Documentation of Employee Management System project

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Employee Management System

Introduction

This project demonstrates a **Employee Management System** integrating an SQL database with a Java application. The system handles **departments**, **employees**, and **payroll records** using **Builder Pattern, Singleton Pattern, Factory Pattern, Proxy Pattern, Repository and Adapter Pattern**.

The system involves:

- Managing **employees** (Full-Time, Part-Time, Contractor) using different patterns.
- Integrating payroll processing and legacy payroll systems.
- Connecting the system to a relational database (**Microsoft SQL server**) for data storage.

Database integration in java

To connect the Java code to the MySQL server database, we will use the **JDBC (Java Database Connectivity)** API.

Design Patterns

The system is scalable, well-structured, and demonstrates practical use of:

- **Singleton Pattern:** Ensures a single, shared instance of the database connection manager.
- **Proxy Pattern:** Adds a layer of control and security for the database connection.
- **Builder Pattern**: Simplifies object creation for Employees.
- **Factory Pattern:** Provides a centralized way to create different departments dynamically.
- **Adapter Pattern:** Allows the integration of legacy payroll systems with new components.
- **Repository Pattern** :Encapsulates database access logic, providing CRUD operations for Employee objects.

Use Case Senarios

- **Scenario 1: Adding a New Employee**
  - A user can dynamically create a new employee of any type (Full-Time, Part-Time, Contractor) and associate them with a department.
  - The new employee's details are stored in the database, and their salary is updated in the payroll table.
- **Scenario 2: Processing Payroll**
  - The system retrieves employee salary details from the database and processes payroll.
  - For legacy compatibility, the system also updates the **Legacy Payroll** table via the Adapter.
- **Scenario 3: Real-Time Data Retrieval**
  - A user can view all employees with their department names and salaries.
  - performance management.
- **Scenario 4: Ensuring Secure Database Access**
  - The system establishes a database connection through the **Proxy** to ensure that the connection is secure and monitored.
  - Connection logs can be saved for further auditing.

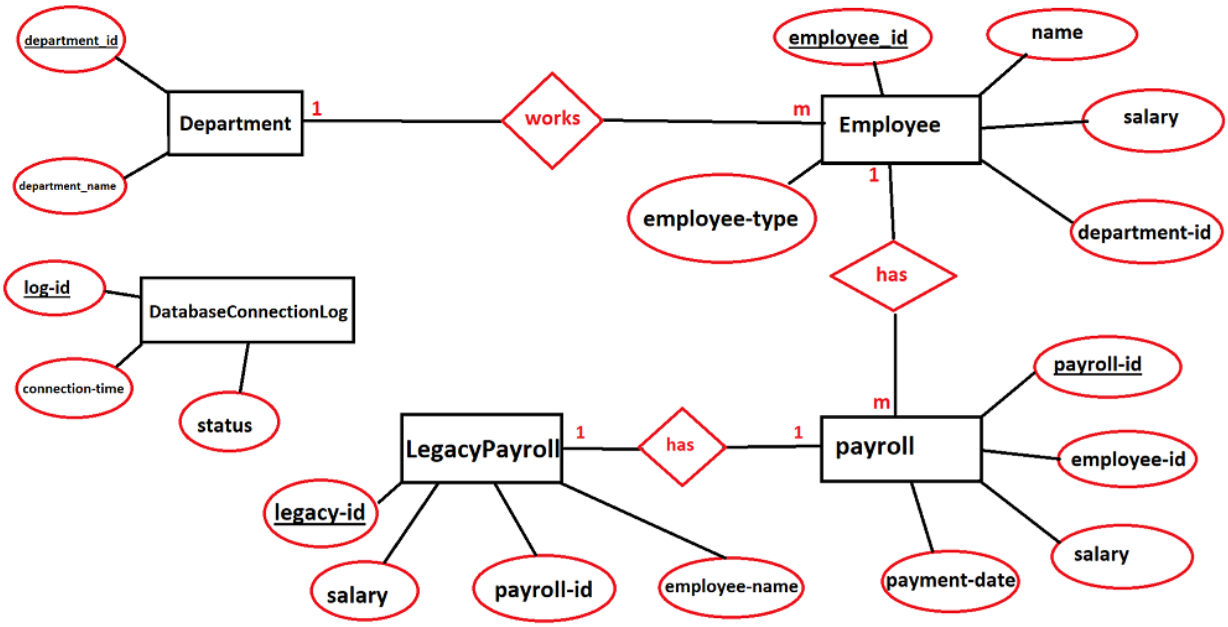
Conclusion

The **Employee Management System** integrates a **Microsoft SQL server** database with a Java application to manage employees, departments, and payroll records efficiently. Using well-known design patterns like **Singleton**, **Factory**, **Builder**, and **Proxy**, the system ensures clean architecture, flexibility, and easy maintenance.

This project enables real-time data management, including employee creation, department assignments, and payroll processing, while also supporting legacy systems through an adapter. The secure and centralized database connection ensures smooth operation and reliable performance.

Overall, the system provides a solid foundation for managing company data and can be easily enhanced to include new features such as reporting tools, authentication, and automated payroll processing. It is scalable, user-friendly, and designed for real-world enterprise use.

ERD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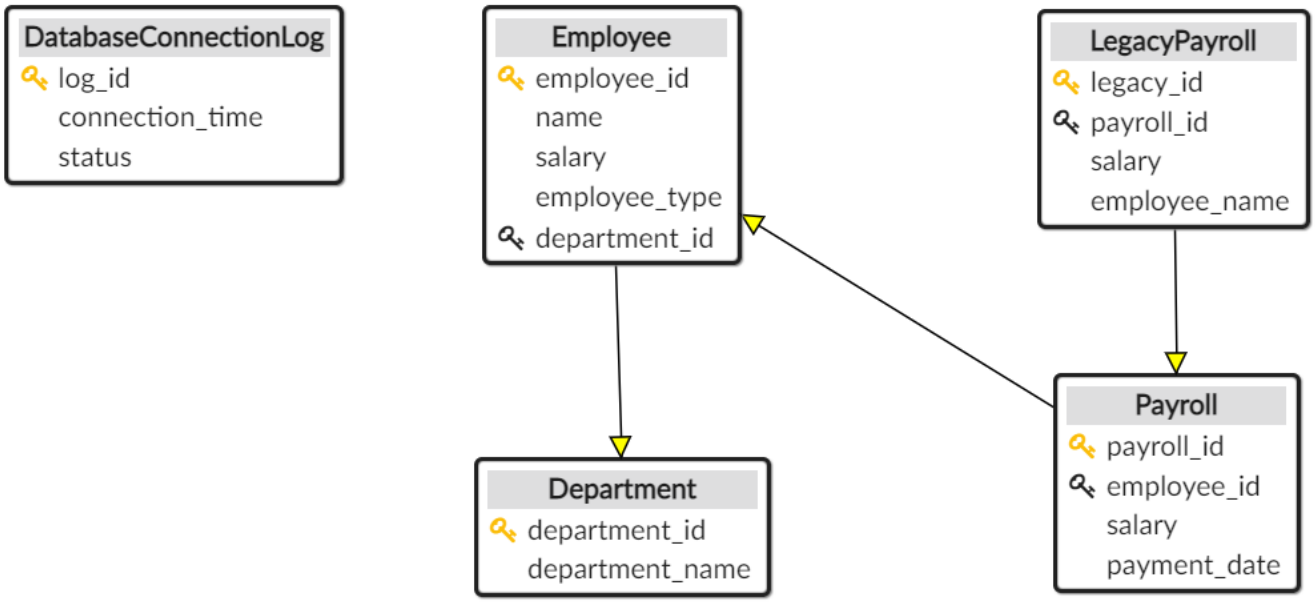
Schema



Thank you !