PROJECTREPORT

EMPLOYEE MANAGEMENT SYSTEM

BATCH:2023-2027

CLASS&SECTION:CSE-A

(FourthSemester)

SUBMITTEDTO:

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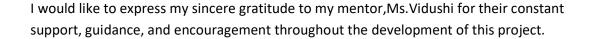
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INTRODUCTION

In today's fast-paced and competitive business environment, managing human resources effectively has become a cornerstone of organizational success. As companies grow, so does the complexity of managing employees, their roles, salaries, departmental affiliations, and daily work records. Manual systems of tracking this data are prone to errors, time-consuming, and inefficient, which can negatively impact productivity and decision-making. To address these challenges, the Employee Management System with Attendance Tracking has been designed as a robust, structured, and scalable solution.

This system provides a centralized platform for storing and managing employee information. It facilitates the organization of employees into departments, assigns them appropriate job roles, defines salary structures, and most importantly, keeps a precise record of their daily attendance. The system ensures data consistency and integrity through the use of relational database concepts and constraints like primary keys, foreign keys, unique constraints, and check conditions.

The Departments table categorizes the organization into various functional units such as Human Resources, Finance, Engineering, and Sales, each identified by a unique ID. The Jobs table stores details about different job roles within the organization, including their titles and salary ranges, helping HR managers assign appropriate roles and ensure equitable compensation. The Employees table serves as the heart of the system, containing all essential personal and job-related information about the staff. It is linked to both the Departments and Jobs tables via foreign keys to maintain relational integrity.

A key feature of the system is the Attendance module. Accurate attendance tracking is essential for payroll processing, performance reviews, and workforce analytics. This table captures daily attendance records, tagging each entry with the status of 'Present', 'Absent', or 'Leave'. Such structured tracking allows organizations to analyze attendance trends, ensure compliance, and manage leaves effectively.

By implementing this database-backed system, organizations can automate many HR-related tasks, reduce administrative overhead, and gain insights into employee performance and attendance. The system also lays the groundwork for developing a user-friendly front-end application that HR personnel can use without needing to interact directly with the database.

OBJECTIVE

The primary objective of the Employee Management System with Attendance Tracking is to design and implement a relational database that efficiently manages employee-related data within an organization. This system aims to streamline various HR processes by providing a structured and reliable way to store, retrieve, and analyze employee, departmental, job, and attendance records.

The specific objectives of this project are:

1. To maintain a centralized repository of employee data including personal details, contact information, job titles, and departmental affiliations.

2. To define and manage organizational structure through clearly categorized departments and predefined job roles with associated salary ranges.

3. To enable accurate and consistent data storage by enforcing relational integrity using primary keys, foreign keys, and constraints (e.g., uniqueness, check constraints).

4. To record and track daily attendance of employees with a simple status system (Present, Absent, Leave) for better monitoring and evaluation.

5. To support HR operations like payroll management, leave tracking, and performance reviews by providing access to reliable and organized data.

6. To reduce manual errors and administrative workload by automating the collection and storage of employee attendance and job data.

7. To lay the foundation for future scalability, allowing integration with frontend applications, reporting tools, and advanced HR management systems.

TOOLS & TECHNOLOGIES USED

SQL (Structured Query Language):
- SQL is the core technology used in this project for designing and managing the relational database.
- It is used for creating tables, defining relationships, inserting records, and performing queries.
2. Relational Database Management System (RDBMS):
- The database schema is compatible with any standard RDBMS such as:
- MySQL

SQL Constraints and Keys:
- Primary Keys ensure each record is uniquely identified.
- Foreign Keys maintain referential integrity across related tables.
- Unique Constraints prevent duplicate entries (e.g., unique emails).
- Check Constraints enforce business rules (e.g., only allow specific attendance statuses).

SOURCE CODE

```sql
CREATE TABLE Departments (
    DepartmentID INT PRIMARY KEY,
    DepartmentName VARCHAR(100) NOT NULL
);


CREATE TABLE Jobs (
    JobID INT PRIMARY KEY,
    JobTitle VARCHAR(100) NOT NULL,
    MinSalary DECIMAL(10, 2),
    MaxSalary DECIMAL(10, 2)
);


CREATE TABLE Employees (
    EmployeeID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Email VARCHAR(100) UNIQUE,
    Phone VARCHAR(15),
    HireDate DATE,
    DepartmentID INT,
    JobID INT,
    Salary DECIMAL(10, 2),
    FOREIGN KEY (DepartmentID) REFERENCES Departments(DepartmentID),
    FOREIGN KEY (JobID) REFERENCES Jobs(JobID)
);


CREATE TABLE Attendance (
    AttendanceID INT PRIMARY KEY,
    EmployeeID INT,
    Date DATE,
    Status VARCHAR(10),
    FOREIGN KEY (EmployeeID) REFERENCES Employees(EmployeeID),
    CHECK (Status IN ('Present', 'Absent', 'Leave'))
);


INSERT INTO Departments VALUES
(101, 'Human Resources'),
(102, 'Finance'),
(103, 'Engineering'),
(104, 'Sales');
```

```
INSERT INTO Jobs VALUES
(1, 'HR Manager', 40000, 80000),
(2, 'Accountant', 35000, 70000),
(3, 'Software Engineer', 50000, 120000),
(4, 'Sales Executive', 30000, 60000);


INSERT INTO Employees VALUES
(1, 'Alice', 'Johnson', 'alice@company.com', '9876543210', '2021-04-12', 101, 1, 65000),
(2, 'Bob', 'Smith', 'bob@company.com', '9876543211', '2020-06-15', 102, 2, 55000),
(3, 'Charlie', 'Lee', 'charlie@company.com', '9876543212', '2022-01-10', 103, 3, 85000),
(4, 'Diana', 'Brown', 'diana@company.com', '9876543213', '2019-11-05', 104, 4, 45000);


INSERT INTO Attendance VALUES
(1, 1, '2025-05-01', 'Present'),
(2, 1, '2025-05-02', 'Absent'),
(3, 2, '2025-05-01', 'Present'),
(4, 3, '2025-05-01', 'Leave'),
(5, 4, '2025-05-01', 'Present'),
(6, 4, '2025-05-02', 'Present');
```

OUTPUT SCREENSHOT

Select*from Employees;

EmployeeID	FirstName	LastName	Email	Phone	HireDate	DepartmentID	JobID	Salary
1	Alice	Johnson	alice@company.com	9876543210	2021-04-12	101	1	65000.00
2	Bob	Smith	bob@company.com	9876543211	2020-06-15	102	2	55000.00
3	Charlie	Lee	charlie@company.com	9876543212	2022-01-10	103	3	85000.00
4	Diana	Brown	diana@company.com	9876543213	2019-11-05	104	4	45000.00
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Select*from Departments;

DepartmentID	DepartmentName
101	Human Resources
102	Finance
103	Engineering
104	Sales
NULL	NULL

Select*from Jobs;

JobID	JobTitle	MinSalary	MaxSalary
1	HR Manager	40000.00	80000.00
2	Accountant	35000.00	70000.00
3	Software Engineer	50000.00	120000.00
4	Sales Executive	30000.00	60000.00
NULL	NULL	NULL	NULL

Select*from Attendance;

AttendanceID	EmployeeID	Date	Status
1	1	2025-05-01	Present
2	1	2025-05-02	Absent
3	2	2025-05-01	Present
4	3	2025-05-01	Leave
5	4	2025-05-01	Present
6	4	2025-05-02	Present
NULL	NULL	NULL	NULL

```
SELECT FirstName, LastName, DepartmentName
FROM Employees
JOIN Departments ON Employees.DepartmentID = Departments.DepartmentID
WHERE DepartmentName = 'Engineering';
```

FirstName	LastName	DepartmentName
Charlie	Lee	Engineering

```
SELECT e.FirstName, e.LastName, j.JobTitle, e.Salary
FROM Employees e
JOIN Jobs j ON e.JobID = j.JobID;
```

FirstName	LastName	JobTitle	Salary
Alice	Johnson	HR Manager	65000.00
Bob	Smith	Accountant	55000.00
Charlie	Lee	Software Engineer	85000.00
Diana	Brown	Sales Executive	45000.00

Learning outcome

Understanding of Database Design Principles:

•   Gained knowledge of how to design normalized relational databases.

•   Learned how to define primary keys, foreign keys, and constraints to maintain data integrity.

2.   Practical SQL Skills:

•   Acquired proficiency in writing SQL queries for table creation, data insertion, updating, and retrieval.

•   Understood how to apply JOIN operations to fetch related data from multiple tables.

3.   Data Modeling and Relationship Mapping:

•   Learned how to model real-world entities such as departments, jobs, employees, and attendance using relational tables.

•   Developed the ability to represent one-to-many relationships (e.g., one department to many employees).

4.   Business Logic Implementation:

•   Implemented real-world business rules such as unique email addresses, valid attendance statuses, and salary constraints using SQL constraints.

5.   Problem Solving and Data Management:

•   Strengthened skills in identifying data requirements, organizing information logically, and solving HR-related problems using database queries.

6.   Hands-on Experience with RDBMS Tools:

•   Gained experience using tools such as MySQL, PostgreSQL, or other database management systems to execute and test SQL code.

CONCLUSION

The Employee Management System with Attendance Tracking efficiently organizes and manages employee, department, job, and attendance data using a relational database. The system ensures data consistency and integrity through well-structured tables and relationships. It serves as a foundational model for HR management systems, demonstrating the importance of SQL and database design in real-world applications. This project can be expanded with additional features like leave management, payroll integration, and a user interface for more comprehensive HR solutions.