SOFTWARE DESIGN AND MANAGEMENT PROJECT

DESIGN AND IMPLEMENTATION OF EMPLOYEE CLOCKING SYSTEM

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**1. Introduction**

1.1 Project Overview

The Employee Clocking System is a digital solution designed to track employee attendance, working hours, and shift schedules. The system ensures efficient workforce management by allowing employees to clock in and out, while administrators can manage attendance records, generate reports, and monitor employee activities.

1.2 Objectives

- Automate employee attendance tracking

- Provide real-time data for workforce analysis

- Enhance HR management with attendance insights

- Ensure compliance with organizational policies

- Improve employee accountability and transparency

1.3 Scope

This project will develop a web-based and employee clocking system with authentication, monitoring, and report generation.

- Employees: Clock in/out, view attendance, request leave, receive notifications

- Admins: Manage employees, monitor attendance, generate reports, set roles & permissions

- System: Web-based solution using Next.js, PostgreSQL, Prisma ORM, and deployed on Vercel

**2. System Development Life Cycle (SDLC) Approach**

The system follows the Agile SDLC Model, ensuring iterative development and continuous feedback.

2.1 Phase 1: Planning

2.1.1 Requirements Gathering

- Employee functionalities (clock-in, attendance history, leave requests, notifications)

- Admin functionalities (CRUD operations on employees, attendance tracking, reports, roles & permissions)

- Database design (ER Diagram, PostgreSQL integration)

- Deployment strategy (Next.js for frontend & backend, Prisma ORM, Vercel hosting)

2.1.2 Feasibility Study

- Technical Feasibility: Uses modern web technologies (Next.js, PostgreSQL, Prisma ORM)

- Economic Feasibility: Cost-effective as it runs on Vercel’s free tier & PostgreSQL instance

- Operational Feasibility: Streamlined employee management and attendance tracking

2.2 Phase 2: System Analysis & Design

2.2.1 System Architecture

[Insert System Architecture Diagram here]

The system follows a three-tier architecture:

Frontend: Next.js (React-based UI)

User interface for employees and administrators.

Backend: Next.js API routes with Prisma ORM

Server-side logic and database management.

Database: PostgreSQL

Stores attendance records, employee details, and logs.

-Hosting: Vercel, Github

2.2.2 Entity-Relationship (ER) Diagram

[Insert ER Diagram here]

2.2.3 Database Schema

[Insert database schema details]

2.2.4 Wireframes & UI Design

[Insert Figma Wireframes]

2.3 Phase 3: Implementation

2.3.1 Technology Stack

- Frontend: Next.js (React.js, Tailwind CSS)

- Backend: Next.js API routes

- Database: PostgreSQL

- ORM: Prisma ORM

- Hosting: Vercel, Github

2.3.2 Key Features Implementation

- Authentication: Secure login system

- Clocking System: Employees clock in/out with timestamps

- Attendance Management: Admins manage attendance records

- Notifications: Employees receive updates & reminders

- Leave Requests: Employees request leave, admin approves/rejects

- Reports & Analytics: Admin generates reports & statistics

2.4 Phase 4: Testing

2.4.1 Testing Strategies

- Unit Testing: Verify individual components (Next.js API & UI components)

- Integration Testing: Ensure seamless interaction between frontend, backend, and database

- User Acceptance Testing (UAT): Test system with employees & admins for usability feedback

2.5 Phase 5: Deployment

2.5.1 Deployment Strategy

- Hosting: Deploy frontend & backend on Vercel

- Database: PostgreSQL instance on Vercel

- Domain: Custom domain setup (if required)

- CI/CD: Automate deployment with GitHub integration

2.5.2 System Flow

[Insert System Flow Diagram]

2.6 Phase 6: Maintenance & Future Enhancements

- Bug Fixes & Updates: Continuous monitoring and fixing issues

- Scalability: Optimizing for large enterprises

- Feature Additions: Biometric authentication, mobile app integration, AI-based analytics

**CHAPTER x : CONCLUSION AND RECOMMENDATIONS**

**x.1 Conclusion**

The project successfully implemented an employee clocking system that enhances attendance management, reduces errors, and improves security.

The Employee Clocking System provides an efficient solution for workforce management by automating attendance tracking, improving HR efficiency, and enhancing transparency in organizations. By utilizing modern web technologies, the system ensures a scalable and user-friendly experience.

**Limitations**

**x.2 Recommendations**

* Integration with payroll systems.
* Mobile app extension for remote clocking.
* Cloud storage for scalability.

**References**

[List any references used, such as API documentation, research papers, etc.]