Advanced HRMS Database Design Task

Objective:

It's required to design a Human Resources Management System (HRMS) database to manage employees, departments, position, attendance, payroll, and leave management.

The database should be designed in a normalized manner and should reflect real-world business rules commonly found in HR systems.

The implementation of the database and all queries should be performed using **PostgreSQL** database.

Employee and Department Management:

The system must store detailed employee information, including a unique identifier, full name, email address, phone number, hire date, job title, and basic salary. Each employee works in exactly one department and has one position that is related to the same department.

Employees may report to a manager, who is also an employee within the organization. An employee cannot be assigned as their own manager.

Departments must store a unique identifier, name and location. Each department is managed by one employee and may contain many employees. A department must not be deleted if employees are assigned to it. Each department also can have multiple positions.

Positions must store a unique identifier, name, and head count which is the number of employees can be assigned to this position. Each position must have one department.

Attendance Tracking:

The database must track employee attendance on daily basis. Each attendance record must store the employee reference, the attendance date, and the attendance status (such as Present, Absent, or Leave). The system must ensure that only one attendance record exists per employee per date.

Attendance also must store check-in and check-out times, total working hours, missing hours and overtime hours, we can assume that each employee must work exactly 8 hours per day.

Payroll Management:

Payroll information must be stored for each employee on monthly basis. Each payroll record should include the employee reference, payroll month, payroll year, allowances, deductions, gross salary and the calculated net salary. The database must ensure that each

employee has only one payroll record per month and year combination, and that the net salary value is never negative.

Leave Management

Leave Types:

The system must support multiple types of leaves, such as Annual Leave, Sick Leave, or Unpaid Leave. Each leave type must have a unique name, a description, an indicator of whether the leave is paid or unpaid, and a maximum number of days allowed per year.

Leave Balances:

For each employee, the system must track leave balances per leave type. Each leave balance record should be associated with exactly one employee and one leave type, and it has a start date and expiration date, employee leave balance is added to employee per year or starting from the employee hiring date.

The database must ensure that an employee has only one leave balance record per leave type. The number of used leave days must never exceed the allocated leave days, and remaining leave days must not be negative, and the expiration date cannot be before the start date of the balance.

Leave Requests:

Employees must be able to submit leave requests. Each leave request must be associated with one employee and one leave type. The request must include the start date, end date, number of requested days, request date, and status (such as Pending, Processing, Approved, Rejected or expired). The database must ensure that the start date is not later than the end date and that the number of requested days is greater than zero. Also, there must not be overlapping requests with the statuses rejected or approved.

Requirements

- Schema and ERD design for the database design that shows all fields, appropriate data types and decided relations between tables.
- Any possible indexes for better performance.
- Populate the database with realistic sample data, including multiple departments, employees, leave types, attendance records, payroll entries, leave balances, and leave requests. The data should be sufficient to meaningfully test the queries.
- Write SQL queries to retrieve:
    - employee, position and department information
        - employee information
        - department name
        - position name
    - attendance summaries.
        - Attendance related information and calculations.
        - Employee information
        - Employee hiring date
        - Department and position name.
    - Payroll calculations.
        - Payroll calculations.
        - Employee information
        - Department name
        - Position name
    - Employee leave balance report for each leave type and balance period.
        - Leave Balance information
        - Employee information
        - Department name
        - Position name
    - Employee leave requests report
        - Leave request information.
        - Employee information
        - Department name
        - Position name

  All queries should include joins, aggregations, filtering, and grouping operations.