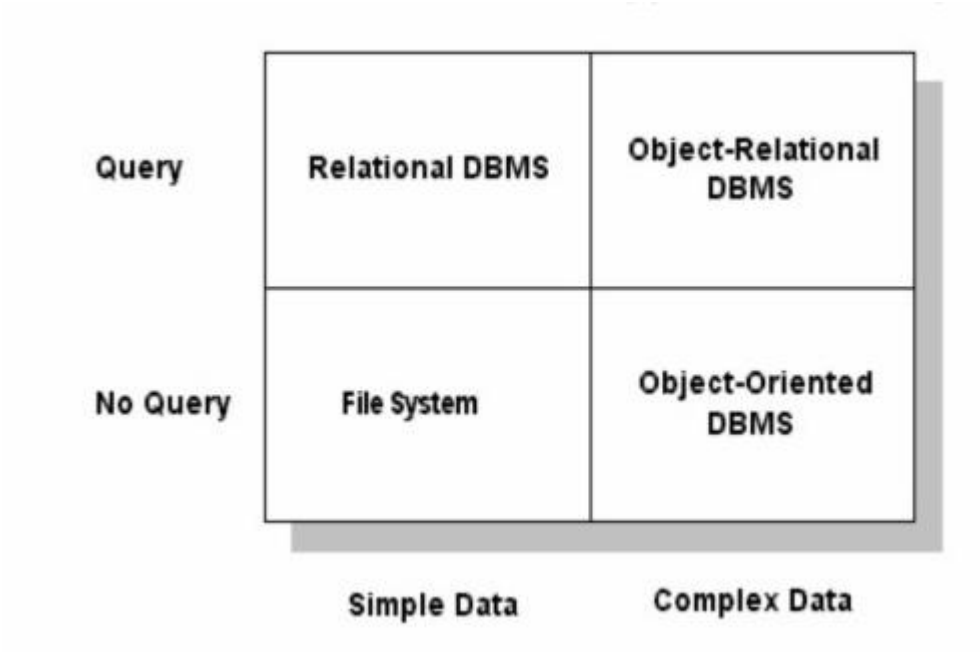
BIC2353 – DATABASE TECHNOLOGY

1. Discuss the classification of Michael Stonebraker's Classification of both database applications and systems.



- When it uses **query** and is **simple data**, it is relational DBMS (Upper left quadrant)

- When it uses **query** and is **complex data**, it is object-relational DBMS (Upper right quadrant)

- When it uses **no query** and is **simple data**, it is File system (Lower left quadrant)

- When it uses **no query** and is **complex data**, it is Object-oriented DBMS (Lower right quadrant)

-- Complex data = object

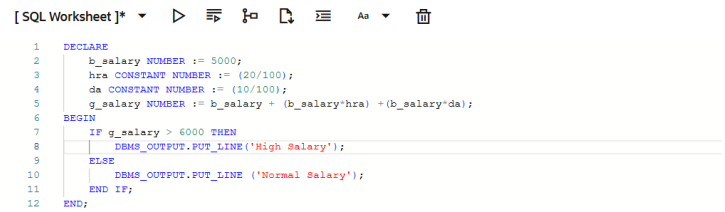
-- Query = relational

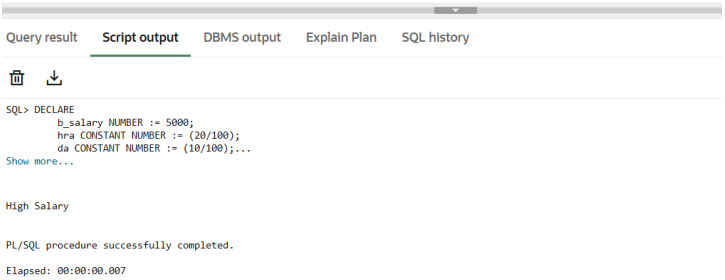
2. Write PL/SQL code for the following :

Question 1: Salary Calculation with IF-ELSE

Write a PL/SQL program to calculate the gross salary of an employee:
- Declare basic salary as a variable and set it to 5000.
- Use a constant for HRA (20%) and DA (10%) of the basic salary.
- If gross salary exceeds 6000, print “High Salary”, else print “Normal Salary”.

Note : gross_salary := basic_salary + (basic_salary * hra) + (basic_salary * da);






```
DECLARE
   b_salary NUMBER := 5000;
   hra CONSTANT NUMBER := (20/100);
   da CONSTANT NUMBER := (10/100);
   g_salary NUMBER := b_salary + (b_salary*hra) +(b_salary*da);
BEGIN
   IF g_salary > 6000 THEN
      DBMS_OUTPUT.PUT_LINE('High Salary');
   ELSE
      DBMS_OUTPUT.PUT_LINE ('Normal Salary');
   END IF;
END;
```

Question 2: Loop and Arithmetic Operations

Write a PL/SQL program that:
- Uses a loop to calculate the square and cube of numbers from 1 to 5.
- Print the number, its square, and its cube using DBMS_OUTPUT.PUT_LINE.

```
DECLARE
    i NUMBER:= 1;
    square NUMBER;
    cube NUMBER;
BEGIN
    LOOP
        EXIT WHEN i>5;
        square := i*i;
        cube := i*i*i;
        DBMS_OUTPUT.PUT_LINE('i = '||i||' square = '||square||' cube = '||cube);
        i := i + 1;
    END LOOP;
END;
```

Query result | Script output | DBMS output | Explain Plan | SQL history

```
i = 1 square = 1 cube = 1
i = 2 square = 4 cube = 8
i = 3 square = 9 cube = 27
i = 4 square = 16 cube = 64
i = 5 square = 25 cube = 125


PL/SQL procedure successfully completed.

Elapsed: 00:00:00.007
```

```
DECLARE
  i NUMBER:= 1;
  square NUMBER;
  cube NUMBER;
BEGIN
  LOOP
    EXIT WHEN i>5;
    square := i*i;
    cube := i*i*i;
    DBMS_OUTPUT.PUT_LINE('i = '||i||' square = '||square||' cube = '||cube);
    i := i + 1;
  END LOOP;
END;
```

Question 3: Character Manipulation Functions

Write a PL/SQL program to:
- Declare a variable containing the string ' welcomeToPLSQL***'.
- Use and display the output of LTRIM, RTRIM, UPPER, LOWER, INITCAP, and LENGTH functions on it.

```
DECLARE
    original_str VARCHAR2(50) := '   welcomeToPLSQL***';
BEGIN
    DBMS_OUTPUT.PUT_LINE('Original string: [' || original_str || ']');
    DBMS_OUTPUT.PUT_LINE('LTRIM: [' || LTRIM(original_str, ' ') || ']');
    DBMS_OUTPUT.PUT_LINE('RTRIM: [' || RTRIM(original_str, '*') || ']');
    DBMS_OUTPUT.PUT_LINE('UPPER: [' || UPPER(original_str) || ']');
    DBMS_OUTPUT.PUT_LINE('LOWER: [' || LOWER(original_str) || ']');
    DBMS_OUTPUT.PUT_LINE('INITCAP: [' || INITCAP(original_str) || ']');
    DBMS_OUTPUT.PUT_LINE('LENGTH: ' || LENGTH(original_str));
END;
```

Query result | **Script output** | DBMS output | Explain Plan | SQL history

```
Original string: [   welcomeToPLSQL***]
LTRIM: [welcomeToPLSQL***]
RTRIM: [   welcomeToPLSQL]
UPPER: [   WELCOMETOPLSQL***]
LOWER: [   welcometoplsql***]
INITCAP: [   Welcometoplsql***]
LENGTH: 20
```

```
DECLARE
  original_str VARCHAR2(50) := '   welcomeToPLSQL***';
BEGIN
  DBMS_OUTPUT.PUT_LINE('Original string: [' || original_str || ']');
  DBMS_OUTPUT.PUT_LINE('LTRIM: [' || LTRIM(original_str, ' ') || ']');
  DBMS_OUTPUT.PUT_LINE('RTRIM: [' || RTRIM(original_str, '*') || ']');
  DBMS_OUTPUT.PUT_LINE('UPPER: [' || UPPER(original_str) || ']');
  DBMS_OUTPUT.PUT_LINE('LOWER: [' || LOWER(original_str) || ']');
  DBMS_OUTPUT.PUT_LINE('INITCAP: [' || INITCAP(original_str) || ']');
  DBMS_OUTPUT.PUT_LINE('LENGTH: ' || LENGTH(original_str));
END;
```