Software Requirements Specification & Synopsis

For

Recycling Plant Database Management System

Version 1.0

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Table of Contents

1. Introduction

1.1 Purpose

The purpose of this document is to provide a detailed Software Requirements Specification (SRS) for the Recycling Plant Database Management System (DBMS) website. The website will serve as a platform for employees of the recycling plant to manage and view various aspects related to plant operations, such as machine status, processes, and employee check-ins/check-outs, based on their roles within the plant.

1.2 Document Conventions

This document uses the following conventions:

- **Bold** for emphasis.
- *Italics* for technical terms.
- Code snippets and database schema will be represented in monospace font.

1.3 Project Scope

The Recycling Plant DBMS website will provide an interface for plant employees to log in and access various functionalities based on their roles. The system will manage entities such as employees, machines, floor plans, processes, and sources of materials. Key features include role-based access control, machine status monitoring, process management, and employee check-in/check-out tracking. The Recycling Plant DBMS will also include additional functionalities such as alerts and notifications for machine status and process updates, reporting and analytics for performance and data visualization, and enhanced search and filtering capabilities for machines, processes, and employee directories.

The Recycling Plant DBMS will feature a notification system to alert users to check machine statuses based on predefined schedules. Users will be able to log in and update machine statuses, which will be stored in the MySQL database.

1.4 References

- IEEE Standard for SRS documentation.
- Database design principles.

2. Overall Description

2.1 Product Perspective

The Recycling Plant DBMS website is an internal tool designed to improve operational efficiency by providing employees with real-time data on plant operations. It integrates with existing plant systems and databases to ensure data consistency and accuracy.

2.2 Product Features

- **User Authentication:** Secure login for employees based on their roles.
- **Role-Based Access Control:** Different access levels for admins and regular employees.
- **Process Management:** Overview of ongoing and scheduled processes.
- **Employee Check-In/Check-Out:** Tracking of employee attendance and working hours.
- **Data Management:** Management of entities such as machines, employees, processes, and materials.
- **Alerts and Notifications:** Machine alerts for malfunctions or maintenance and process updates with notifications.
- **Reporting and Analytics:** Performance reports and data visualization.
- **Search and Filtering:** Search and filter machines, processes, and employee data.
- **Notification System:** Periodic notifications to users for checking machine statuses and notification scheduling stored in MySQL.
- **User Interface for Logging Status:** Forms for users to log machine statuses and maintenance records.
- **Backend Processing:** API endpoints in Express for handling status updates and data storage.
- **Database Management:** MySQL used for data storage and management of notifications, machine statuses, and maintenance records.

2.3 User Classes and Characteristics

- **Admins:** Full access to all system features, including the ability to manage users, machines, and processes.
- **Regular Employees:** Access to machine statuses, processes, and their own check-in/check-out data. Limited management capabilities.
- **Maintenance Personnel:** Specialized access to machine maintenance records and status updates.

2.4 Operating Environment

- **Web Browser:** The website will be accessible through modern web browsers like Chrome.
- **Server Environment:** The backend will run on server with a MySQL database.
- **Network Requirements:** The system requires a stable internet connection to access the database and perform real-time updates.

2.5 Design and Implementation Constraints

- **Security:** The system must adhere to strict security protocols to protect sensitive plant data.
- **Compliance:** The system must comply with industry regulations regarding data management and employee privacy.
- **Scalability:** The system should be scalable to handle future expansions of plant operations.

2.6 Assumptions and Dependencies

- The system assumes that all users have basic knowledge of web browsers and internet navigation.
- The system depends on the availability of a stable network connection and operational database servers.
- The system assumes the use of MySQL for database management and storage. It depends on the integration of scheduling libraries for notifications and relies on React and Express for the frontend and backend development.

3. System Features

3.1 System Feature 1: User Authentication

- **Description:** Secure login for all employees with role-based access.
- **Inputs:** Username and password.
- **Processing:** Verification of credentials and assignment of session tokens.
- **Outputs:** Access to the system dashboard based on user roles.

3.2 System Feature 2: Machine Monitoring

- **Description:** Real-time updates on machine statuses within the plant.
- **Inputs:** Manual entries by maintenance personnel and scheduled checks.
- **Processing:** Display machine status on the dashboard, with alerts for any issues.
- **Outputs:** Visual representation of machine status, including operational, under maintenance, and offline indicators.
- **Additional Feature:** Users can log check results after verifying machine status, with a record of who performed the check and the machine's condition.

3.3 System Feature 3: Process Management

- **Description:** Overview and management of recycling processes.
- **Inputs:** Process schedules, machine status, and employee assignments.
- **Processing:** Track ongoing processes and update status as needed, and adjust schedules as needed.
- **Outputs:** Process status updates, alerts when machines need maintenance, and the ability to allocate resources based on the process.

3.4 System Feature 4: Employee Check-In/Check-Out

- **Description:** Allows employees to log their working hours.
- **Inputs:** Employee ID, check-in, and check-out times.
- **Processing:** Record and calculate total working hours.

- **Outputs:** Attendance records for payroll and management review.

4. External Interface Requirements

4.1 User Interfaces (Design)

- **Web-based interface with role-specific dashboards:** Admins have full access; regular employees and maintenance staff see only what they need.
- Easy-to-use controls and clear navigation.
- Includes sample screens for Admin, Employee, and Maintenance Dashboards.

4.2 Software Interfaces (Integration)

- **Database:** MySQL backend.
- **APIs:** RESTful APIs for integration with existing systems.
- **Libraries:** Front-end (React.js), Back-end (Node.js, Express).

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- **Response Time**: Quick response time.
- **Simulated Data Performance:** The system should efficiently handle performance and reporting functionalities using simulated data without real-world complexities.

5.2 Safety Requirements

- **Data Integrity:** Rollback feature to prevent data loss; compliance with industry regulations.

5.3 Security Requirements

- **Authentication:** Role-based access control (RBAC); encrypted data transmission.

5.4 User Interfaces (Design):

- **Availability:** 99.9% uptime.
- **Usability:** User-friendly interface with clear instructions.
- **Interoperability:** Seamless integration with existing systems.

6. Other Requirements

Database: MySQL

Legal Compliance: Adherence to data protection and environmental regulations.

Appendix A: Glossary

DBMS: Database Management System.

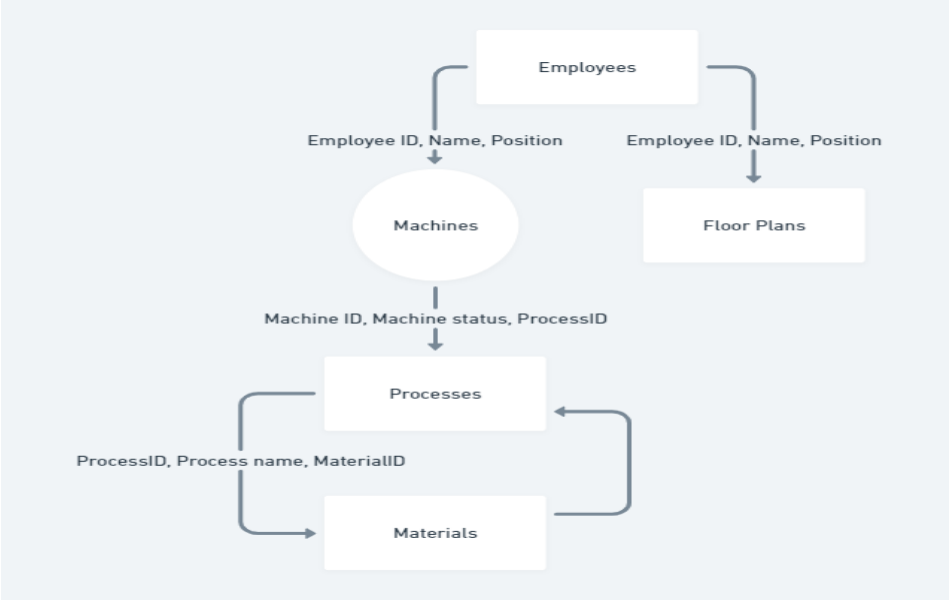
RBAC: Role-Based Access Control.

Appendix B: Analysis Models

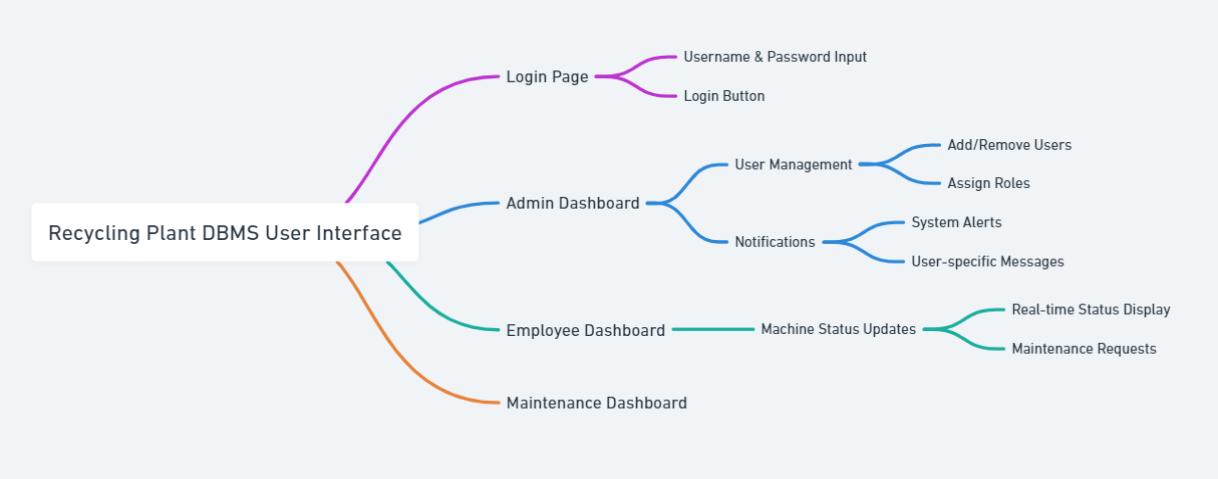
DFDs: Context Diagram and Level 1 DFD for system processes.

ERD: Entity-Relationship Diagram for key entities.

Diagrams



Recycling Plant Database Management system



The User Interface for the Recycling Plant Database

Project Synopsis: Recycling Plant DBMS

Project Title: Recycling Plant Database Management System (DBMS)

Project Description:

The Recycling Plant Database Management System (DBMS) is a web-based application designed to streamline the operations of a recycling plant by offering a centralized platform for managing and monitoring various aspects of plant activities. This system will facilitate efficient management of plant resources, improve operational visibility, and enhance employee productivity through a user-friendly interface.

Objectives:

- **Operational Efficiency:** Provide real-time access to critical data on plant operations, including machine status, processes, and employee attendance.
- **Role-Based Access:** Enable employees to view and interact with information relevant to their roles, such as administrative tasks, machine monitoring, and process management.
- **Attendance Tracking:** Implement a reliable system for recording and managing employee check-ins and check-outs.

Key Features:

- **User Authentication:** Secure login system with role-based access control to ensure employees can only access information pertinent to their roles.
- **Machine Monitoring**: Real-time updates on the status of plant machinery, including operational states and maintenance alerts.
- **Process Management:** Tools for overseeing and managing various recycling processes, including tracking progress and making schedule adjustments.
- **Employee Check-In/Check-Out:** Functionality for employees to log their working hours, with automated tracking and reporting for payroll purposes.
- **Data Management:** Comprehensive management of key entities such as employees, machines, processes, and materials, integrated with existing plant systems.
- **Additional Features:** Alerts for maintenance needs, reporting, search and filtering, maintenance scheduling.

Technical Details:

- **Platform:** Accessible via modern web browsers with a backend supported by a server and MySQL database.
- **Integration:** RESTful APIs for system integration, with a frontend developed using React.js and a backend using Node.js and Express.

Benefits:

- **Improved Efficiency**: Streamlined operations with real-time data and role-specific functionalities.
- **Enhanced Accuracy:** Reliable tracking of machine statuses and employee attendance.
- **Scalability:** Designed to accommodate future growth and additional features as needed.

Documentation and Support:

- **Glossary and Models:** Definitions and diagrams to assist in understanding system components and processes.

Conclusion:

The Recycling Plant DBMS will be a vital tool for modernizing plant operations, offering a centralized solution to manage and monitor plant activities effectively. With its role-based access and real-time data capabilities, the system aims to boost productivity and operational efficiency within the recycling plant.