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

Vocab	Definitions
DUAL	Dummy table used to view results from functions and calculations
FORMAT	The arrangement of data for storage or display.
INITCAP	Converts alpha character values to uppercase for the first letter of each word, all other letters in lowercase.
CHARACTER MANIPULATION FUNCTIONS	Functions that accept character data as input and can return both character and numeric values.
TRIM	Removes all specific characters from either the beginning or the ending of a string.
EXPRESSION	A symbol that represents a quantity or a relationship between quantities
SINGLE ROW FUNCTIONS	Functions that operate on single rows only and return one result per row
UPPER	Converts alpha characters into upper case
INPUT	Raw data entered into the computer
CONCAT	Concatenates the first character value to the second character value; equivalent to concatenation operator (||).
OUTPUT	Data that is processed into information
LOWER	Converts alpha character values to lowercase.
LPAD	Pads the left side of a character, resulting in a right-justified value
SUBSTR	Returns specific characters from character value starting at a specific character position and going specified character positions long

REPLACE	Replaces a sequence of characters in a string with another set of characters
INSTR	Returns the numeric position of a named string
LENGTH	Returns the number of characters in the expression
RPAD	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:
    a.

The Best Class
Oracle Internet Academy

    b. SELECT 'Oracle' || ' ' || 'Internet' || ' ' || 'Academy' AS "The Best Class" FROM DUAL;
2. Use the string “Oracle Internet Academy” to produce the following output:
    a.

The Net
net

    b. SELECT SUBSTR('Oracle Internet Academy', 13, 3) AS "The Net" FROM DUAL;
3. What is the length of the string “Oracle Internet Academy”?
    a. SELECT LENGTH('Oracle Internet Academy') AS length_of_string FROM DUAL;
    b. 23
4. What’s the position of “I” in “Oracle Internet Academy”?
    a. SELECT INSTR('Oracle Internet Academy', 'I') AS position_of_I FROM DUAL;
5. Starting with the string “Oracle Internet Academy”, pad the string to create ****Oracle****Internet****Academy****
    a. SELECT '****' || REPLACE('Oracle Internet Academy', ' ', '****') || '****' AS padded_string FROM DUAL;
6. Starting with the string “Oracle Internet Academy”, pad the string to produce: Oracle$$$Internet$$$Academy

a. SELECT REPLACE('Oracle Internet Academy', ' ', '$$$') AS padded_string FROM DUAL;

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

The Best Class
Oracle 2013-2014 Academy

   b. SELECT REPLACE('Oracle Internet Academy', 'Internet', '2013-2014') AS "The Best Class" FROM DUAL;
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 $
   a. SELECT ORDER_DATE, LPAD(ORDER_TOTAL, 10, '$') AS TOTAL FROM F_ORDERS;
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
   a. SELECT FIRST_NAME || ' ' || LAST_NAME || ' ' || STREET || ' ' || CITY || ', ' || STATE || ' ' || ZIP_CODE AS"ADDRESS" FROM F_CUSTOMERS;
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.
    a. SELECT SUBSTR(FIRST_NAME, 1, 1) || LAST_NAME AS "Name", SALARY, DEPARTMENT_ID FROMEMPLOYEES WHERE DEPARTMENT_ID = &dept_id;
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
    a. SELECT DEPARTMENT_ID, DEPARTMENT_NAME, LOCATION_ID FROM DEPARTMENTS WHEREDEPARTMENT_NAME = &dept_name;
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.

a. SELECT * FROM EMPLOYEES WHERE TO_CHAR(HIRE_DATE, 'MON') = UPPER(&month_abbr);

4-2: Number Functions

Vocab	Definitions
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.

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.
    a. SELECT last_name, ROUND(salary/1.55,2) AS "Salary"
    FROM employees
    WHERE employee_id BETWEEN 100 AND 102;
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.
    a. SELECT last_name, TRUNC(salary * 1.05333,2) AS "Salary with Raise"
    FROM employees
    WHERE department_id = 80;
3. Use a MOD number function to determine whether 38873 is an even number or an odd number.
    a. SELECT MOD(38873,2)
    FROM DUAL;
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

a. SELECT round(845.553,1)
   FROM DUAL;
b. SELECT round(30695.348,2)
   FROM DUAL;
c. SELECT ROUND(30695.348,-2)
   FROM DUAL;
d. 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.
   a. SELECT last_name, salary
      FROM employees
      WHERE MOD(salary,3) = 0;
6. 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?
   a. .004 * 1 = .004; .004 *1000 = $4.00; .004*100,000 = $ 400.00; .004 * 1,000,000 = $4000.00

4-3: Data Functions

Vocab	Definitions
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

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.
    a. SELECT ROUND(MONTHS_BETWEEN(SYSDATE, EVENT_DATE)) AS months_between FROM EVENTS
    WHERE EVENT_NAME = 'Vigil wedding';
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."
    a. SELECT ROUND (MONTHS_BETWEEN(END_DATE, START_DATE) * 30.5) AS "Days" FROM_SCHOOL_VACATIONS;
3. Display the days between January 1 and December 31.
    a. SELECT TO_DATE('2024-12-31', 'YYYY-MM-DD') - TO_DATE('2024-01-01', 'YYYY-MM-DD') 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.
5. What is the last day of the month for June 2005? Use an alias for the output.
    a. SELECT LAST_DAY(TO_DATE('2005-06-01', 'YYYY-MM-DD')) AS last_day_june FROM DUAL;
6. Display the number of years between the Global Fast Foods employee Bob Miller's birthday and today. Round to the nearest year.
    a. SELECT ROUND(MONTHS_BETWEEN(SYSDATE, TO_DATE(BIRTH_DATE, 'YYYY-MM-DD')) / 12) ASyears_between 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."
    a. SELECT ADD_MONTHS(SYSDATE, 6) AS "Appointment" FROM DUAL;
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."
    a. SELECT LAST_DAY(SYSDATE) AS "Deadline" FROM DUAL;
9. How many months between your birthday this year and January 1 next year?
    a. SELECT MONTHS_BETWEEN(TO_DATE('2025-01-01', 'YYYY-MM-DD'), TO_DATE('2024-07-27', 'YYYY-MM-DD')) AS months_between FROM DUAL;
10. What's the date of the next Friday after your birthday this year? Name the output, "First Friday."
    a. SELECT TO_DATE('2024-08-02', 'YYYY-MM-DD') AS "First Friday" FROM DUAL;
11. Name a date function that will return a number.
    a. MONTHS_BETWEEN
12. Name a date function that will return a date.
    a. SELECT ADD_MONTHS(SYSDATE, 6) AS future_date FROM DUAL;
13. Give one example of why it is important for businesses to be able to manipulate date data?
    a. Trend analysis, strategy development, data-driven solutions