Employee Attendance Tracking System

Introduction

The Employee Attendance Tracking System is a comprehensive SQL-based database project designed to automate and streamline employee management, attendance monitoring, and departmental coordination within an organization. It focuses on ensuring data integrity, efficiency in tracking work hours, punctuality, absenteeism, and provides analytical insights into workforce behavior.

Abstract

This project demonstrates the use of advanced SQL functionalities including triggers, functions, and stored procedures to build a dynamic attendance management system. The system manages departments, roles, employees, and attendance records. It automates routine administrative tasks such as calculating work hours, preventing data inconsistencies, and generating analytical summaries for better decision-making.
This project reflects real-world database practices essential for HR and operations departments.

Tools Used

1. **PostgreSQL** – for database creation, schema design, and advanced SQL functionalities.
2. **pgAdmin** – for database management and query execution.
3. **PL/pgSQL** – for writing triggers, procedures, and functions.
4. **SQL Analytics** – for creating performance-based analytical queries and summaries.

Steps Involved in Building the Project

1. **Database Design:** Created normalized tables for Departments, Roles, Employees, and Attendance with appropriate primary and foreign keys.
2. **Data Insertion:** Inserted records for multiple departments, roles, and employees to simulate a working environment.
3. **Function Creation:** Developed PL/pgSQL functions to calculate total monthly hours, number of late days, and employee absences.
4. **Trigger Implementation:** Added triggers to auto-set hire dates, prevent deletion of employees with attendance records, and automatically compute total work hours from timestamps.
5. **Stored Procedure:** Created a procedure **mark_attendance()** to insert attendance efficiently and calculate work hours dynamically.
6. **Analytical Queries:** Implemented insights such as total monthly work hours, punctuality, absenteeism rate by department, and average work hours per department.
7. **Validation and Testing:** Ensured referential integrity and validated triggers and functions by running multiple test scenarios.

Conclusion

The Employee Attendance Tracking System efficiently automates daily attendance management. It ensures data integrity using triggers, functions and Store Procedure provides valuable insights into employee performance through analytical queries, and supports HR teams in decision-making regarding punctuality and productivity.