Software Requirements Specification (SRS)

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1. Introduction

1.1 Purpose

The purpose of the Employee Leave Management System is to automate and streamline the leave application and approval process within an organization. The system will allow employees to submit leave requests, enable managers(Admin) to review and approve/reject requests, and help HR/administrators maintain accurate leave records. This will reduce manual paperwork, save time, and improve transparency in leave management.

1.2 Scope

The Employee Leave Management System (ELMS) will be a web-based application designed to streamline and automate the process of managing employee leave requests within an organization. The system will cover various types of leave, including but not limited to, casual leave, sick leave, annual leave, maternity leave, paternity leave, and compensatory off. The scope of this system includes:

The system will allow employees to:

- Register and log in securely using their credentials.
- Submit leave applications specifying leave type, dates, and reason.
- View leave status (approved, pending, rejected) and leave balance.
- Track employees leave history.

The system will allow managers/administrators to:

- Approve registration of employees.

- Review and approve/reject employee leave requests.
- Monitor leave records for all employees.
- Generate reports on employee leave statistics.

The system will:

- Provide role-based access control (Employee, Admin).
- Send notifications (email or in-system) on leave request updates.
- Maintain a centralized database for all leave-related records and user data..
- Ensure data security, reliability, and accessibility from multiple devices.

The Employee Leave Management System will replace existing manual or semi-automated leave tracking methods, reducing administrative overhead, improving accuracy, and enhancing transparency in leave management.

1.3 Definitions, Acronyms, and Abbreviations

Term/Acronym	Definition
ELMS	Employee Leave Management System: The software system being developed.
HR	Human Resources: The department responsible for managing employee related matters.
UI	User Interface: The means by which the user and a computer system interact.
UX	User Experience: The overall experience of a person using a product, system, or service.
API	Application Programming Interface: A set of defined rules that enable different applications to communicate with each other.
DB	Database: An organized collection of data.
SLA	Service Level Agreement: A commitment between a service provider and a client.

PTO	Paid Time Off: A type of leave that combines vacation, sick days, and personal days into a single bank of days for employees to use.
HRIS	Human Resources Information System: A software solution used by organizations to collect, store, manage, and report employee-related data such as personal details, job history, attendance, and leave records. It serves as a centralized database for human resource information and supports HR decision-making.
SSO	Single Sign-On: an authentication method that allows users to log into multiple applications and services with just one set of credentials.

1.4 References

- IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications.
  URL: IEEE 830-1998.pdf
- Use case diagram for ELMS
  URL: [Link for use case diagram]
- Data flow diagram for ELMS (Level 0 and Level 1)
  URL(Level 0): [Link for level 0 diagram]
  URL(Level 1): [Link for level 1 diagram]
- Mozilla Developer Network web docs
  URL: [Link]
- NodeJs documentation
  URL: [Link]
- Spring boot documentation
  URL: [Link]
- WCAG(Web Content Accessibility Guidelines) 2.1 AA guidelines
  URL: [Link]
- GDPR(General Data Protection Regulation) guidelines
  URL: [Link]
- CCPA(Central Consumer Protection Authority) guidelines
  URL: [Link]
- SSO wiki
  URL: [Link]
- AD(Active Directory) Microsoft overview
  URL: [Link]
- Investopedia. What are accruals?
  URL: [Link]

- Forbes. (2024, May 28). Leave Management: The Ultimate Guide
  URL: [Link]

- Pulpstream. Key Features You Need in a Leave Management System
  URL: [Link]
- TechnologyAdvice. 5 Best leave management software
  URL: [Link]

1.5 Overview

This SRS document is structured to provide a clear and detailed description of the Employee Leave Management System (ELMS). Following this introductory section,

Section 2:
Overall Description, will provide a general overview of the product, its functions, user characteristics, constraints, assumptions, and dependencies.
Section 3:
Specific Requirements, will delve into the detailed functional and non-functional requirements of the system.
Subsequent sections will cover supporting information such as appendices and an index. This structured approach ensures all critical aspects of the ELMS are thoroughly documented and easily accessible.

2. Overall Description

2.1 Product Perspective

The Employee Leave Management System (ELMS) is a standalone software product designed to automate and centralize leave management processes within an organization. It is not a component of a larger system but will interact with external systems, primarily for user authentication and potentially for data exchange with payroll or HRIS in future phases. The system will be accessible via a web browser, eliminating the need for client-side software installation. It will serve as the primary tool for employees to manage their leave, for managers/admin to approve/reject leave. The ELMS aims to reduce manual paperwork, minimize errors, and provide real-time visibility into leave data, thereby improving operational efficiency and compliance with company policies and labor laws.

2.2 Product Functions

The ELMS will provide a comprehensive set of functions to manage the entire leave lifecycle, aligning with the use cases identified in the system. These functions are categorized by the primary actors interacting with them:

For Unregistered Employees:

- **Register Employee:** Allows new employees to register within the system.

For Registered Employees (including 'Not in Leave' and 'In Leave' states):

- **Login Employee:** Enables registered employees to access the system.
- **Apply for Leave:** Allows employees to submit new leave requests.
- **Update Leave Request:** Provides functionality to modify existing leave requests.
- **Cancel Leave:** Enables employees to cancel their submitted leave requests.
- **View Leave Request:** Allows employees to view the details and status of their leave requests.
- **View Leave Approval Status:** Enables employees to check the approval status of their leave applications.
- **View Remaining Leaves:** Provides employees with an overview of their available leave balances.

For Admin:

- **Approve Registration:** Allows administrators to approve new employee registrations.
- **View Leave Request:** Enables administrators to view all leave requests within the system.
- **Approve Request:** Allows administrators to approve submitted leave requests.
- **Reject Request:** Enables administrators to reject submitted leave requests.
- **View Analytics:** Provides administrators with insights into leave patterns and other relevant data.

2.3 User Characteristics

The ELMS is designed to cater to different user roles, each with specific interactions and expectations from the system. The use case diagram identifies the following primary actors:

- **Employee (Unregistered):** This refers to individuals who are part of the organization but have not yet registered with the ELMS. Their primary interaction is to register themselves.
- **Employee (Registered):** This encompasses employees who have successfully registered and can log in to the system. This category further branches into:
    - **Employee (Not in Leave):** Employees who are registered and currently not on leave. They can apply for leave, view their leave status, and check remaining leaves.
    - **Employee (In Leave):** Employees who are currently on an approved leave. They can view their leave status and potentially cancel or update their leave requests.
- **Admin:** This role represents the system administrators who have elevated privileges. They are responsible for approving employee registrations, managing leave requests (approving/rejecting), and viewing system analytics.

All users are expected to have basic computer literacy and access to a stable internet connection and a modern web browser. The system's interface will be designed to be intuitive and user-friendly, minimizing the need for extensive training across all user types of users.

2.4 Constraints

The development and operation of the ELMS are subject to several constraints:

Technology Stack: The system will be developed using a web-based technology stack compatible with modern browsers (e.g., HTML5, CSS3, JavaScript for frontend; Node.js/Express or SpringBoot for backend; PostgreSQL/ MySQL for database). Specific technology choices will be finalized during the design phase.

Performance: The system must be capable of handling a large number of concurrent users and transactions without significant performance

degradation. Response times for critical operations (e.g., submitting a leave request, viewing a calendar) should be within acceptable limits (e.g., less than 3 seconds for 90% of requests).

Security: The system must adhere to industry best practices for web application security, including protection against common vulnerabilities such as SQL injection, cross-site scripting (XSS), and authentication bypass. Data encryption (in transit and at rest) will be implemented to protect sensitive employee information.

Scalability: The architecture should be designed to allow for future expansion in terms of user base, data volume, and additional features without requiring a complete re-architecture.

Usability: The system must be intuitive and easy to use for all user roles, minimizing the need for extensive training. The user interface should be consistent and provide clear feedback to users.

Maintainability: The codebase should be well-documented, modular, and follow established coding standards to facilitate future maintenance, bug fixes, and enhancements.

Data Migration: If replacing an existing system, a strategy for migrating historical leave data will be required. This will be a critical constraint during the deployment phase.

Accessibility: The system should aim to comply with WCAG 2.1 AA guidelines to ensure accessibility for users with disabilities.

2.5 Assumptions and Dependencies

This SRS is based on the following assumptions and dependencies:

Availability of Infrastructure: It is assumed that the necessary server infrastructure, network connectivity, and database services will be available for deployment and operation of the ELMS.

User Data Availability: Accurate and up-to-date employee data (e.g., employee ID, name, department, hire date) will be available from an existing HR system or provided manually for initial setup.

Defined Leave Policies: The organization will provide clear, well-defined, and

documented leave policies, including accrual rules, eligibility criteria, and approval workflows, before system configuration begins.

User Training: Adequate training will be provided to all user roles (employees, managers, HR) to ensure effective adoption and utilization of the system.

Stakeholder Cooperation: Active participation and timely feedback from all stakeholders (employees, Admin/manager) will be available throughout the development lifecycle.

Third-Party Services: Any integration with third-party services (e.g., authentication providers, email services for notifications) will require their respective APIs to be stable and well-documented.

Browser Compatibility: Users will access the system using modern, up-to-date web browsers (e.g., Chrome, Firefox, Edge, Safari). Support for older browser versions may be limited.

Internet Connectivity: Users will have reliable internet connectivity to access the web-based ELMS.

3. Specific Requirements

This section details the specific functional and non-functional requirements of the Employee Leave Management System (ELMS). Each requirement will be stated clearly, unambiguously, and verifiably. Requirements are categorized for clarity and ease of understanding, following the IEEE 830-1998 standard. Each requirement will be assigned a unique identifier for traceability.

3.1 Functional Requirements

3.1.1 Registration and Authentication

FR-01: The system shall allow employees to register by providing name, employee ID, contact details, and department.
FR-02: The system shall notify the Admin of pending registrations.
FR-03: The Admin shall approve/reject registrations.

FR-04: The system shall notify employees if their registrations are approved or rejected.
FR-05: The system shall allow registered employees to log in using credentials or SSO.

3.1.2 Leave Management (Employee Functions)

FR-06: Employees shall be able to apply for leave by selecting type, dates, and reason.
FR-07: The system shall validate leave requests against balance and company policy.
FR-08: Employees shall be able to update or cancel pending leave requests.
FR-09: The system shall notify employees and Admin of leave application status.
FR-10: Employees shall view leave history, approval status, and remaining balance.

3.1.3 Leave Management (Admin Functions)

FR-11: Admin shall review and approve/reject leave requests.
FR-12: Admin shall provide reasons for rejection.
FR-13: Admin shall generate reports and view analytics (leave utilization, absenteeism).

3.1.4 Notifications and Reports

FR-14: The system shall send email/in-app notifications for registration, approval, rejection, and cancellation.
FR-15: The system shall generate reports in PDF/CSV formats and also show graphs/charts.

3.1.5 Database Management

FR-16: The system shall maintain employee details, leave balances, and history.
FR-17: The system shall store company leave policies and holidays.
FR-18: The system shall maintain an audit log of all actions.

3.2 Non-Functional Requirements

The following non-functional requirements depend directly on the above functional requirements.

3.2.1 Performance Requirements

NFR-01 (Supports FR-06, FR-11, FR-15): Leave requests, approvals, and report generation shall be processed within 2–5 seconds under normal load.

NFR-02 (Supports FR-17, FR-18): The system shall support up to 5,000 active employees and 500 managers simultaneously without degradation.

3.2.2 Reliability and Availability

NFR-03 (Supports FR-06–FR-13): The system shall have an uptime of 99.5% excluding maintenance.

NFR-04 (Supports FR-16, FR-18): The system shall ensure data integrity with transactional consistency.

3.2.3 Security

NFR-05 (Supports FR-01, FR-03, FR-04): The system shall authenticate users via authentication(SSO) and enforce role-based access control.

NFR-06 (Supports FR-13, FR-18): The system shall maintain immutable audit logs for security events.

3.2.4 Usability

NFR-07 (Supports FR-05, FR-09, FR-14): The UI shall be responsive across devices (desktop, tablet, mobile).

NFR-08 (Supports FR-05–FR-07): The system shall provide clear error messages and validation feedback on forms.

3.2.5 Maintainability and Scalability

NFR-09 (Supports all FRs): The codebase shall follow modular design principles to allow future enhancements (e.g., additional leave types).

NFR-10 (Supports FR-12, FR-14): The reporting and analytics modules shall allow for future extension with minimal changes.

3.2.6 Legal and Compliance

NFR-11 (Supports FR-16, FR-17): The system shall comply with labor laws and data protection regulations (e.g., GDPR).

3.3 External Interfaces

This subsection describes how the ELMS will interact with external systems, hardware, and users.

3.3.1 User Interfaces

The ELMS will provide intuitive and responsive web-based user interfaces for employees and admins. The UI will be designed to be consistent across all modules, ensuring ease of navigation and a positive user experience. Key UI requirements include:

UI-01: The system shall provide a web-based interface accessible via standard web browsers (Chrome, Firefox, Edge, Safari).

UI-02: The user interface shall be responsive, adapting to various screen sizes (desktop, tablet, mobile) to ensure usability across devices.

UI-03: The system shall provide distinct dashboards for Employees and Admin/Managers tailored to their respective roles and displaying relevant information at a glance.

UI-04: All forms for leave application, approval, and policy configuration shall include clear labels, input validation, and informative error messages.

UI-05: The system shall provide visual cues (e.g., color-coding, icons) to indicate the status of leave requests (e.g., pending, approved, rejected).

UI-06: Navigation menus shall be clear, consistent, and easy to use, allowing users to quickly access different sections of the system.

UI-07: The system shall provide a calendar view for employees to see their own leave, and for managers to see their team's leave, clearly indicating approved and pending leaves.

UI-08: All reports generated by the system shall be presented in a clear, readable format and allow for export to common formats (e.g., PDF, CSV, Excel).

UI-09: The system shall provide a consistent look and feel across all pages, adhering to a defined style guide and branding guidelines.

3.3.2 Hardware Interfaces

The ELMS will primarily be a software-only solution and will not directly interface with specialized hardware devices. It will operate on standard server hardware and be accessed via client devices (desktops, laptops, tablets, smartphones) with internet connectivity. Therefore, specific hardware interface requirements are minimal:

HI-01: The system shall be compatible with standard server hardware configurations (x86-64 architecture).
HI-02: The system shall not require any specialized client-side hardware beyond a standard internet-connected device with a web browser.

3.3.3 Software Interfaces

The ELMS will interact with several external software systems:

SI-01 (Authentication System): The ELMS shall integrate with the organization's existing Single Sign-On (SSO) or Active Directory (AD) system for user authentication. This integration will ensure that employees use their existing organizational credentials to access the ELMS.

SI-02 (Email Notification System): The ELMS shall integrate with an email service to send automated notifications for leave requests, approvals, rejections, and other relevant updates to employees, managers, and HR.

SI-03 (Database System): The ELMS shall interface with a relational database management system (RDBMS) for data storage and retrieval (e.g., PostgreSQL, MySQL).

3.3.4 Communications Interfaces

CI-01: The system shall communicate over standard internet protocols (HTTP/HTTPS) for web access.

CI-02: The system shall support secure API communication protocols (e.g., RESTful APIs with OAuth2 or API Key authentication) for integration with other software systems.

3.4 Logical Database Requirements

This subsection describes the logical requirements for the data that will be stored and managed by the ELMS.

DB-01: The system shall store employee information, including employee ID, name, department, manager ID, hire date, and employment status.

DB-02: The system shall store details of all defined leave types, including name, description, accrual rules, and policy parameters.

DB-03: The system shall store individual employee leave balances for each leave type, including accrued, utilized, and remaining days.

DB-04: The system shall store all leave requests, including employee ID, leave type, start date, end date, duration, reason, status, submission date, and approval history (approver, date, comments).

DB-05: The system shall store company-wide holiday calendars, including holiday name and date.

DB-06: The system shall store an audit log of all significant system actions, including user, timestamp, action type, and details of changes.

DB-07: The database schema shall enforce data integrity through appropriate primary and foreign key constraints.

DB-08: Sensitive employee data (e.g., personal details, leave reasons) shall be encrypted at rest.

DB-09: The system shall support data backup and recovery mechanisms to prevent data loss.

3.5 Other Requirements

3.5.1 Operational Requirements

OP-01: The system shall provide administrative tools for system monitoring, health checks, and performance metrics.

OP-02: The system shall support configurable notification settings for various events.

OP-03: The system shall integrate with existing IT monitoring and alerting.

3.5.2 Legal and Regulatory Requirements

LR-01: The system shall comply with data privacy regulations (e.g., GDPR, CCPA) regarding the collection, storage, and processing of employee personal data.

LR-02: The system shall adhere to local labor laws and regulations concerning leave entitlements, accruals, and reporting requirements.

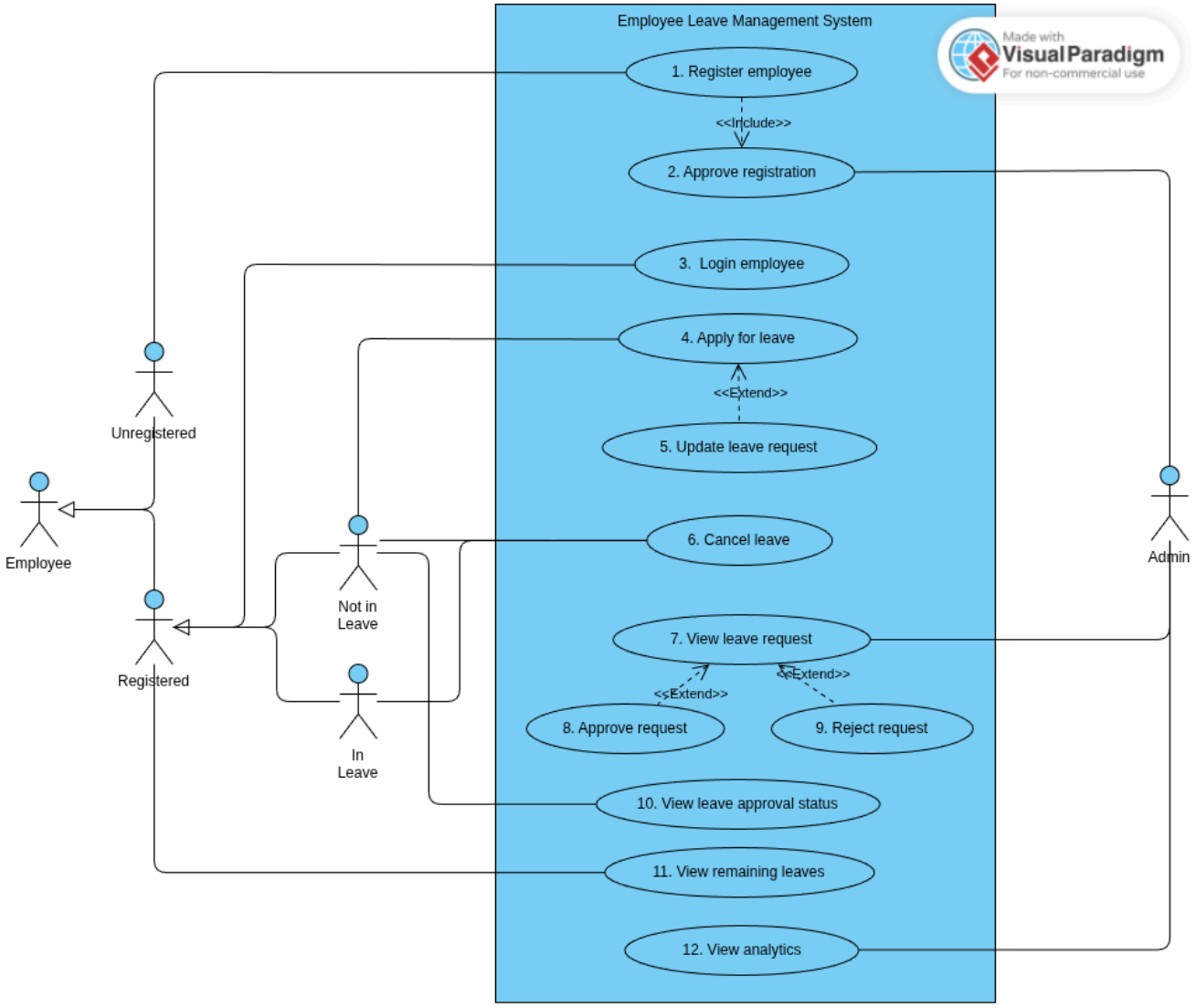
3.5.3 Usability Requirements

US-01: The system shall provide clear and concise help documentation and FAQs for all user roles.
US-02: The system shall minimize the number of steps required to complete common tasks (e.g., applying for leave, approving a request).

US-03: The system shall provide immediate and informative feedback to users for all actions.

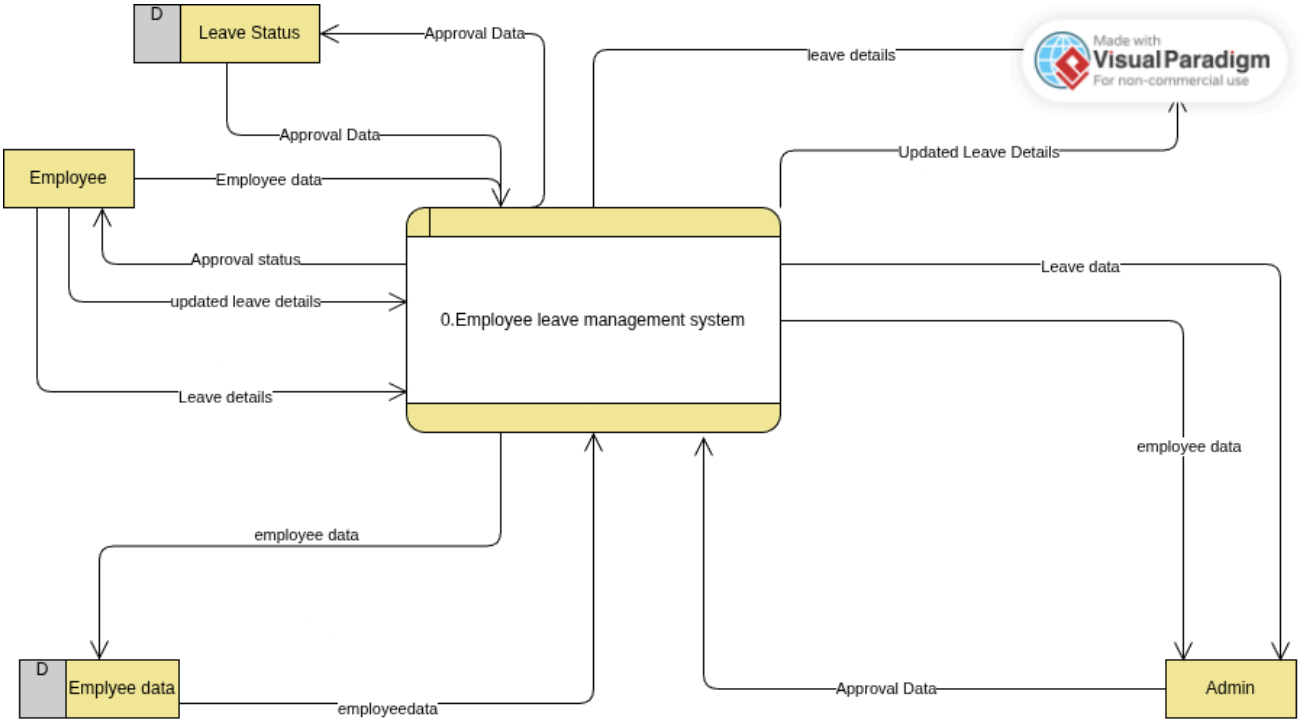
4. Appendixes

4.1 Use case diagram

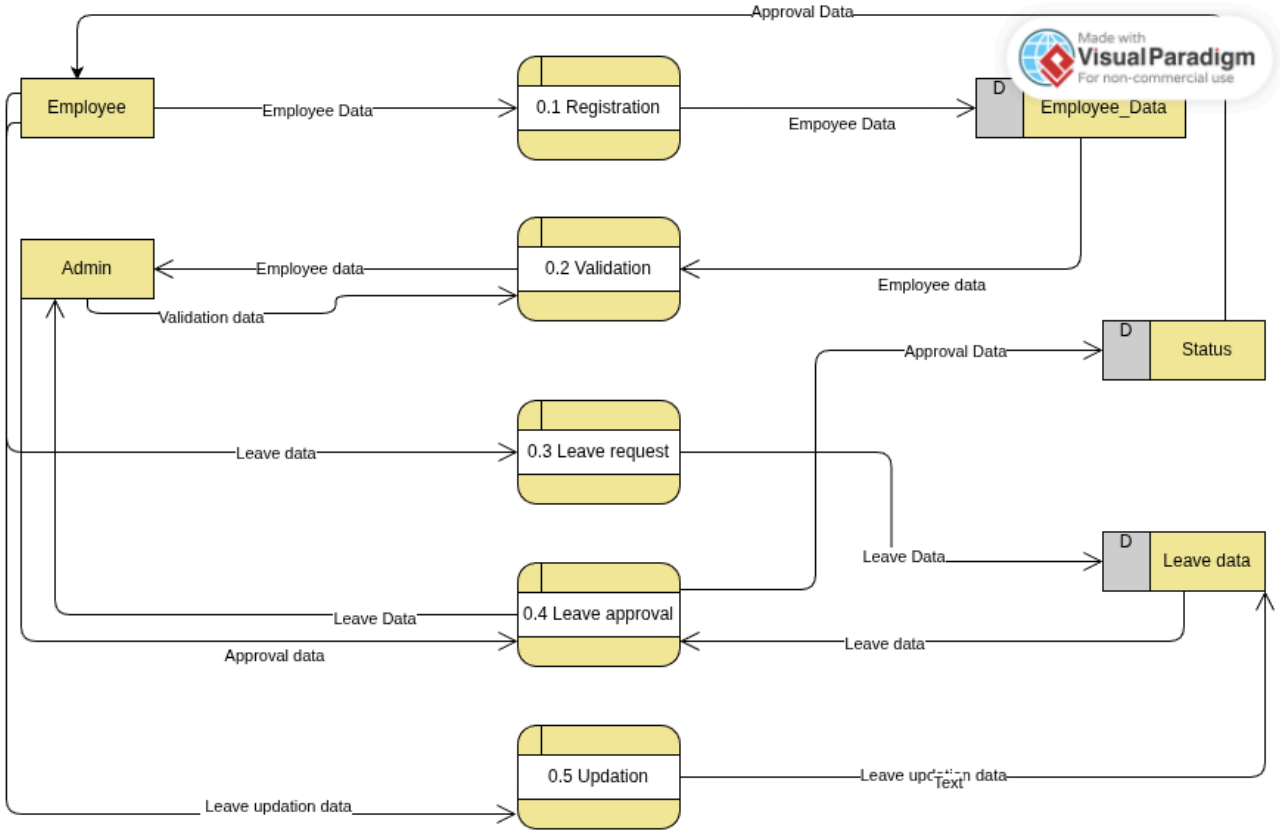


4.2 Data flow diagram

4.2.1 Data flow diagram level 0



4.2.2 Data flow diagram level 1



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