your birthday this year? Name the output, "First Friday."

```
SELECT NEXT_DAY(TO_DATE('12-NOV-2024', 'DD-MON-YYYY'), 'FRIDAY') AS "First Friday"
FROM DUAL;
```

```
First Friday
11/15/2024
```

11. Name a date function that will return a number.

```
MONTHS_BETWEEN()
```

12. Name a date function that will return a date.

```
ADD_MONTHS()
```

13. Give one example of why it is important for businesses to be able to manipulate date data?

```
Businesses need to calculate payroll, schedule payments, track orders, and manage deadlines based on date
manipulations.
```

Extension Exercises

1. Using DUAL, write a statement that will convert 86.678 to 86.68.

```
SELECT ROUND(86.678, 2) FROM DUAL;
```

2. Write a statement that will display the DJs on Demand CD titles for cd_numbers 90 and 91 in uppercase in a column headed "DJs on Demand Collections."

```
SELECT UPPER(title) AS "DJs on Demand Collections"
FROM d_cds
WHERE cd_number IN (90, 91);
```

3. Write a statement that will create computer usernames for the DJs on Demand partners. The usernames will be the lowercase letters of the last name + the uppercase first letter in the first name. Title the column “User Passwords.” For example, Mary Smythers would be smythersM.

```
SELECT LOWER(last_name) || UPPER(SUBSTR(first_name, 1, 1)) AS "User Passwords"
FROM partners;
```

4. Write a statement that will convert “It’s a small world” to “HELLO WORLD.”

```
SELECT REPLACE('It''s a small world', 'It''s a small', 'HELLO') AS "HELLO WORLD"
FROM DUAL;
```

5. Write a statement that will remove the “fiddle” from “fiddledeedee” and the “dum” from “fiddledeedum.” Display the result “fiddledeedeedee” in a column with the heading “Nonsense.”

```
SELECT REPLACE('fiddledeedee', 'fiddle', '') || REPLACE('fiddledeedum', 'dum', '') AS "Nonsense"
FROM DUAL;
```

6. Replace every “i” in Mississippi with “$.”

```
SELECT REPLACE('Mississippi', 'i', '$') FROM DUAL;
```

7. Using DUAL, convert 5332.342 to 5300.

```
SELECT TRUNC(5332.342, -2) FROM DUAL;
```

8. Using DUAL, convert 3.14159 to 3.14.

```
SELECT ROUND(3.14159, 2) FROM DUAL;
```

9. Using DUAL, convert 73.892 to 73.8.

```
SELECT ROUND(73.892, 1) FROM DUAL;
```

10. What is the next Friday six months from now? Label the column “Future.”

```
SELECT NEXT_DAY(ADD_MONTHS(SYSDATE, 6), 'FRIDAY') AS "Future"
FROM DUAL;
```

11. What is the date 10 years from now? Label the column “Future.”

```
SELECT ADD_MONTHS(SYSDATE, 120) AS "Future"
FROM DUAL;
```

12. Leap years occur every four years. Remember, 2004 was a leap year. Now create a function that will show the date of the next leap year as 29-Feb-2008. Label the column “Future.”

13. Write a statement that will find any of the DJs on Demand CD themes that have an “ie” in their names.

```
SELECT description as themes
FROM d_themes
WHERE description LIKE '%ie%';
```

14. Write a statement that will return only the DJs on Demand CDs with years greater than 2000 but less than 2003. Display both the title and year.

15. Write a statement that will return the Oracle database employee’s employee ID and his starting hire dates between January 1, 1997 and today. Display the result ordered from most recently hired to the oldest.

```
SELECT employee_id, hire_date
FROM employees
WHERE hire_date BETWEEN TO_DATE('01-JAN-1997', 'DD-MON-YYYY') AND SYSDATE
ORDER BY hire_date DESC;
```