4-1 Case and Character Manipulation

Vocabulary

dual	Dummy table used to view results from functions and calculations
format	The arrangement of data for storage or display
INITCAP	Converts alpha values to uppercase for the first letter of each word, all other letters in lowercase
Chacter 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 strong
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 to uppercase
Input	Raw data entered into the computer
CONCAT	Concatenates the first character value to the second character value; equivalent to concatenation operator (II)
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

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

The Best Class
Oracle Internet Academy

```
SELECT CONCAT(‘Oracle’, ‘Internet’) || ‘Academy’ AS “The Best Class”
FROM DUAL;
```

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

The Net
net

```
SELECT SUBSTR (‘Oracle Internet Academy’, 13,3) AS “The Net”
FROM DUAL;
```

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

23

```
SELECT LENGTH(‘Oracle Internet Academy’) AS “Length”
FROM DUAL;
```

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

8

```
SELECT INSTR (‘Oracle Internet Academy’, ‘I’) AS “Position”
FROM DUAL;
```

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

```
SELECT LPAD (‘Oracle’, 10 ‘*’) II LPAD(‘Internet’,12,’*’)IIRPAD(LPAD(‘Academy’,11,
‘*’),15,’*’)AS “OIA”
FROM DUAL;
```

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

```
SELECT RPAD(‘Oracle Internet Academy’, ‘Internet’, ‘2013-2014’) AS “The Best Class”
FROM DUAL;
```

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

```
The Best Class
Oracle 2013- 2014
```

```
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 $.

```
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.

```
SELECT UPPER(first_name) ||’ ‘ || UPPER(last_name) || ‘ ‘|| UPPER(address)||’
‘||UPPER(city) ||’, ‘||UPPER(state)|| ‘ ‘||zip AS “ADDRESS”
FROM f_customers
WHERE id = 456;
```

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, department_id
```

```
FROM employees
WHERE department_id = 20;

SELECT SUBSTR(first_name, 1, 1) || last_name AS “Name”, salary, department_id
FROM employees
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.

```
SELECT department_id, department_name, location_id
FROM departments
WHERE department_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

```
SELECT *

FROM employees

WHERE SUBSTR(hire_date, 4,3) = :entered_month;
```

4-2 Number Functions

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 lsat_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, ROUND(salary/1.55,2) AS “Salary Calculation”

   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.

   ```
   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.

   Odd. This is an example of using MOD when diving by 2 to determine whether a number is odd or even.

   ```
   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

   ```
   SELECT round(845.553,1)
   FROM DUAL;
   ```

   30695.348 - round to two decimal places

```
SELECT round(30695.348,2)
FROM DUAL;
```

30695.348 - round to -2 decimal places

```
SELECT ROUND(30695.348,-2)
FROM DUAL;
```

2.3454 - truncate the 454 from the decimal place

```
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;
```

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 a thousand people, a 100,000 people, or a million people! Would it make a difference then? How much difference?

.004 * 1 = .004; .004 *1000 = $4.00; .004*100,000 = $ 400.00; .004 * 1,000,000 = $4000.00

4-3 Date Functions

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.

```
SELECT ROUND(MONTHS_BETWEEN (SYSDATE,event_date)) AS MONTHS
FROM d_events where id=105;
```

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.”

   ```
   SELECT ROUND(MONTHS_BETWEEN ('05-Sep-2004', '15-Jun-2004')*30.5) AS
   DAYS
   FROM dual;
   ```

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

   ```
   SELECT ROUND(MONTHS_BETWEEN ('31-Dec-2004','01-Jan-2004')*30.5) 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 Month,ROUND(SYSDATE,'YEAR')
   AS YEAR,TRUNC(SYSDATE,'MONTH')AS Month, TRUNC(SYSDATE,'YEAR')
   AS Year
   FROM DUAL;
   ```

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

   ```
   SELECT LAST_DAY('01-Jun-2005') AS "LAST DAY"

   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.

```
SELECT last_name, ROUND(MONTHS_BETWEEN(SYSDATE, birthdate)/12)
AS YEARS
FROM f_staffs
WHERE id = 9;
```

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;
```

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;
```

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

```
SELECT ROUND(MONTHS_BETWEEN('01-Jan-2005', '19-Jun-2004'))
FROM DUAL;
```

10. What’s the date of the next Friday after your birthday this year? Name the output, “First Friday.”

```
SELECT ROUND(NEXT_DAY('19-Jun-2004','Friday'))AS "First Friday"
FROM DUAL;
```

11. Name a date function that will return a number.
    MONTHS_BETWEEN
12. Name a date function that will return a date.
    Any of ADD_MONTHS, NEXT_DAY, LAST_DAY, ROUND, and TRUNC
13. Give one example of why it is important for businesses to be able to manipulate date data?
    Schedule payrolls and payments, track employee performance reviews and years of service, or keep track of orders and shipments.

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

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

15. 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);
```

16. 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 CONCAT(LOWER(last_name),UPPER(SUBSTR(first_name,1,1))) AS
"User Passwords"
FROM d_partners;
```

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

```
SELECT UPPER(CONCAT('hello ',(SUBSTR('Its a small world',13, 18))))
FROM DUAL;
```

18. 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 SUBSTR('fiddledeedum',1,9)||SUBSTR('fiddledeedee',7, 12)AS
"Nonsense"
FROM DUAL;
```

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

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

20. Using DUAL, convert 5332.342 to 5300.

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

21. Using DUAL, convert 3.14159 to 3.14.

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

22. Using DUAL, convert 73.892 to 73.8.

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

23. 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;
```

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

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

25. 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.”

```
SELECT ADD_MONTHS(LAST_DAY('01-Feb-2004'),48) AS "Future"
FROM DUAL;
```

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

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

27. 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.

```
SELECT title, year
FROM d_cds
WHERE year > 2000 AND year < 2003;
```

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

```
SELECT employee_id, start_date
FROM job_history
WHERE start_date BETWEEN '01-Jan-1997'AND SYSDATE
ORDER BY start_date DESC, employee_id;
```

5-1 Conversion Functions

CHAR	Used for text and character data of fixed length, including numbers, dashes, and special characters
fm	Used to remove padded blanks or to suppress leading zeros
NUMBER	Functions that convert a value from one datatype to another - conversion function
VARCHAR2	Used for character data of variable length, including numbers, special characters, and dashes

DATE	Used for date and time values
TO_CHAR	Converts dates or numbers to character strings with optional formatting
RR	Century value depends on the specified year and the last two digits of the current year
TO_NUMBER	Converts a character string containing digits to a number with optional formatting
DD	Numeric day of the month
TO_DATE	Converts a character string representing a date to a date value with optional formatting

1. List the last names and birthdays of Global Fast Food Employees. Convert the birth dates to character data in the Month DD, YYYY format. Suppress any leading zeros.

```
        SELECT last_name, TO_CHAR(birthdate, ‘Month DD, YYYY) as birthdate
FROM f_staffs;
```

2. Convert January 3, 04, to the default date format 03-Jan-2004.

```
        SELECT TO_DATE(‘Janurary 3,04’, ‘Month DD YY’) as birthdate
        FROM f_staffs
```

3. Format a query from the Global Fast Foods f_promotional_menus table to print out the start_date of promotional code 110 as: The promotion began on the tenth of February 2004.

```
        SELECT 'The promotion began on the ' || TO_CHAR(start_date, 'ddthsp "of"
Month YYYY') as output
        FROM f_promotional_menus
        WHERE code = 110;
```

4. Convert today’s date to a format such as: “Today is the Twentieth of March, Two Thousand Four”

```
        SELECT 'Today is the ' || TO_CHAR(SYSDATE, 'fmDdthsp "of" Month, Year') as
today
FROM dual;
```

5. List the ID, name, and salary for all Global Fast Foods employees. Display salary with a $ sign and two decimal places.

```
        SELECT id, first_name ||' '||last_name as  name, TO_CHAR( salary,
'$999999.99') as salary
FROM f_staffs;
```

6. Ellen Abel is an employee who has received a $2,000 raise. Display her first name and last name, her current salary, and her new salary. Display both salaries with a $ and two decimal places. Label her new salary column AS New Salary.

```
        SELECT first_name, last_name, TO_CHAR( salary, '$999999.99') as "Old
Salary", TO_CHAR( salary + 2000 , '$9999999.99') as "New Salary"
FROM employees
WHERE first_name = 'Ellen'  AND last_name = 'Abel' ;
```

7. On what day of the week and date did Global Fast Foods’ promotional code 110 Valentine’s Special begin?

```
SELECT TO_CHAR(start_date, 'fmdd-Mon-YYYY (Day)') as startdate
FROM f_promotional_menus
WHERE  code = 110;
```

8.Create one query that will convert 25-Dec-2004 into each of the following (you will have to convert 25-Dec-2004 to a date and then to character data):

December 25th, 2004: SELECT TO_CHAR(TO_DATE('25-Dec-2004', 'dd-Mon-yyyy'),
'Month ddth, yyyy') as changeddate
FROM dual;

DECEMBER 25TH, 2004: SELECT TO_CHAR(TO_DATE('25-Dec-2004',
'dd-Mon-yyyy'), 'MONTH DDth, yyyy') as changeddate
FROM dual;

25th
december, 2004: SELECT TO_CHAR(TO_DATE('25-Dec-2004', 'dd-Mon-yyyy'), 'fmddth
month, yyyy') as changeddate
FROM dual;

9. Create a query that will format the DJs on Demand d_packages columns, low-range and high-range package costs, in the format $2500.00.

```
SELECT code, TO_CHAR(low_range,'$999999.99') as low_range,
TO_CHAR(high_range,'$999999.99') as high_range
FROM d_packages ;
```

10. Convert JUNE192004 to a date using the fx format model.

```
SELECT TO_DATE('JUNE192004','fxfmMONTHddyyyy') as changeddate
FROM dual;
```

11. What is the distinction between implicit and explicit datatype conversion? Give an example of each.

Implicit: SELECT SYSDATE FROM dual;

- Convert VARCHAR2 and CHAR data to NUMBER and DATE data types.

Explicit: SELECT TO_CHAR(SYSDATE, ‘MONTH DDth, yyyy’) FROM dual;

- Convert NUMBER and DATE back to CHARACTER type.

12. Why is it important from a business perspective to have datatype conversions?

So that data can be used a multitude of ways and meet the general needs of clients.

5-2 NULL Functions

NVL	Converts nulls to an actual value
COALESCE	Returns the first non-null expression in the list
NVL2	Examines the first expression; if the first expression is not null, it returns the second expression; if the first expression is null, it returns the third expression
NULLIF	Compares two expressions; if they are equal, the function returns null; if they are not equal, the function returns the first expression

Use aliases to make the output more readable.

1. Create a report that shows the Global Fast Foods promotional name, start date, and end date from the f_promotional_menus table. If there is an end date, temporarily replace it with “end in two weeks.” If there is no end date, replace it with today’s date.

```
SELECT name, start_date, end_date, NVL2(end_date, 'end in two weeks', TO_CHAR(
SYSDATE, 'DD-Mon-YYYY')) as nvl2
FROM f_promotional_menus;
```

2. Not all Global Fast Foods staff members receive overtime pay. Instead of displaying a null value for these employees, replace null with zero. Include the employee’s last name and overtime rate in the output. Label the overtime rate as “Overtime Status”.

```
SELECT last_name, NVL(overtime_rate,0) as "Overtime Status"
FROM f_staffs;
```

3. The manager of Global Fast Foods has decided to give all staff who currently do not earn overtime an overtime rate of $5.00. Construct a query that displays the last names and the overtime rate for each staff member, substituting $5.00 for each null overtime value.

```
SELECT last_name, TO_CHAR( NVL(overtime_rate,5), '$999.99') as "Overtime Status"
FROM f_staffs;
```

4. Not all Global Fast Foods staff members have a manager. Create a query that displays the employee last name and 9999 in the manager ID column for these employees.

```
SELECT last_name,  NVL(manager_id,9999) as manager_id
FROM f_staffs;
```

5. Which statement(s) below will return null if the value of v_sal is 50?
   A. SELECT nvl(v_sal, 50) FROM emp;
   B. SELECT nvl2(v_sal, 50) FROM emp;
   C. SELECT nullif(v_sal, 50) FROM emp;
   SELECT coalesce (v_sal, Null, 50) FROM emp;

6. What does this query on the Global Fast Foods table return?

   ```
   SELECT COALESCE(last_name, to_char(manager_id)) as NAME
   FROM f_staffs;
   ```

7.

A. Create a report listing the first and last names and month of hire for all employees in the EMPLOYEES table (use TO_CHAR to convert hire_date to display the month).

```
SELECT NVL(first_name,'FNU') , last_name, TO_CHAR(hire_date, 'Month') as "month
of hire"
FROM employees;
```

B. Modify the report to display null if the month of hire is September. Use the NULLIF function.

```
SELECT NVL(first_name,'FNU') , last_name, NULLIF( TO_CHAR(hire_date, 'Month'),
'September') as "month of hire"
FROM employees;
```

8. For all null values in the specialty column in the DJs on Demand d_partners table, substitute “No Specialty.” Show the first name and s

```
SELECT first_name, NVL(specialty, 'No Specialty') as specialty


FROM d_partners;
```

5-3 Conditional Expressions

DECODE	Compares an expression to each of the search values
Conditional expression	An if-then-else expression whose value depends on the truth-value of a Boolean expression
CASE	Implements conditional processing within a SQL statement; it meets the ANSI standard

1. From the DJs on Demand d_songs table, create a query that replaces the 2-minute songs with “shortest” and the 10-minute songs with “longest”. Label the output column “Play Times”.

```
        SELECT title, CASE
WHEN TO_NUMBER(REPLACE(NVL(duration,'0 min'), ' min', '')) = 2 THEN 'Shortest'
WHEN TO_NUMBER(REPLACE(NVL(duration,'0 min'), ' min', '')) = 10 THEN 'Longest'
ELSE NVL(duration,'0 min')
END
as "Play Times"
FROM d_songs;
```

2. Use the Oracle database employees table and CASE expression to decode the department id.

```
SELECT NVL(TO_CHAR(department_id), 'none') department_id , last_name,
NVL(salary,0) salary,
CASE department_id
WHEN 10 THEN 1.25*NVL(salary,0)
WHEN 90 THEN 1.5*NVL(salary,0)
WHEN 130 THEN 1.75*NVL(salary,0)
ELSE NVL(salary,0)
END
as "New Salary"
FROM employees;
```

3. Display the department id, last name, salary, and a column called “New Salary” whose value is based on the following conditions:

   If the department id is 10 then 1.25 * salary

   If the department id is 90 then 1.5 * salary

   If the department id is 130 then 1.75 * salary

   Otherwise, display the old salary.

4. Display the first name, last name, manager ID, and commission percentage of all employees in departments 80 and 90. In a 5 column called “Review”, again display the manager ID. If they don’t have a manager, display the commission percentage. If they don’t have a commission, display 99999

```
SELECT first_name, last_name, manager_id, commission_pct,

COALESCE(manager_id,commission_pct ,99999)
as "Review"

FROM employees

WHERE department_id in (80, 90);
```