Database Management System

EXPERIMENT 6 SINGLE ROW FUNCTIONS

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Let's verify our data and add some more for better demonstration:

```
-- Check current employees
SELECT COUNT(*) FROM employees;
```

Expected Output:

```
 COUNT(*)
----------
        19
```

Exercise Solutions:

1. Display current date

```
SELECT SYSDATE AS "Date" FROM dual;
```

Expected Output:

```
Date
---------
```

```
23-JAN-24
```

2. Display employee details with 15.5% salary increase

```
SELECT employee_id, last_name, salary,
       ROUND(salary * 1.155) AS "New Salary"
FROM employees;
```

Expected Output:

```
EMPLOYEE_ID LAST_NAME                     SALARY New Salary
----------- ------------------------- ---------- ----------
        100 King                         24000      27720
        101 Kochhar                      17000      19635
        102 De Haan                      17000      19635
        103 Hunold                        9000      10395
        104 Ernst                         6000       6930
        107 Lorentz                       4200       4851
        124 Mourgos                       5800       6699
        141 Rajs                          3500       4043
        142 Davies                        3100       3581
        143 Matos                         2600       3003
        144 Vargas                        2500       2888
        149 Zlotkey                      10500      12128
        174 Abel                         11000      12705
        176 Taylor                        8600       9933
        200 Whalen                        4400       5082
        201 Hartstein                    13000      15015
        202 Fay                           6000       6930
        205 Higgins                      12000      13860
```

3. Add a column showing the salary increase amount

```
SELECT employee_id, last_name, salary,
       ROUND(salary * 1.155) AS "New Salary",
       ROUND(salary * 1.155) - salary AS "Increase"
FROM employees;
```

Expected Output:

```
EMPLOYEE_ID LAST_NAME                     SALARY New Salary
Increase
----------- ------------------------- ---------- ----------
----------
        100 King                         24000      27720
3720
        101 Kochhar                      17000      19635
2635
        102 De Haan                      17000      19635
2635
        103 Hunold                        9000      10395
1395
        104 Ernst                         6000       6930
930
        107 Lorentz                       4200       4851
651
        124 Mourgos                       5800       6699
899
        141 Rajs                          3500       4043
543
        142 Davies                        3100       3581
481
        143 Matos                         2600       3003
403
        144 Vargas                        2500       2888
388
```

```
        149 Zlotkey                      10500      12128
1628
        174 Abel                         11000      12705
1705
        176 Taylor                        8600       9933
1333
        200 Whalen                        4400       5082
682
        201 Hartstein                    13000      15015
2015
        202 Fay                           6000       6930
930
        205 Higgins                      12000      13860
1860
```

4. Display formatted names and lengths for names starting with J, A, or M

```
SELECT INITCAP(last_name) AS "Last Name",
       LENGTH(last_name) AS "Name Length"
FROM employees
WHERE UPPER(SUBSTR(last_name, 1, 1)) IN ('J', 'A', 'M')
ORDER BY last_name;
```

Expected Output:

```
Last Name                   Name Length
------------------------- ------------
Abel                                 4
Davies                               6
Hartstein                            9
Matos                                5
Mourgos                              7
Rajs                                 4
```

```
Taylor                               6
```

5. Prompt user for starting letter and display matching employees

```
-- This will prompt for input
SELECT last_name, LENGTH(last_name) AS "Name Length"
FROM employees
WHERE UPPER(SUBSTR(last_name, 1, 1)) =
UPPER('&start_letter')
ORDER BY last_name;
```

When prompted with 'H': Expected Output:

```
Enter value for start_letter: H
old   3: WHERE UPPER(SUBSTR(last_name, 1, 1)) =
UPPER('&start_letter')
new   3: WHERE UPPER(SUBSTR(last_name, 1, 1)) = UPPER('H')
LAST_NAME                   Name Length
------------------------- ------------
Hartstein                            9
Higgins                              7
Hunold                               6
```

6. Calculate months worked for each employee

```
SELECT last_name,
       CEIL(MONTHS_BETWEEN(SYSDATE, hire_date)) AS
MONTHS_WORKED
FROM employees
ORDER BY MONTHS_WORKED;
```

Expected Output:

```
LAST_NAME                 MONTHS_WORKED
------------------------- -------------
King                               439
Whalen                             436
Kochhar                            412
Hunold                             408
Ernst                              392
De Haan                            372
Higgins                            355
Rajs                               339
Hartstein                          334
Abel                               331
Fay                                317
Davies                             323
Matos                              310
Taylor                             309
Vargas                             305
Mourgos                            290
Lorentz                            298
Zlotkey                            287
```

7. Create "Dream Salaries" report

```
SELECT last_name || ' earns ' || TO_CHAR(salary) ||
       ' monthly but wants ' || TO_CHAR(salary * 3) AS
"Dream Salaries"
FROM employees;
```

Expected Output:

```
Dream Salaries
------------------------------------------------------------
--------------------
```

```
King earns 24000 monthly but wants 72000
Kochhar earns 17000 monthly but wants 51000
De Haan earns 17000 monthly but wants 51000
Hunold earns 9000 monthly but wants 27000
Ernst earns 6000 monthly but wants 18000
Lorentz earns 4200 monthly but wants 12600
Mourgos earns 5800 monthly but wants 17400
Rajs earns 3500 monthly but wants 10500
Davies earns 3100 monthly but wants 9300
Matos earns 2600 monthly but wants 7800
Vargas earns 2500 monthly but wants 7500
Zlotkey earns 10500 monthly but wants 31500
Abel earns 11000 monthly but wants 33000
Taylor earns 8600 monthly but wants 25800
Whalen earns 4400 monthly but wants 13200
Hartstein earns 13000 monthly but wants 39000
Fay earns 6000 monthly but wants 18000
Higgins earns 12000 monthly but wants 36000
```

8. Display salary with left-padded $ symbol

```
SELECT last_name,
       LPAD('$' || TO_CHAR(salary), 15, '$') AS SALARY
FROM employees;
```

Expected Output:

```
LAST_NAME                 SALARY
------------------------- ---------------
King                      $$$$$$$$$$24000
Kochhar                   $$$$$$$$$$17000
De Haan                   $$$$$$$$$$17000
Hunold                    $$$$$$$$$$$9000
```

```
Ernst                     $$$$$$$$$$$6000
Lorentz                   $$$$$$$$$$$4200
Mourgos                   $$$$$$$$$$$5800
Rajs                      $$$$$$$$$$$3500
Davies                    $$$$$$$$$$$3100
Matos                     $$$$$$$$$$$2600
Vargas                    $$$$$$$$$$$2500
Zlotkey                   $$$$$$$$$$10500
Abel                      $$$$$$$$$$11000
Taylor                    $$$$$$$$$$$8600
Whalen                    $$$$$$$$$$$4400
Hartstein                 $$$$$$$$$$13000
Fay                       $$$$$$$$$$$6000
Higgins                   $$$$$$$$$$12000
```

9. Display hire date and salary review date (first Monday after 6 months)

```
SELECT last_name,
       TO_CHAR(hire_date, 'fmDay, "the" fmDDth "of" Month,
YYYY') AS hire_date,
       TO_CHAR(NEXT_DAY(ADD_MONTHS(hire_date, 6), 'MONDAY'),
              'fmDay, "the" fmDDth "of" Month, YYYY') AS
REVIEW
FROM employees;
```

Expected Output:

```
LAST_NAME                 HIRE_DATE
REVIEW
------------------------- ----------------------------------
------------ ---------------------------------------------
King                      Tuesday, the 17th of June, 1987
Monday, the 21st of December, 1987
```

Kochhar	Thursday, the 21st of September, 1989	Monday, the 26th of March, 1990
De Haan	Wednesday, the 13th of January, 1993	Monday, the 19th of July, 1993
Hunold	Wednesday, the 3rd of January, 1990	Monday, the 9th of July, 1990
Ernst	Tuesday, the 21st of May, 1991	Monday, the 25th of November, 1991
Lorentz	Sunday, the 7th of February, 1999	Monday, the 9th of August, 1999
Mourgos	Tuesday, the 16th of November, 1999	Monday, the 22nd of May, 2000
Rajs	Tuesday, the 17th of October, 1995	Monday, the 22nd of April, 1996
Davies	Wednesday, the 29th of January, 1997	Monday, the 4th of August, 1997
Matos	Sunday, the 15th of March, 1998	Monday, the 21st of September, 1998
Vargas	Thursday, the 9th of July, 1998	Monday, the 11th of January, 1999
Zlotkey	Saturday, the 29th of January, 2000	Monday, the 31st of July, 2000
Abel	Saturday, the 11th of May, 1996	Monday, the 11th of November, 1996
Taylor	Tuesday, the 24th of March, 1998	Monday, the 28th of September, 1998
Whalen	Thursday, the 17th of September, 1987	Monday, the 21st of March, 1988
Hartstein	Saturday, the 17th of February, 1996	Monday, the 19th of August, 1996
Fay	Sunday, the 17th of August, 1997	Monday, the 16th of February, 1998
Higgins	Tuesday, the 7th of June, 1994	

```
Monday, the 12th of December, 1994
```

10. Display day of week for hire date, ordered starting with Monday

```
SELECT last_name, hire_date,
       TO_CHAR(hire_date, 'fmDay') AS DAY
FROM employees
ORDER BY CASE TO_CHAR(hire_date, 'DY',
'NLS_DATE_LANGUAGE=ENGLISH')
           WHEN 'MON' THEN 1
           WHEN 'TUE' THEN 2
           WHEN 'WED' THEN 3
           WHEN 'THU' THEN 4
           WHEN 'FRI' THEN 5
           WHEN 'SAT' THEN 6
           WHEN 'SUN' THEN 7
         END;
```

Expected Output:

```
LAST_NAME                 HIRE_DATE DAY
------------------------- --------- --------------------
Mourgos                   16-NOV-99 Tuesday
Taylor                    24-MAR-98 Tuesday
Higgins                   07-JUN-94 Tuesday
Rajs                      17-OCT-95 Tuesday
Ernst                     21-MAY-91 Tuesday
Davies                    29-JAN-97 Wednesday
De Haan                   13-JAN-93 Wednesday
King                      17-JUN-87 Wednesday
Hunold                    03-JAN-90 Wednesday
Vargas                    09-JUL-98 Thursday
Kochhar                   21-SEP-89 Thursday
```

```
Whalen                    17-SEP-87 Thursday
Hartstein                 17-FEB-96 Saturday
Zlotkey                   29-JAN-00 Saturday
Abel                      11-MAY-96 Saturday
Lorentz                   07-FEB-99 Sunday
Fay                       17-AUG-97 Sunday
Matos                     15-MAR-98 Sunday
```

Additional Single Row Function Examples:

Character Functions:

11. Case conversion functions

```
SELECT last_name,
       LOWER(last_name) AS lower_name,
       UPPER(last_name) AS upper_name,
       INITCAP(last_name) AS initcap_name
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
LAST_NAME                 LOWER_NAME            UPPER_NAME
INITCAP_NAME
------------------------- -------------------- -------------
------- --------------------
King                      king                 KING
King
Kochhar                   kochhar              KOCHHAR
Kochhar
De Haan                   de haan              DE HAAN
De Haan
Hunold                    hunold               HUNOLD
```

```
Hunold
Ernst                     ernst                ERNST
Ernst
```

12. String manipulation functions

```
SELECT last_name,
       SUBSTR(last_name, 1, 3) AS first_3_chars,
       LENGTH(last_name) AS name_length,
       INSTR(last_name, 'a') AS position_of_a,
       REPLACE(last_name, 'a', '*') AS replaced_a
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
LAST_NAME                 FIRST_3_CHARS NAME_LENGTH
POSITION_OF_A REPLACED_A
------------------------- ------------- ----------- --------
----- --------------------
King                      Kin                     4
0 King
Kochhar                   Koc                     7
5 Kochh*r
De Haan                   De                      7
4 De H**n
Hunold                    Hun                     6
0 Hunold
Ernst                     Ern                     5
0 Ernst
```

Numeric Functions:

13. Rounding and truncation functions

```
SELECT salary,
       ROUND(salary, -3) AS rounded_thousands,
       TRUNC(salary, -3) AS truncated_thousands,
       MOD(salary, 1000) AS remainder
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
   SALARY ROUNDED_THOUSANDS TRUNCATED_THOUSANDS   REMAINDER
---------- ----------------- ------------------- ----------
     24000             24000               24000          0
     17000             17000               17000          0
     17000             17000               17000          0
      9000              9000                9000          0
      6000              6000                6000          0
```

Date Functions:

14. Date arithmetic and functions

```
SELECT last_name, hire_date,
       ADD_MONTHS(hire_date, 6) AS after_6_months,
       LAST_DAY(hire_date) AS month_end,
       NEXT_DAY(hire_date, 'FRIDAY') AS next_friday
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
LAST_NAME                 HIRE_DATE AFTER_6_MO MONTH_END
NEXT_FRIDA
```

```
------------------------- --------- ---------- ---------- --
--------
King                      17-JUN-87 17-DEC-87  30-JUN-87
19-JUN-87
Kochhar                   21-SEP-89 21-MAR-90  30-SEP-89
22-SEP-89
De Haan                   13-JAN-93 13-JUL-93  31-JAN-93
15-JAN-93
Hunold                    03-JAN-90 03-JUL-90  31-JAN-90
05-JAN-90
Ernst                     21-MAY-91 21-NOV-91  31-MAY-91
24-MAY-91
```

Conversion Functions:

15. TO_CHAR with dates

```
SELECT last_name, hire_date,
       TO_CHAR(hire_date, 'DD-MON-YYYY') AS simple_format,
       TO_CHAR(hire_date, 'Day, Month DD, YYYY') AS
long_format,
       TO_CHAR(hire_date, 'YYYY"Q"Q') AS quarter
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
LAST_NAME                 HIRE_DATE SIMPLE_FORMAT
LONG_FORMAT                     QUARTER
------------------------- --------- ------------- ---------
--------------------- -------
King                      17-JUN-87 17-JUN-1987   Wednesday,
June 17, 1987       1987Q2
Kochhar                   21-SEP-89 21-SEP-1989   Thursday,
September 21, 1989   1989Q3
De Haan                   13-JAN-93 13-JAN-1993   Wednesday,
January 13, 1993    1993Q1
Hunold                    03-JAN-90 03-JAN-1990   Wednesday,
January 03, 1990    1990Q1
Ernst                     21-MAY-91 21-MAY-1991   Tuesday,
May 21, 1991          1991Q2
```

16. TO_CHAR with numbers

```
SELECT last_name, salary,
       TO_CHAR(salary, '$99,999.00') AS currency_format,
       TO_CHAR(salary, '099999') AS leading_zeros,
       TO_CHAR(salary, '9.999EEEE') AS scientific
FROM employees
WHERE ROWNUM <= 5;
```

Expected Output:

```
LAST_NAME                     SALARY CURRENCY_FORMAT
LEADING_ZEROS SCIENTIFIC
------------------------- ---------- --------------- -------
------ ----------
King                          24000    $24,000.00      024000
2.400E+04
Kochhar                       17000    $17,000.00      017000
1.700E+04
De Haan                       17000    $17,000.00      017000
1.700E+04
Hunold                         9000     $9,000.00      009000
9.000E+03
Ernst                          6000     $6,000.00      006000
```

```
6.000E+03
```

17. NVL and NVL2 functions

```
SELECT last_name, salary, commission_pct,
       NVL(commission_pct, 0) AS nvl_commission,
       NVL2(commission_pct, 'Has Commission', 'No
Commission') AS commission_status
FROM employees
WHERE ROWNUM <= 8;
```

Expected Output:

```
LAST_NAME                     SALARY COMMISSION_PCT
NVL_COMMISSION COMMISSION_STATUS
------------------------- ---------- -------------- --------
------ -----------------
King                         24000                 0 No
Commission
Kochhar                      17000                 0 No
Commission
De Haan                      17000                 0 No
Commission
Hunold                        9000                 0 No
Commission
Ernst                         6000                 0 No
Commission
Lorentz                       4200                 0 No
Commission
Mourgos                       5800                 0 No
Commission
Rajs                          3500                 0 No
```

```
Commission
```

Comprehensive Example:

18. Employee information with formatted output

```
SELECT
    INITCAP(last_name) || ', ' || INITCAP(first_name) AS
"Employee Name",
    'Department: ' || department_id AS "Department",
    TO_CHAR(salary, '$99,999') AS "Monthly Salary",
    TO_CHAR(salary * 12, '$999,999') AS "Annual Salary",
    TO_CHAR(hire_date, 'MM/DD/YYYY') AS "Hire Date",
    ROUND(MONTHS_BETWEEN(SYSDATE, hire_date)/12, 1) || '
years' AS "Service"
FROM employees
ORDER BY last_name;
```

Expected Output:

```
Employee Name               Department          Monthly
Salary Annual Salary Hire Date Service
--------------------------- -------------------- -----------
--- ------------- --------- --------------------
Abel, Ellen                Department: 80         $11,000
$132,000    05/11/1996 27.6 years
Davies, Curtis             Department: 50          $3,100
$37,200    01/29/1997 26.9 years
De Haan, Lex               Department: 90         $17,000
$204,000    01/13/1993 31 years
Ernst, Bruce               Department: 60          $6,000
$72,000    05/21/1991 32.6 years
Fay, Pat                   Department: 20          $6,000
```

```
$72,000    08/17/1997 26.4 years
Hartstein, Michael         Department: 20          $13,000
$156,000    02/17/1996 27.9 years
Higgins, Shelley           Department: 110         $12,000
$144,000    06/07/1994 29.6 years
Hunold, Alexander          Department: 60           $9,000
$108,000    01/03/1990 34 years
King, Steven               Department: 90          $24,000
$288,000    06/17/1987 36.6 years
Kochhar, Neena             Department: 90          $17,000
$204,000    09/21/1989 34.3 years
Lorentz, Diana             Department: 60           $4,200
$50,400    02/07/1999 24.9 years
Matos, Randall             Department: 50           $2,600
$31,200    03/15/1998 25.8 years
Mourgos, Kevin             Department: 50           $5,800
$69,600    11/16/1999 24.2 years
Rajs, Trenna               Department: 50           $3,500
$42,000    10/17/1995 28.2 years
Taylor, Jonathan           Department: 80           $8,600
$103,200    03/24/1998 25.8 years
Vargas, Peter              Department: 50           $2,500
$30,000    07/09/1998 25.5 years
Whalen, Jennifer           Department: 10           $4,400
$52,800    09/17/1987 36.3 years
Zlotkey, Eleni             Department: 80          $10,500
$126,000    01/29/2000 23.9 years
```

Summary of Single Row Functions:

1. **Character Functions** - UPPER, LOWER, INITCAP, SUBSTR, LENGTH, INSTR, CONCAT, LPAD, RPAD, TRIM, REPLACE
2. **Number Functions** - ROUND, TRUNC, MOD, CEIL, FLOOR

3. **Date Functions** - SYSDATE, MONTHS_BETWEEN, ADD_MONTHS, NEXT_DAY, LAST_DAY, ROUND, TRUNC
4. **Conversion Functions** - TO_CHAR, TO_NUMBER, TO_DATE
5. **General Functions** - NVL, NVL2, COALESCE, CASE, DECODE