



# Hr Management System

Management system for Albanian company.  
System Documentation

Subject: Advanced Software Engineering

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# 1. Summary

## 1.1 Overview

This document outlines the development of an HR software application designed to streamline the vacation request process for employees and facilitate management by HR personnel. The application enables employees to register, log in, view their information, and request vacation days while allowing HR managers to approve or reject these requests and manage employee data. The HR Management System is a comprehensive software solution designed to meet the functional and non-functional requirements of organizations in managing their human resources effectively. It aims to streamline HR processes, enhance employee satisfaction, and support strategic HR initiatives. The system provides a range of features and capabilities to handle various aspects of HR management.

## 1.2 Project purpose

The HR Management System's objective is to give businesses a digital way to effectively manage their HR activities. Its objectives are to centralize employee data, automate critical procedures, improve communication, guarantee regulatory compliance, and offer an intuitive user interface for both employees and HR staff. Achieving our client's happiness and fulfilling as many of his requirements as we can in the software are equally important to us.

## 1.3 Stakeholders

Our HR management software project depends on the cooperation and involvement of multiple stakeholders, each of whom brings a different set of needs and requirements to the table.

**HR Professionals:** Since they will be the program's main users, HR professionals are at the project's center. Their understanding of workflows, HR procedures, and desired features is crucial for developing a solution that effectively satisfies their requirements.

**Workers:** The software directly affects workers since they will use it to update personal data, read corporate guidelines, and obtain leaves of absence. Their pleasure with the software and their user experience are crucial to its overall success.

**Supervisors & Managers:** These individuals are essential to the uptake and application of the program. For things like approving leaves of absence, evaluating employee performance, and getting employee data, they depend on the system. It is essential to get their input on functionality and usability in order to tailor the program to their requirements.

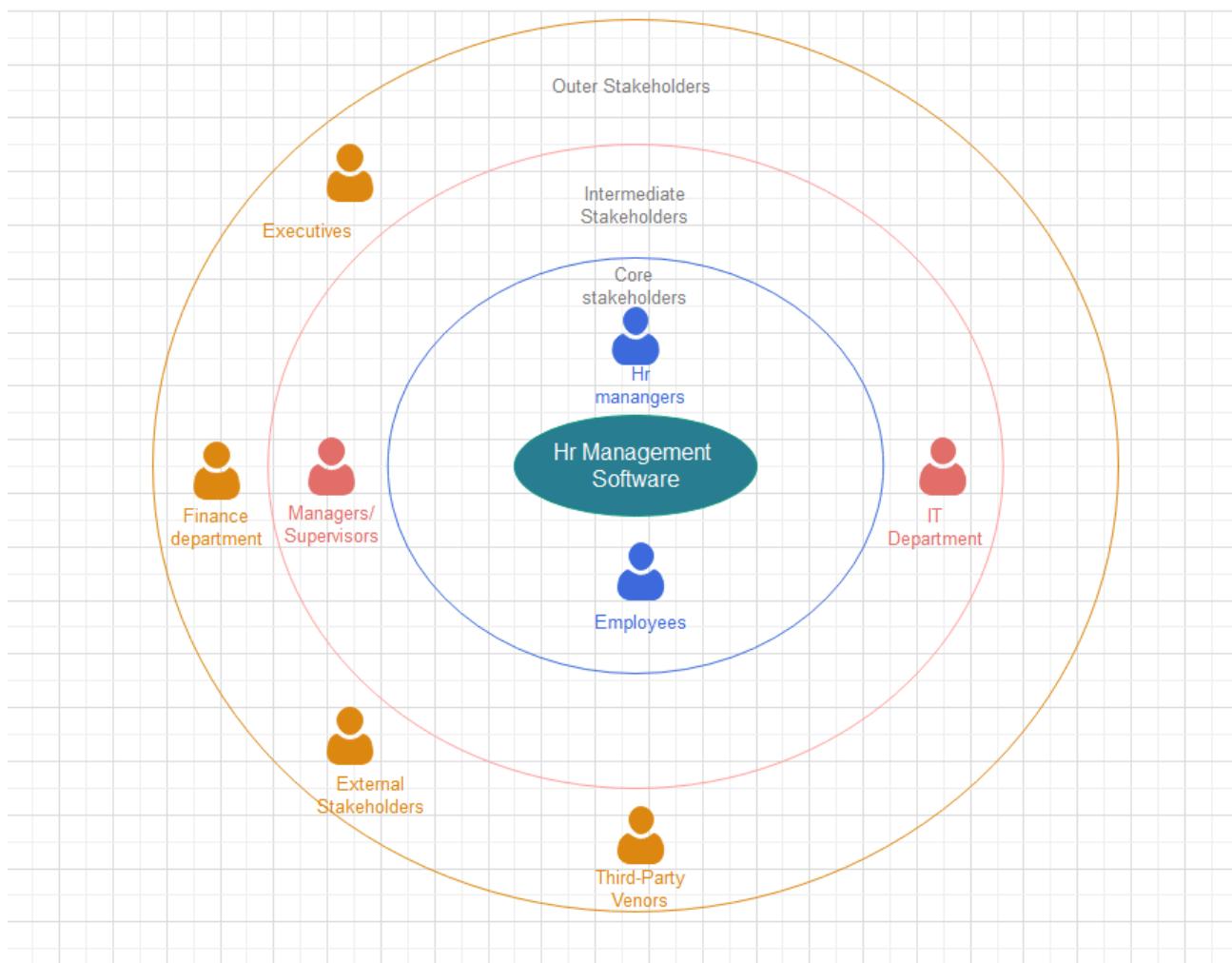
**IT Department:** The IT department is in charge of the HR software's technical integration, upkeep, and implementation. They make sure that the program complies with security requirements, works seamlessly with current systems, and fixes any potential bugs.

**Executives and Senior Management:** Based on data insights from the system, executives and senior management make strategic decisions using HR software. They are looking for measures that the software should deliver that are relevant to workforce trends, employee engagement, and overall HR success.

**Finance Department:** Payroll processing, budgeting, and financial reporting are among the duties for which the finance department may use the HR software. Including financial features in the program fits their requirements and improves overall productivity inside the company.

**External stakeholders** may be interested in the HR software, especially in relation to compliance with rules and regulations. These stakeholders may include auditors, regulators, and legal authorities, depending on the firm. Retaining credibility and confidence requires making sure the program complies with legal regulations.

**Third-Party Vendors:** These vendors are stakeholders with an interest in the functioning and performance of the HR software if the organization uses them for support or implementation of the program. Effective vendor collaboration guarantees a seamless implementation and continuous support procedure.



*Fig.1 Stakeholders Onion Diagram*

## **2. Product Description**

### **2.1 Context**

Introducing the HR Management System (HRMS), a state-of-the-art solution designed to satisfy the ever-changing needs of urban businesses. HRMS provides an extensive range of tools and services that are intended to improve employee experiences and streamline HR operations. HRMS serves businesses of all sizes, from start-ups to global conglomerates, offering a user-friendly platform for effective HR administration in busy urban settings.

### **2.2 User Features**

Designed with urban enterprises' HR managers and professionals in mind, HRMS provides a consolidated way to handle the difficulties of contemporary workforce management. Recognizing the dynamic character of urban work environments, HRMS tackles the particular difficulties encountered by HR departments, ranging from hiring to developing employees. HRMS is the perfect tool for tech-savvy professionals who value creativity and productivity because of its intuitive interface. HRMS enables HR staff to enhance corporate success and create a vibrant workplace culture in urban environments by promoting cooperation and optimizing operations.

### **2.3 Assumptions**

The HR Management System (HRMS) is predicated on the knowledge that its principal users—which are mostly managers and HR professionals—are internet literate and have access to gadgets. The platform is intuitive and user-friendly because it is created with the knowledge that users are accustomed to using similar digital applications. Furthermore, HRMS considers that users are looking for effective ways to handle HR duties that are in line with their goals and professional responsibilities. Moreover, HRMS assumes that teams in HR must collaborate and communicate to provide smooth interactions and workflow management.

### **2.4 Constraints**

HRMS is divided into multiple modules, each designed to handle a distinct HR function and assuming a rudimentary knowledge of HR procedures. Extensive modification is not permitted by the system's design to preserve system stability and avoid operational disruptions. Important functions, like performance reviews and personnel data management, depend on particular standards and setups outlined in HR regulations. Moreover, variables like server load and network availability may have an impact on the functionality and responsiveness of HRMS.

## 2.5 Dependencies

HRMS's primary functions are interdependent with the organization's HR infrastructure, depending on data synchronization and integration with current HR systems; the platform's capacity to process HR transactions and produce reports is reliant on the timeliness and accuracy of HR data inputs; future improvements, like adding advanced analytics or integrating with external systems, depend on forming alliances and adhering to organizational goals; and the system's dependability and performance are affected by the upkeep of the infrastructure and software updates.

# 3. Requirements

## 3.1 Functional Requirements

### a. User Account Management:

- **User Registration:**
  - Provide a user-friendly registration process for HR professionals and managers to create accounts.
  - Capture essential information during registration, including full name, email address, job title, department, and contact details.
  - Implement validation checks to ensure the uniqueness of usernames and email addresses.
  - Send automated email verification links to newly registered users to confirm their identities and activate their accounts securely.
- **Account Creation:**
  - Offer multiple options for account creation, such as self-registration, manual creation by administrators, or bulk import from external systems.
  - Allow administrators to assign roles and permissions to new accounts based on job responsibilities and organizational hierarchy.
  - Implement role-based access control (RBAC) to restrict access to sensitive features and data based on user roles.
- **Account Editing:**
  - Enable users to update their account information, including personal details, contact information, and preferences, through a user-friendly profile management interface.
  - Implement validation checks to ensure data accuracy and integrity when users edit their accounts.
  - Log all changes made to user accounts, including timestamps, previous values, and the identity of the user who made the changes, for audit trail purposes.
- **Access Permissions:**
  - Provide administrators with granular control over access permissions, allowing them to define access levels for each user role.
  - Support hierarchical role structures, where higher-level roles inherit permissions from lower-level roles to streamline permission management.
  - Allow administrators to easily add, modify, or revoke access permissions as needed, with changes taking effect immediately.
- **Preferences:**
  - Allow users to customize their experience by setting preferences such as language, date/time format, theme (light/dark), and notification preferences.
  - Provide a centralized settings dashboard where users can easily update their preferences and see the effects reflected across the platform.

- Implement persistent storage for user preferences, ensuring that settings are retained across sessions and devices.

| Requirement ID | Requirement Description   |
|----------------|---|
| UAM-FR-01      | Users should be able to register new accounts with unique usernames and email addresses.                |
| UAM-FR-02      | Administrators should be able to create new user accounts manually or in bulk.                          |
| UAM-FR-03      | User accounts should support role-based access control (RBAC) with configurable permissions.            |
| UAM-FR-04      | Users should have the ability to edit their account information and preferences.                        |
| UAM-FR-05      | Administrators should be able to manage access permissions for user roles effectively.                  |
| UAM-FR-06      | The system should support customization of user preferences such as language and notification settings. |

*Tab.1 Requirements UAM-FR*

## b. Employee Data Management:

- **Data Capture:**
  - Provide intuitive interfaces for HR staff to input and capture comprehensive employee data during onboarding and throughout the employment lifecycle.
  - Capture essential personal details such as name, date of birth, gender, contact information, and emergency contacts.
  - Collect employment-related information including job title, department, manager, employment status (full-time, part-time, contractor), and hire date.
- **Data Storage:**
  - Utilize a robust relational database management system (RDBMS) to securely store employee data, ensuring data integrity, confidentiality, and availability.
  - Implement data encryption mechanisms to protect sensitive employee information such as social security numbers, bank account details, and medical records.
  - Establish backup and disaster recovery procedures to safeguard employee data against loss or corruption.
- **Data Updating:**
  - Enable HR staff to update employee information dynamically as changes occur, such as promotions, transfers, salary adjustments, or terminations.

- Implement approval workflows for certain types of data updates, requiring manager or HR approval before changes are applied to employee records.
  - Log all changes made to employee data, including the user who made the change, timestamp, and previous values, for audit trail and compliance purposes.
- **Change Tracking:**
  - Implement version control mechanisms to track changes made to employee data over time, allowing users to view historical records and audit trails of data modifications.
  - Provide robust search and filtering capabilities to enable HR staff to quickly locate and retrieve employee records based on various criteria such as name, department, or employment status.
- **Integration with HR Processes:**
  - Integrate employee data management functionality with other HR processes such as performance management, training, and payroll to ensure data consistency and accuracy across the system.
  - Establish data synchronization mechanisms to ensure that employee data is synchronized with external systems such as payroll providers or benefits administration platforms.
- **Compliance and Security:**
  - Implement role-based access controls (RBAC) to restrict access to employee data based on job roles and responsibilities, ensuring that only authorized users can view or modify sensitive information.
  - Enforce compliance with data protection regulations such as GDPR, HIPAA, and CCPA by implementing privacy controls, data anonymization techniques, and consent management features.
  - Conduct regular security audits and vulnerability assessments to identify and mitigate potential security risks and vulnerabilities in the employee data management system.

| Requirement ID | Requirement Description  |
|----------------|--|
| EDM-FR-01      | The system should capture and store comprehensive employee data including personal details and job roles.    |
| EDM-FR-02      | HR staff should be able to update employee information dynamically with appropriate approval workflows.      |
| EDM-FR-03      | The system should maintain a detailed audit trail of all changes made to employee data for accountability.   |
| EDM-FR-04      | Users should be able to search, filter, and retrieve employee records based on various criteria efficiently. |
| EDM-FR-05      | Employee data management functionality should be integrated with other HR processes for data consistency..   |

|           |  |
|-----------|--|
| EDM-FR-06 | Access to sensitive employee data should be restricted based on role-based access controls (RBAC). |
|-----------|--|

*Tab.2 Requirements EDM-FR*

### **c. Performance Management:**

- **Goal Setting:**
  - Provide a platform for HR professionals and managers to define clear and measurable goals for employees aligned with organizational objectives.
  - Enable employees to view their assigned goals, understand expectations, and track progress towards achieving them.
  - Support the SMART framework (Specific, Measurable, Achievable, Relevant, Time-bound) for goal setting to ensure goals are meaningful and attainable.
- **Performance Evaluation:**
  - Facilitate the process of conducting periodic performance evaluations, including self-assessments, manager assessments, and peer feedback.
  - Provide customizable evaluation templates or forms to capture performance ratings, comments, and development areas for each employee.
  - Automate the scheduling and notification of performance reviews to ensure timely completion and feedback delivery.
- **Feedback Mechanisms:**
  - Establish channels for ongoing feedback and communication between employees and managers to address performance issues, provide recognition, and offer support.
  - Enable 360-degree feedback mechanisms where employees receive input from multiple sources, including peers, subordinates, and clients, to gain a comprehensive view of their performance.
  - Implement real-time feedback features to encourage continuous feedback exchange and foster a culture of continuous improvement.
- **Performance Tracking:**
  - Capture and analyze performance data over time to identify trends, strengths, and areas for improvement.
  - Provide dashboards and reports to visualize performance metrics such as goal attainment, key performance indicators (KPIs), and competency ratings.
  - Utilize performance analytics to identify high-performing employees, address performance gaps, and allocate resources effectively.
- **Performance Reports:**
  - Generate comprehensive performance reports summarizing individual and team performance metrics, facilitating decision-making and talent management.
  - Include graphical representations, trend analysis, and comparative benchmarks in performance reports to enhance readability and actionable insights.
  - Distribute performance reports to relevant stakeholders, including employees, managers, HR professionals, and executives, through secure channels.

| Requirement ID | Requirement Description   |
|----------------|---|
| PM-FR-01       | The system should support the creation and management of clear and measurable goals for employees.                            |
| PM-FR-02       | Performance evaluations should be conducted periodically using customizable evaluation templates                              |
| PM-FR-03       | The system should facilitate ongoing feedback exchange between employees and managers through various communication channels. |
| PM-FR-04       | Performance data should be captured and analyzed over time to identify trends and areas for improvement.                      |
| PM-FR-05       | Comprehensive performance reports should be generated and distributed to relevant stakeholders.                               |
| PM-FR-06       | Performance analytics should be used to identify high-performing employees and address performance gaps effectively.          |

*Tab.3 Requierments PM-FR*

#### **d. Training and Development:**

- **Training Resources:**

- Provide a comprehensive repository of training resources, including e-learning modules, videos, webinars, articles, and books, covering a wide range of topics and skill areas.
- Partner with external training providers or content providers to offer a diverse catalog of courses and learning materials tailored to employee development needs.
- Curate and categorize training resources based on relevance, proficiency levels, and learning objectives to help employees easily discover and access relevant content.

- **Course Catalog:**

- Maintain a centralized course catalog with detailed descriptions, learning objectives, prerequisites, and duration for each course offered.
- Allow employees to browse the course catalog, search for specific topics, and enroll in courses based on their interests and development goals.
- Provide recommendations and suggestions for courses based on employee job roles, career aspirations, and performance evaluations to promote personalized learning paths.

- **Development Programs:**

- Design and implement structured development programs tailored to employee career paths, job roles, and organizational needs, incorporating a mix of formal training, on-the-job learning, and mentoring/coaching.
- Offer leadership development programs, succession planning initiatives, and high-potential talent programs to identify and groom future leaders within the organization.
- Provide guidance and support for employees to create individual development plans (IDPs) outlining their learning goals, development activities, and timelines.
- **Participation Tracking:**
  - Track employee participation in training activities, recording completion status, scores, certifications achieved, and feedback received for each training program.
  - Automate the enrollment process and progress tracking to streamline administrative tasks and ensure accurate records of employee training history.
  - Integrate with learning management systems (LMS) or training platforms to synchronize training data and provide a seamless learning experience for employees.
- **Progress Monitoring:**
  - Monitor employee progress and performance improvements resulting from training initiatives, tracking key metrics such as skill acquisition, competency development, and job performance.
  - Provide feedback mechanisms for trainers, managers, and peers to evaluate the effectiveness of training programs and identify areas for improvement.
  - Conduct periodic assessments and evaluations to measure the impact of training on employee performance, productivity, and job satisfaction.

| Requirement ID | Requirement Description  |
|----------------|--|
| TAD-FR-01      | The system should provide a diverse range of training resources, including e-learning modules, videos, webinars, and articles.         |
| TAD-FR-02      | A centralized course catalog with detailed descriptions and learning objectives should be maintained for easy access and enrollment.   |
| TAD-FR-03      | Structured development programs tailored to employee career paths and organizational needs should be designed and implemented.         |
| TAD-FR-04      | Employee participation in training activities should be tracked and recorded, including completion status and certifications achieved. |
| TAD-FR-05      | The system should monitor employee progress and performance improvements resulting from training initiatives.                          |

*Tab.4 Requirements TAD-FR*

#### e. Attendance and Leave Management:

- **Attendance Recording:**
  - Provide multiple options for employees to record their attendance, including manual entry, biometric scanning, or integration with time-tracking systems.
  - Capture detailed attendance data such as clock-in/out times, break durations, and total hours worked for accurate payroll processing and compliance.
  - Offer flexible attendance tracking options for remote or field-based employees, including mobile apps or web-based timesheets.
- **Leave Requests:**
  - Enable employees to submit leave requests through the system, specifying the type of leave (e.g., vacation, sick leave), requested dates, and reason for the leave.
  - Implement configurable workflows for leave approval, routing requests to appropriate managers or HR personnel based on predefined rules and hierarchies.
  - Provide notifications and reminders for pending leave requests, ensuring timely review and approval to maintain workforce productivity.
- **Leave Balances:**
  - Display employees' leave balances in real-time, showing accrued leave, utilized leave, and remaining balances for each leave category.
  - Allow employees to view their leave history and upcoming scheduled leaves, providing transparency and visibility into their time-off entitlements.
  - Implement automatic leave accrual calculations based on company policies, employment tenure, or other predefined rules to ensure accuracy and consistency.
- **Approval Workflow:**
  - Define flexible approval workflows for different types of leave requests, allowing for multiple levels of approval and delegation of authority.
  - Provide managers with tools to review leave requests, assess their impact on team productivity, and make informed decisions about approving or denying requests.
  - Enable seamless communication between employees and managers regarding leave status, allowing for clarification or adjustment of leave plans as needed.
- **Attendance Reports:**
  - Generate comprehensive attendance reports summarizing employee attendance patterns, absences, tardiness, and compliance with company policies.
  - Include graphical visualizations, trend analysis, and comparative benchmarks in attendance reports to aid in workforce planning and management decisions.
  - Distribute attendance reports to relevant stakeholders, including managers, HR professionals, and finance departments, for payroll processing and compliance purposes.

| Requirement ID | Requirement Description |
|----------------|-------------------------|
|----------------|-------------------------|

|           |   |
|-----------|---|
| ALM-FR-01 | The system should provide multiple options for employees to record their attendance, including manual entry and biometric scanning. |
| ALM-FR-02 | Employees should be able to submit leave requests through the system with specified dates, leave types, and reasons                 |
| ALM-FR-03 | Leave approval workflows should be configurable, allowing for multiple levels of approval and delegation of authority.              |
| ALM-FR-04 | Real-time leave balance tracking should be available for employees, showing accrued, utilized, and remaining leave balances.        |
| ALM-FR-05 | Comprehensive attendance reports should be generated summarizing employee attendance patterns and compliance with policies..        |

*Tab.5 Requierments ALM-FR*

## f. Payroll Processing:

- **Automated Calculations:**
  - Implement algorithms and business rules to automate payroll calculations, including salary, bonuses, commissions, overtime, deductions, and taxes.
  - Ensure compliance with local tax laws, labor regulations, and company policies when calculating payroll amounts and withholding taxes.
  - Configure payroll parameters such as pay frequency, pay rates, tax brackets, and benefit contributions to accommodate varying employee situations.
- **Payslip Generation:**
  - Generate electronic payslips for employees detailing earnings, deductions, taxes, and net pay for each pay period.
  - Provide options for employees to access their payslips securely through the HRMS platform or via email, ensuring privacy and confidentiality.
  - Customize payslip formats and layouts to meet legal requirements and employee preferences, including support for multi-currency and multi-language payslips.
- **Tax Compliance:**
  - Stay up-to-date with changes in tax legislation and regulatory requirements to ensure accurate tax calculations and compliance.
  - Deduct and withhold income taxes, social security contributions, Medicare, pension contributions, and other statutory deductions as required by law.
  - Generate tax reports and statutory filings (e.g., W-2 forms, 1099 forms) for submission to tax authorities and compliance with reporting obligations.
- **Payment Distribution:**
  - Facilitate timely and accurate payment of salaries, bonuses, and other compensation to employees through direct deposit, checks, or electronic funds transfer.
  - Securely transmit payroll data to banking institutions or payment processors for processing payroll disbursements, ensuring confidentiality and data integrity.

- Provide employees with access to payment details and transaction history, allowing them to review and reconcile their earnings and deductions.
- **Payroll Reporting:**
  - Generate comprehensive payroll reports summarizing payroll expenses, tax liabilities, employee deductions, and reimbursements for financial reporting and analysis.
  - Include graphical visualizations, trend analysis, and comparative benchmarks in payroll reports to aid in budgeting, forecasting, and decision-making.
  - Distribute payroll reports to relevant stakeholders, including finance departments, HR professionals, and executives, for review and audit purposes.

| Requirement ID | Requirement Description   |
|----------------|---|
| PP-FR-01       | The system should automate payroll calculations, including salary, bonuses, deductions, and taxes, based on predefined rules. |
| PP-FR-02       | Electronic payslips should be generated for employees detailing earnings, deductions, and net pay for each pay period.        |
| PP-FR-03       | Payroll processing should comply with local tax laws, labor regulations, and company policies to ensure legal compliance.     |
| PP-FR-04       | Secure and accurate payment distribution methods should be provided, including direct deposit and electronic funds transfer.  |
| PP-FR-05       | Comprehensive payroll reports should be generated summarizing payroll expenses, tax liabilities, and employee deductions.     |

Tab.6 Requirements PP-FR

## g. Compliance Monitoring and Reporting:

- **Regulatory Compliance:**
  - Ensure adherence to labor laws, employment regulations, and industry standards relevant to HR operations, including but not limited to minimum wage laws, overtime regulations, and anti-discrimination laws.
  - Regularly review and update HR policies, procedures, and practices to align with changing legal requirements and mitigate compliance risks.
  - Provide guidance and training to HR staff and managers on compliance obligations, ethical standards, and best practices for HR management.
- **Data Privacy and Security:**
  - Implement robust data privacy measures to protect employee information from unauthorized access, disclosure, or misuse, in compliance with data protection laws such as GDPR, CCPA, and HIPAA.

- Encrypt sensitive data at rest and in transit, enforce access controls and user authentication mechanisms, and regularly audit system access and usage to maintain data integrity and confidentiality.
- Conduct privacy impact assessments (PIAs) and risk assessments to identify and address potential vulnerabilities and threats to data privacy and security.
- **Audit and Monitoring:**
  - Conduct periodic audits and assessments of HR processes, systems, and controls to ensure compliance with internal policies, external regulations, and industry standards.
  - Monitor HR activities, transactions, and user interactions within the system to detect anomalies, unauthorized access, or potential compliance violations.
  - Generate audit logs and reports documenting audit findings, corrective actions taken, and recommendations for improvement to demonstrate compliance and accountability.
- **Reporting and Documentation:**
  - Generate custom reports and dashboards summarizing HR metrics, workforce demographics, compliance status, and key performance indicators (KPIs) for management review and decision-making.
  - Document compliance activities, incident reports, and remediation efforts in compliance management systems or electronic document repositories for record-keeping and audit trail purposes.
  - Ensure transparency and accountability by providing access to compliance reports and documentation to relevant stakeholders, including regulatory authorities, auditors, and internal oversight bodies.

| Requirement ID | Requirement Description   |
|----------------|---|
| CMR-FR-01      | The system should support compliance with labour laws, employment regulations, and industry standards relevant to HR operations.        |
| CMR-FR-02      | Robust data privacy measures should be implemented to protect employee information in compliance with data protection laws.             |
| CMR-FR-03      | Periodic audits and assessments of HR processes, systems, and controls should be conducted to ensure compliance with internal policies. |
| CMR-FR-04      | Custom reports summarizing HR metrics, compliance status, and key performance indicators should be generated for management review.     |

## 3.2 Non-functional Requirements

### 3.2.1 Product Requirements

#### a. User Interface Requirements:

- Browser Accessibility:  
Ensure the HRMS platform is accessible via web browsers, offering comparable functionality to the desktop application.
- Intuitive and User-Friendly Design:  
Design the interface to be intuitive and easy to navigate, with clear menus and navigation paths.
- Responsive and Adaptive Layout:  
Ensure the platform's layout adapts seamlessly to different devices and screen sizes, maintaining consistency in user experience.
- Visually Appealing Presentation:  
Utilize visually engaging design elements, such as high-quality graphics and intuitive iconography, to enhance user experience and engagement.

These requirements form the foundation for the design and development of the HR Management System, ensuring it meets the needs of HR professionals and managers in urban organizations.

#### b. Usability:

- Ease of Learning and User Onboarding:

The HR Management System (HRMS) should prioritize ease of learning, enabling HR professionals and managers to quickly familiarize themselves with the platform. This could involve providing a user-friendly onboarding process for new users, offering guided tours or tutorials that highlight key functionalities such as employee data management, performance evaluation, and payroll processing. The aim is to minimize the learning curve and facilitate rapid adoption of the HRMS, even for users who may not have prior experience with similar systems.

- Accessibility for All Users:

The HRMS should be designed with universal accessibility in mind, ensuring that all users, regardless of their abilities, can effectively utilize the platform. This includes adherence to accessibility standards such as screen reader compatibility, support for voice commands, and options for adjusting text size. The design should also consider factors like color contrast and alternative navigation methods to accommodate users with visual or motor impairments. By prioritizing accessibility, the HRMS enhances its usability and ensures inclusivity for all HR professionals and managers within the organization.

#### c. Efficiency:

- High Performance and Low Latency:

The HR Management System (HRMS) should be optimized for high performance, providing swift responses and minimal latency, especially during periods of heavy usage. This involves

implementing efficient data handling mechanisms and optimizing server responses to accommodate multiple concurrent user requests. By prioritizing performance, the HRMS ensures that HR professionals and managers can access and interact with the system seamlessly, enhancing productivity and user satisfaction.

- Resource Optimization on Devices:

The HRMS should be designed to minimize resource consumption on users' devices, including battery life and data usage. This requires optimizing image sizes, caching frequently accessed data, and ensuring that background processes do not excessively drain device resources. By conserving device resources, the HRMS ensures a smooth user experience for HR professionals and managers, particularly for those who rely on the system throughout the day and may have limited access to charging facilities or Wi-Fi connectivity.

d. Security:

- Simplified User Authentication:

The HR Management System (HRMS) should implement a user authentication system that is both secure and user-friendly. This can be achieved through the use of password-based logins combined with security questions or other forms of multi-factor authentication. By simplifying the authentication process while maintaining security standards, the HRMS ensures ease of use for HR professionals and managers, without compromising on data protection.

- Basic Data Encryption:

To safeguard sensitive data, the HRMS should prioritize the implementation of standard SSL/TLS encryption for data transmission. This encryption protocol ensures that personal details, employee data, and other confidential information exchanged between the user's device and the HRMS servers are protected from unauthorized access or interception. By employing basic data encryption measures, the HRMS enhances data security and protects user privacy.

- Periodic Security Reviews:

Regular security reviews should be scheduled to assess the integrity of the HRMS and identify potential vulnerabilities. This can include basic vulnerability scanning, penetration testing, and adherence to security best practices. By conducting periodic security reviews, the HRMS can proactively address any security concerns and ensure that the system remains resilient against emerging threats. These tasks, while crucial for maintaining security, are manageable for a small development team and contribute to the overall security posture of the HRMS.

e. Technology Stack:

For the HR Management System (HRMS), we propose the following technology stack to ensure robustness, scalability, and efficiency in both the frontend and backend components:

Frontend:

**Angular:** Angular is a comprehensive framework for building web applications, offering features such as two-way data binding, dependency injection, and modular development. Its component-based architecture facilitates the creation of dynamic and responsive user interfaces, essential for a modern HRMS. Angular's extensive ecosystem and robust tooling make it an excellent choice for building complex front-end applications.

**Backend:**

**Spring Boot:** Spring Boot is a powerful framework for building Java-based backend applications. It provides features such as auto-configuration, which simplifies setup and reduces boilerplate code, enabling rapid development. Spring Boot's integration with Spring Security ensures robust authentication and authorization mechanisms, crucial for securing sensitive HR data.

**Version Control:**

**GitHub:** GitHub provides a collaborative platform for version control and project management, allowing developers to efficiently manage code repositories, track changes, and collaborate on projects. Its integration with popular development tools and services makes it an ideal choice for hosting the HRMS codebase and facilitating team collaboration.

**IDE (Integrated Development Environment):**

**IntelliJ IDEA:** IntelliJ IDEA is a powerful IDE that offers a wide range of features for Java development, including code assistance, refactoring tools, and built-in version control integration. Its seamless integration with Spring Boot enables efficient development and debugging of backend code, enhancing developer productivity.

**Code Editor:**

**Visual Studio Code (VS Code):** VS Code is a lightweight and versatile code editor that supports a wide range of programming languages and frameworks. Its extensive library of extensions provides additional functionality for frontend and backend development, including syntax highlighting, debugging, and Git integration. VS Code's intuitive interface and customizable layout make it a popular choice among developers for writing and editing code.

By leveraging this technology stack, we aim to build a robust and scalable HRMS that meets the needs of modern organizations, while also enhancing developer productivity and collaboration.

### 3.2.2. Organizational Requirements

a. Environmental Requirements:

**Cloud-Based Infrastructure:**

For the HR Management System (HRMS), we will leverage a cloud-based infrastructure to ensure efficient use of computing resources and minimize environmental impact. By utilizing

cloud services such as Amazon Web Services (AWS) or Microsoft Azure, we can achieve scalable resource allocation, dynamically adjusting to fluctuating demand without the need for excessive physical infrastructure. This approach aligns with sustainability goals by reducing energy consumption and minimizing carbon footprint. Additionally, the cloud-based infrastructure offers benefits such as high availability, data redundancy, and automated backups, ensuring the reliable and secure operation of the HRMS.

b. Operational Requirements:

Efficient Communication and Coordination:

The HRMS's operational framework is designed to facilitate seamless communication and coordination across various HR functions. The system's architecture enables efficient data conversion and integration, allowing HR professionals and managers to navigate and utilize different features effortlessly. Whether it's managing employee data, processing payroll, or conducting performance evaluations, the HRMS ensures that tasks can be completed efficiently and accurately. This operational design is tailored to meet the diverse needs of organizations, enabling HR teams to streamline processes, improve productivity, and enhance overall operational efficiency.

c. Domain Requirements

- Web and Mobile Application:

The HR Management System (HRMS) is a versatile solution designed to accommodate a diverse user base, primarily comprising HR professionals and managers within organizations. The system is accessible through both web and mobile platforms, ensuring convenience and flexibility for users. Features and access privileges are tailored based on user roles, with distinct functionalities available to different user groups.

- User Roles and Access Privileges:

HR Professionals: HR professionals have access to features such as employee data management, recruitment, performance evaluation, training and development, attendance and leave management, payroll processing, compliance tracking, and reporting.

Managers: Managers have access to features relevant to their managerial responsibilities, such as team management, performance evaluation of their direct reports, leave approval, and access to relevant reports and analytics.

Administrators: Administrators have elevated privileges to configure system settings, manage user accounts and permissions, customize workflows, and generate system-wide reports. They are responsible for overseeing the overall functionality and security of the HRMS.

- Domain-Specific Design:

The HRMS is designed with a domain-specific approach to address the unique needs of HR management within organizations. The system offers specialized access tailored to different user roles, ensuring that each user group has access to the functionalities relevant to their responsibilities. This domain-specific design facilitates efficient HR operations and enhances user productivity within the organizational context.

- Integration with External Systems:

The HRMS may integrate with external systems such as payroll providers, applicant tracking systems, learning management systems, and enterprise resource planning (ERP) systems. Integration with these systems allows for seamless data exchange and enhances the overall functionality of the HRMS by leveraging existing infrastructure and data sources.

d. External Requirements:

i. Regulatory Requirements:

- Compliance with Labor Laws and Regulations:

For the HR Management System (HRMS), compliance with labor laws and regulations is essential. The platform must adhere to relevant labor laws governing employment practices, such as regulations related to minimum wage, working hours, overtime, and employee benefits. Ensuring compliance with these regulations helps organizations avoid legal penalties and maintain fair and ethical employment practices.

- Data Protection and Privacy Regulations:

The HRMS must comply with data protection and privacy regulations to safeguard sensitive employee information. This includes adherence to regulations such as the General Data Protection Regulation (GDPR) in the European Union and the California Consumer Privacy Act (CCPA) in the United States. The system should implement robust security measures, including encryption, access controls, and data anonymization, to protect employee data from unauthorized access or disclosure.

ii. Ethical Requirements:

- Transparency and Honesty:

Transparency and honesty are paramount for the HRMS in providing clear, accurate, and comprehensive information about HR processes and employee data. This includes transparent communication about policies, procedures, and any changes that may affect employees. Additionally, the HRMS should provide employees with access to their personal data and ensure that they understand how their data is used and protected.

- User Privacy and Data Protection:

Respecting user privacy and protecting employee data is a fundamental ethical requirement for the HRMS. The platform must implement strict data protection measures to ensure that employee information is secure and only accessed by authorized personnel. This includes collecting only necessary data, obtaining consent for data processing, and adhering to data retention policies. By prioritizing user privacy and data protection, the HRMS fosters trust and confidence among employees and demonstrates ethical responsibility in handling sensitive information.

e. Legislative Requirements:

i. General Data Protection Regulation (GDPR):

The HR Management System (HRMS) must adhere to the General Data Protection Regulation (GDPR) requirements to ensure the protection of personal data:

- Consent: Obtain clear and explicit consent from users before collecting, processing, or storing their personal data. The HRMS should implement mechanisms for obtaining and managing user consent effectively.
- Right to Access: Ensure users can access their personal data stored in the HRMS and understand how it's being used. Provide mechanisms for users to review, update, or delete their personal information.
- Data Portability: Enable users to obtain and reuse their personal data across different services. The HRMS should support data portability features to allow users to export their data in a commonly used format.
- Right to be Forgotten: Enable users to have their personal data deleted upon their request. Implement procedures for handling data deletion requests and ensure that personal data is permanently removed from the HRMS.
- Data Protection: Implement measures to securely store and transfer personal data, preventing unauthorized access and breaches. Utilize encryption, access controls, and other security measures to protect personal data from unauthorized access or disclosure.

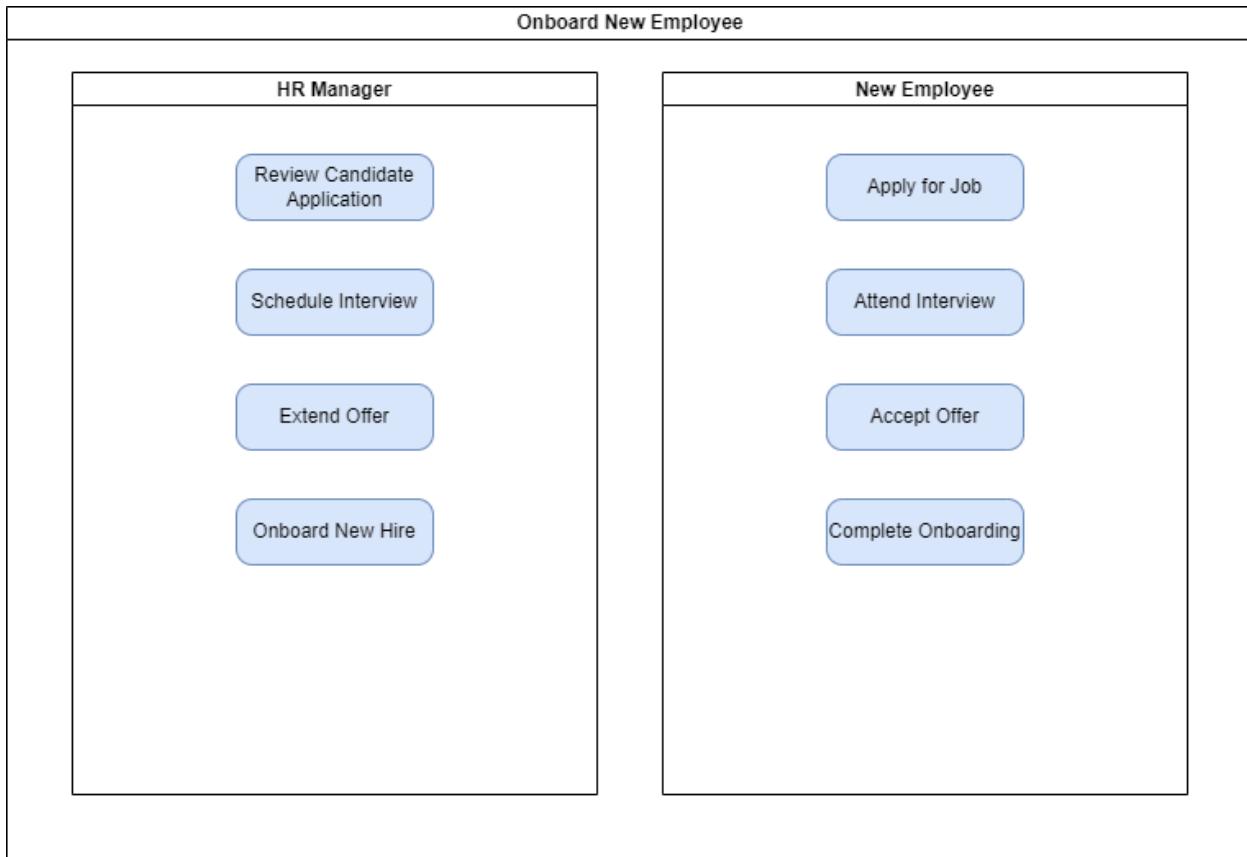
ii. Albanian Legislation (Law No. 9887, Date 10.3.2008 on "Protection of Personal Data"):

The HRMS must also comply with Albanian legislation regarding the protection of personal data:

- Data Controller and Processor Compliance: Ensure that the data controller and processors involved in handling personal data comply with Albanian laws regarding personal data protection.
- Notification of Data Collection: Inform the Information and Data Protection Commissioner and individuals about the collection of personal data and its purpose. Maintain transparency regarding data collection practices.
- Data Security Measures: Implement appropriate technical and organizational measures to protect personal data against accidental or unlawful destruction, loss, alteration, unauthorized disclosure, or access. Adhere to industry best practices for data security.
- Cross-Border Data Transfer: Adhere to regulations governing the transfer of personal data to countries outside Albania, ensuring they provide an adequate level of protection. Implement safeguards, such as standard contractual clauses or binding corporate rules, for cross-border data transfers to comply with Albanian data protection laws.

## 4. Software Design

### 4.1 BPMN

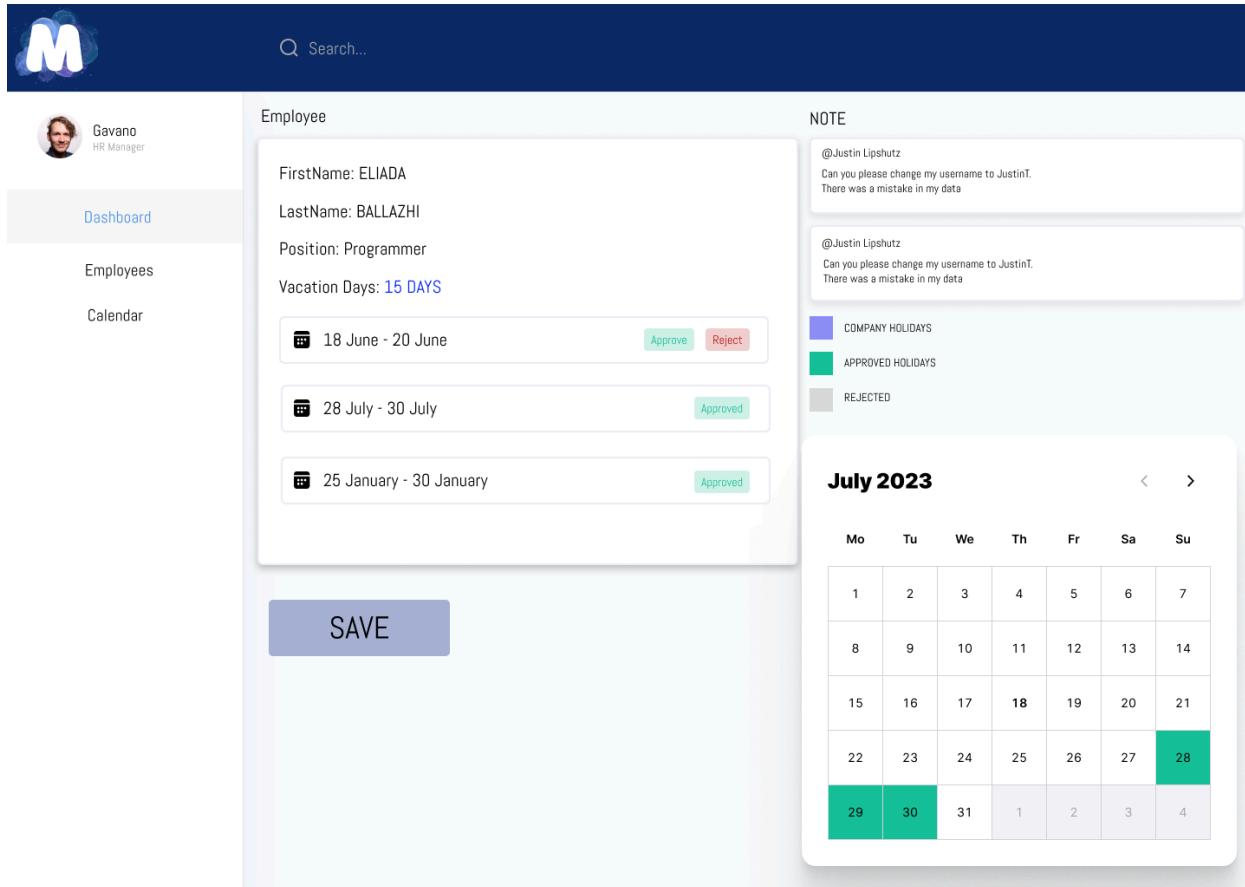


*Fig2. BPMN Diagram*

## 4.1.1 Initial App Sketches and Design

This sketch shows a dashboard interface. At the top is a dark header with a large white 'M' logo and a search bar. Below the header is a sidebar with a user profile (Gavano, HR Manager) and navigation links for Dashboard, Employees, and Calendar. The main content area features a box for 'Total Employees' (856) with a 10% growth indicator. Below this is a table titled 'Employee Status' listing three employees: Justin Lipshutz (Approved), Marcus Culhane (Pending), and Leo Stanton (Rejected). Each row includes edit and delete buttons.

This sketch shows an employee detail view and a vacation request form. The top part displays an employee's information: FirstName: ELIADA, LastName: BALLAZHI, Position: Programmer, and Vacation Days: 15 DAYS. Below this is a date range selector for 'START DATE' and 'END DATE'. To the right is a calendar for July 2023, highlighting specific dates. The bottom section contains a large blue note field and a 'REQUEST' button. A 'Logout' button is located at the bottom left.



The screenshot shows a web-based employee management system. At the top left is a logo with a stylized 'M' inside a blue cloud-like shape. To its right is a search bar with the placeholder "Search...". On the far left, there's a sidebar with a user profile picture of a man named Gavano, labeled "HR Manager". Below the profile are three menu items: "Dashboard" (which is currently selected and highlighted in light blue), "Employees", and "Calendar".

The main content area has two main sections. On the left, under "Employee", it displays basic information: FirstName: ELIADA, LastName: BALLAZHI, Position: Programmer, and Vacation Days: 15 DAYS. Below this, there are three entries for vacation requests:

- 18 June - 20 June: Status is pending, with "Approve" and "Reject" buttons.
- 28 July - 30 July: Status is "Approved".
- 25 January - 30 January: Status is "Approved".

A large blue "SAVE" button is centered below these entries.

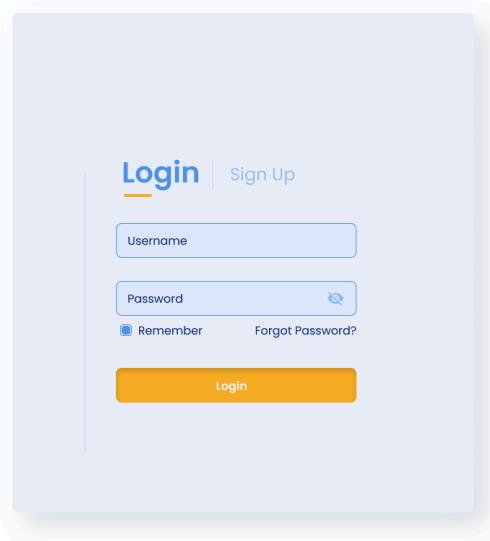
On the right, under "NOTE", there are two messages from users:

- @JustinLipshutz: Can you please change my username to JustinT. There was a mistake in my data.
- @JustinLipshutz: Can you please change my username to JustinT. There was a mistake in my data.

Below the notes is a legend for holiday status:

- COMPANY HOLIDAYS (purple square)
- APPROVED HOLIDAYS (green square)
- REJECTED (grey square)

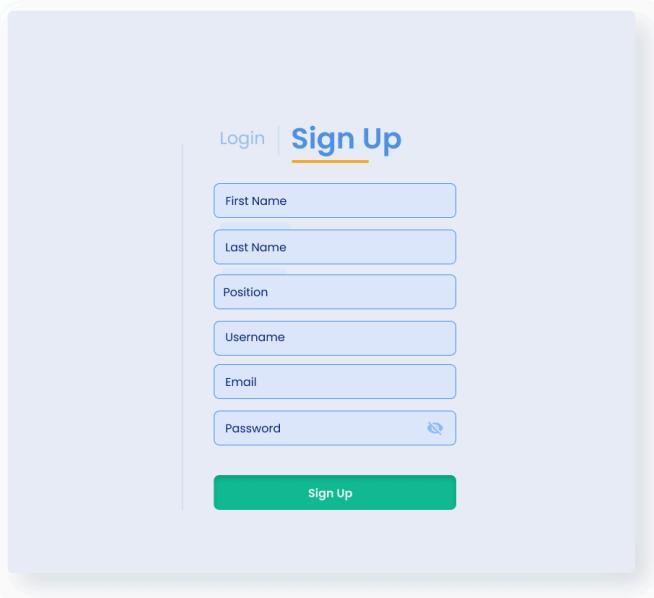
At the bottom right is a calendar for July 2023, showing the days of the week (Mo-Su) and the dates 1 through 31. The 28th is highlighted in green, indicating it is an approved holiday.



The screenshot shows a login form. At the top center are the words "Login" and "Sign Up" with a vertical line between them. Below the "Login" text is a blue horizontal bar.

The form consists of several input fields and buttons:

- A "Username" input field with a placeholder "Username".
- A "Password" input field with a placeholder "Password" and a small eye icon to the right for password visibility.
- Below the password field are two buttons: a blue "Remember" checkbox and a grey "Forgot Password?" link.
- A large yellow "Login" button at the bottom.



## 4.2 User Scenarios

### Scenario Title: HR Professional Creates a New Account

- An HR professional accesses the HR Management System (HRMS) platform.
- They navigate to the user account management section and initiate the account creation process.
- The HR professional provides the necessary details, such as name, email, and job role, to create their personal account.
- After account creation, they set preferences, update personal information, and configure access permissions according to their role within the organization.

### Scenario Title: HR Manager Updates Employee Information

- An HR manager logs into the HRMS platform to manage employee data.
- They navigate to the employee data management section and search for the employee whose information needs to be updated.
- The HR manager edits the employee's personal details, job role, or employment history as required.
- The system tracks the changes made to the employee's information and maintains an audit trail for reference.

**Scenario Title: HR Professional Conducts Performance Evaluation**

- An HR professional initiates a performance evaluation for an employee through the HRMS.
- They define performance goals, and evaluation criteria, and set a timeline for the evaluation process.
- The HR professional collects feedback from managers, peers, and the employee themselves to assess performance.
- After completion of the evaluation, the HRMS generates a performance report summarizing the results and areas for improvement.

**Scenario Title: HR Administrator Manages Training Programs**

- An HR administrator accesses the training and development module within the HRMS.
- They browse available training resources, courses, and development programs.
- The HR administrator assigns relevant training programs to employees based on their job roles and development needs.
- The HRMS tracks employee participation, monitors progress, and generates reports on training activities.

**Scenario Title: Employee Requests Leave**

- An employee logs into the HRMS platform to request leave.
- They navigate to the leave management section and submit a leave request, specifying the dates and reason for their absence.
- The HRMS notifies their manager for approval, and the manager reviews and approves the leave request.
- Upon approval, the HRMS updates the employee's leave balance and sends a confirmation to the employee.

**Scenario Title: Payroll Processing**

- The payroll administrator accesses the payroll processing module within the HRMS.
- They input necessary data, including employee salaries, bonuses, deductions, and taxes.
- The HRMS automatically calculates payroll amounts and generates payslips for each employee.
- After verification, the payroll administrator approves the payroll for processing, and the HRMS facilitates payment distribution through direct deposit or other payment methods.

**Scenario Title: Compliance Monitoring and Reporting**

- The HR compliance officer accesses the compliance and reporting tools within the HRMS.
- They run predefined compliance checks and validations to ensure adherence to labor laws and company policies.
- The HRMS generates custom reports on HR metrics, workforce demographics, compliance status, and other relevant data for regulatory purposes.

- The compliance officer reviews the reports and takes necessary actions to address any compliance issues identified.

### 4.3 Use cases extended

|                            |  |
|----------------------------|--|
| <b>Use Case ID</b>         | <b>UC-HR-01</b>  |
| Use Case Name              | Employee Requests Time Off   |
| Scope                      | HR Management System (HRMS)  |
| Level                      | User Goal  |
| Primary Actor              | Employee   |
| Stakeholders and Interests | - Employee wants to request time off for personal reasons.<br>- HR Manager needs to approve or deny time-off requests for proper workforce management.   |
| Preconditions              | The employee must be registered with the HRMS  |
| Postconditions             | The employee's time-off request is submitted, and the HR manager is notified for approval.   |
| Main Success Scenario      | <ol style="list-style-type: none"> <li>1. Employee logs into the HRMS platform.</li> <li>2. Navigates to the time-off request section.</li> <li>3. Specifies the dates and reason for the time off.</li> <li>4. Submits the request.</li> <li>5. The system notifies the HR manager for approval.</li> </ol> |
| Extensions                 | None   |
| Minimums Guarantees        | The employee receives confirmation of their time-off request submission.   |
| Success Guarantees         | The employee's time-off request is approved by the HR manager.   |
| Trigger                    | Employee initiates a time-off request.   |
| Frequency of Occurrence    | Occurs when employees require time off.  |

Tab.8 Use Cases UC-HR-01

| Use Case ID                | UC-HR-02  |
|----------------------------|---|
| Use Case Name              | HR Manager Updates Employee Information   |
| Scope                      | HR Management System (HRMS)   |
| Level                      | User Goal   |
| Primary Actor              | HR Manager  |
| Stakeholders and Interests | - HR Manager wants to update employee information for accurate record-keeping and management.   |
| Preconditions              | The HR manager must be logged into the HRMS.  |
| Postconditions             | The employee's information is successfully updated in the HRMS, and changes are recorded.   |
| Main Success Scenario      | <ol style="list-style-type: none"> <li>1. HR manager logs into the HRMS platform.</li> <li>2. Navigates to the employee data management section.</li> <li>3. Searches for the employee.</li> <li>4. Edits the employee's personal details, job role, or employment history.</li> <li>5. Saves the changes.</li> </ol> |
| Extensions                 | None  |
| Minimums Guarantees        | The changes made to the employee's information are saved.   |
| Success Guarantees         | The employee's information is accurately updated in the HRMS.   |
| Trigger                    | Occurs when employee information requires updating.   |
| Frequency of Occurrence    | Occurs when employees require time off.   |

Tab.9 Use Cases UC-HR-02

| Use Case ID   | UC-HR-03  |
|---------------|---|
| Use Case Name | HR Professional Conducts Performance Evaluation |
| Scope         | HR Management System (HRMS)                     |
| Level         | User Goal                                       |
| Primary Actor | HR Professional                                 |

|                            |   |
|----------------------------|---|
| Stakeholders and Interests | - HR Professional wants to conduct performance evaluations to assess employee performance and provide feedback.<br>- Employees seek performance feedback to improve their performance.  |
| Preconditions              | HR Professionals must be logged into the HRMS.  |
| Postconditions             | Performance evaluation results are recorded in the HRMS, and a performance report is generated.   |
| Main Success Scenario      | 1. HR professional initiates a performance evaluation for an employee.<br>2. Defines performance goals and evaluation criteria.<br>3. Collect feedback from managers, peers, and the employee.<br>4. Completes the evaluation and generates a performance report. |
| Extensions                 | None  |
| Minimums Guarantees        | The performance evaluation process is completed successfully.   |
| Success Guarantees         | Accurate performance evaluation results are recorded, and a performance report is generated.  |
| Trigger                    | HR professional initiates a performance evaluation.   |
| Frequency of Occurrence    | Occurs periodically for performance assessment.   |

Tab.10 Use Cases UC-HR-03

|                            |   |
|----------------------------|---|
| Use Case ID                | UC-HR-04  |
| Use Case Name              | HR Administrator Manages Training Programs  |
| Scope                      | HR Management System (HRMS)   |
| Level                      | User Goal   |
| Primary Actor              | HR Administrator  |
| Stakeholders and Interests | - HR Administrator wants to manage training programs to facilitate employee skill development. - Employees seek access to training resources to enhance their skills and knowledge. |
| Preconditions              | HR Administrator must be logged into the HRMS.  |
| Postconditions             | Employee participation in training programs is tracked, and   |

|                         |   |
|-------------------------|---|
|                         | training progress is monitored in the HRMS.   |
| Main Success Scenario   | <ol style="list-style-type: none"> <li>1. HR administrator accesses the training and development module within the HRMS.</li> <li>2. Browse available training resources, courses, and development programs.</li> <li>3. Assign relevant training programs to employees based on their job roles and development needs.</li> <li>4. Tracks employee participation and monitors progress.</li> </ol> |
| Extensions              | None  |
| Minimums Guarantees     | Employee participation in training programs is accurately tracked.  |
| Success Guarantees      | Employee training progress is monitored effectively, and relevant training programs are assigned based on job roles and development needs.  |
| Trigger                 | HR administrator initiates management of training programs  |
| Frequency of Occurrence | Occurs periodically for employee skill development.   |

Tab.11 Use Cases UC-HR-04

|                            |   |
|----------------------------|---|
| Use Case ID                | UC-HR-05  |
| Use Case Name              | Employee Requests Leave   |
| Scope                      | HR Management System (HRMS)   |
| Level                      | User Goal   |
| Primary Actor              | Employee  |
| Stakeholders and Interests | - Employee wants to request leave for personal reasons. - HR Staff need to review and approve leave requests for proper leave management.         |
| Preconditions              | Employee must be registered with the HRMS.  |
| Postconditions             | The employee's leave request is submitted, and HR staff are notified for approval.  |
| Main Success Scenario      | <ol style="list-style-type: none"> <li>1. Employee logs into the HRMS platform.</li> <li>2. Navigates to the leave management section.</li> </ol> |

|                         |   |
|-------------------------|---|
|                         | 3. Submits a leave request, specifying dates and reason.<br>4. The HRMS notifies HR staff for approval. |
| Extensions              | None  |
| Minimums Guarantees     | The employee receives confirmation of their leave request submission.                                   |
| Success Guarantees      | The employee's leave request is approved by HR staff.   |
| Trigger                 | Employee initiates a leave request.   |
| Frequency of Occurrence | Occurs when employees require leave.  |

Tab.12 Use Cases UC-HR-05

| Use Case ID                | UC-HR-06   |
|----------------------------|--|
| Use Case Name              | Payroll Processing   |
| Scope                      | HR Management System (HRMS)  |
| Level                      | User Goal  |
| Primary Actor              | Payroll Administrator  |
| Stakeholders and Interests | - Payroll Administrator wants to accurately calculate and process payroll for employees. - Employees expect timely and accurate payment of salaries and other compensations.   |
| Preconditions              | Payroll Administrator must be logged into the HRMS.  |
| Postconditions             | Payroll for employees is processed accurately, and payslips are generated for distribution.  |
| Main Success Scenario      | 1. Payroll administrator accesses the payroll processing module within the HRMS.<br>2. Inputs necessary payroll data, including salaries, bonuses, deductions, and taxes.<br>3. The HRMS automatically calculates payroll amounts and generates payslips for each employee.<br>4. After verification, payroll administrator approves payroll for processing. |
| Extensions                 | None   |
| Minimums Guarantees        | Payroll calculations are accurate, and payslips are generated correctly.   |

|                         |  |
|-------------------------|--|
| Success Guarantees      | Employees receive timely and accurate payment of salaries and other compensations. |
| Trigger                 | Payroll administrator initiates payroll processing.                                |
| Frequency of Occurrence | Occurs periodically for payroll processing.  |

Tab.13 Use Cases UC-HR-06

| Use Case ID                | UC-HR-07   |
|----------------------------|--|
| Use Case Name              | Compliance Monitoring and Reporting  |
| Scope                      | HR Management System (HRMS)  |
| Level                      | User Goal  |
| Primary Actor              | HR Compliance Officer  |
| Stakeholders and Interests | - HR Compliance Officer wants to ensure adherence to labor laws, regulations, and company policies. - Management requires reports on HR metrics, workforce demographics, and compliance status for decision-making.  |
| Preconditions              | HR Compliance Officer must be logged into the HRMS.  |
| Postconditions             | Compliance checks are conducted, and reports on HR metrics, workforce demographics, and compliance status are generated.   |
| Main Success Scenario      | <ol style="list-style-type: none"> <li>1. HR compliance officer accesses compliance and reporting tools within the HRMS.</li> <li>2. Runs predefined compliance checks and validations.</li> <li>3. The HRMS generates custom reports on HR metrics, workforce demographics, and compliance status.</li> </ol> |
| Extensions                 | None   |
| Minimums Guarantees        | Compliance checks are conducted accurately, and relevant reports are generated.  |
| Success Guarantees         | HR compliance officer ensures adherence to labor laws and company policies, and management receives accurate reports for decision-making.  |
| Trigger                    | HR compliance officer initiates compliance monitoring and reporting.   |
| Frequency of Occurrence    | Occurs periodically for compliance monitoring and reporting.   |

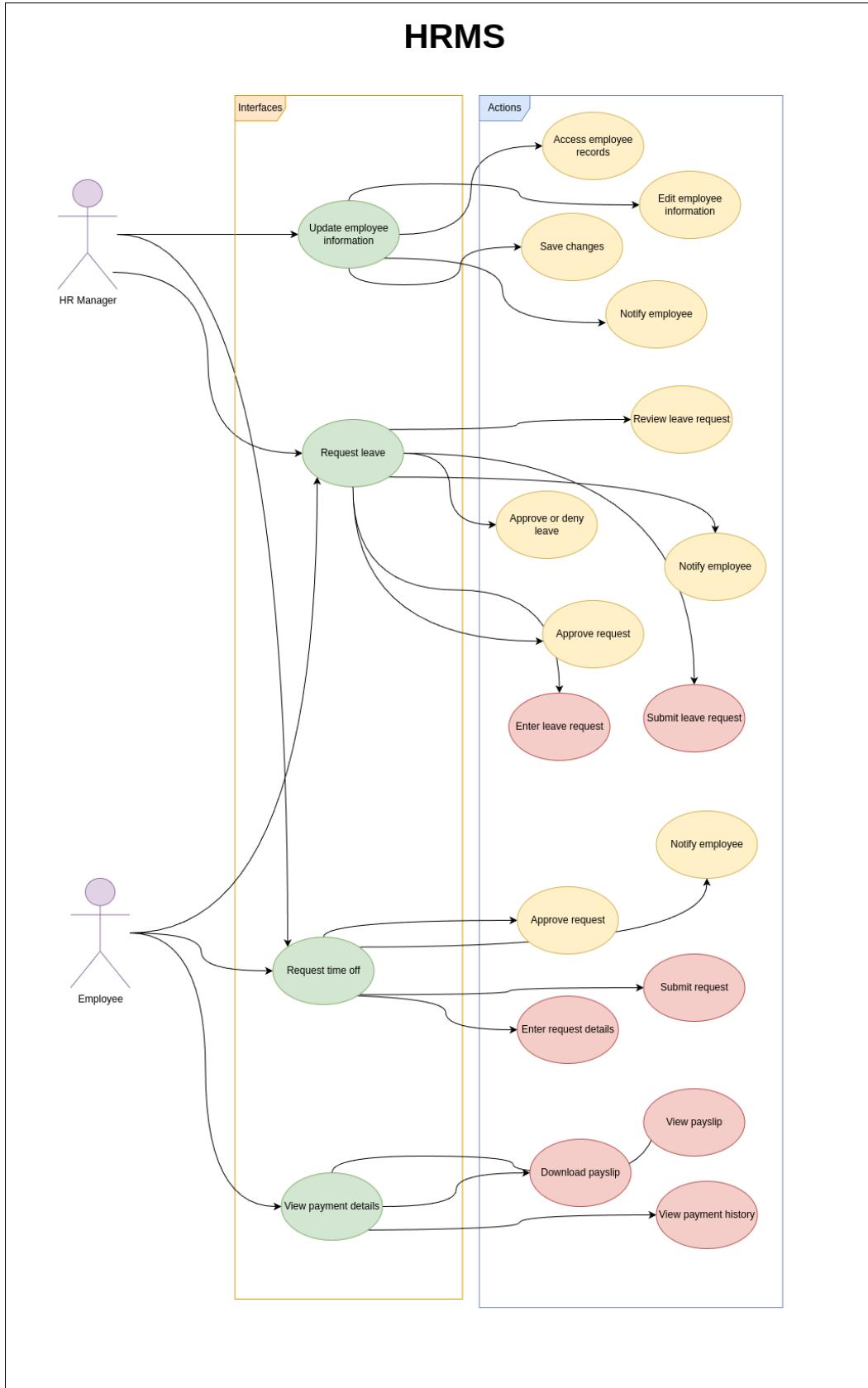
*Tab.14 Use Cases UC-HR-07*

| Use Case ID                       | UC-HR-08  |
|-----------------------------------|---|
| <b>Use Case Name</b>              | View Payment Details  |
| <b>Scope</b>                      | HR Management System  |
| <b>Level</b>                      | User Goal   |
| <b>Primary Actor</b>              | Employee  |
| <b>Stakeholders and Interests</b> | Employee: Wants to view and download their payment details and payslips. HR Department: Ensures employees have access to their payment information.   |
| <b>Preconditions</b>              | The employee must be logged into the HR management system.  |
| <b>Postconditions</b>             | The employee views their payslip and can download it if needed.   |
| <b>Main Success Scenario</b>      | <ol style="list-style-type: none"> <li>1. The employee logs into the HR management system.</li> <li>2. The employee navigates to the "View Payment Details" section.</li> <li>3. The system displays the current and past payslips.</li> <li>4. The employee can download or print the payslips.</li> </ol> |
| <b>Extensions</b>                 | <ol style="list-style-type: none"> <li>1. If the employee is not logged in, they are prompted to log in.</li> <li>2. If there are no payslips available, the system informs the employee.</li> </ol>  |
| <b>Minimum Guarantees</b>         | The employee is informed if there are no payslips available.  |
| <b>Success Guarantees</b>         | The employee can view and download their payslip.   |
| <b>Trigger</b>                    | The employee wants to view their payment details.   |
| <b>Frequency of Occurrence</b>    | Typically once per pay period, but potentially multiple times if the employee needs to access past payslips.  |

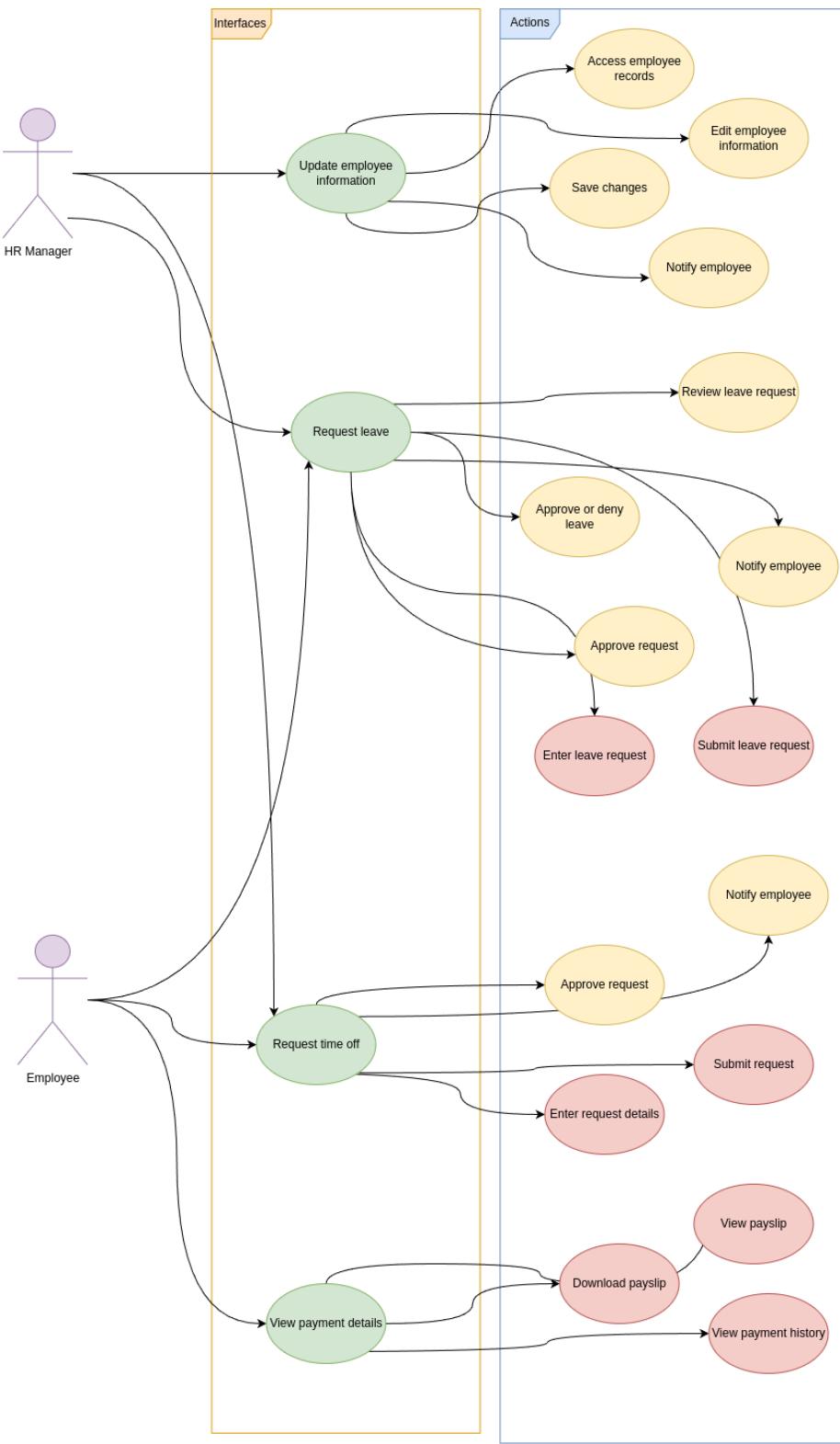


## 4.4 Behavioral Diagrams

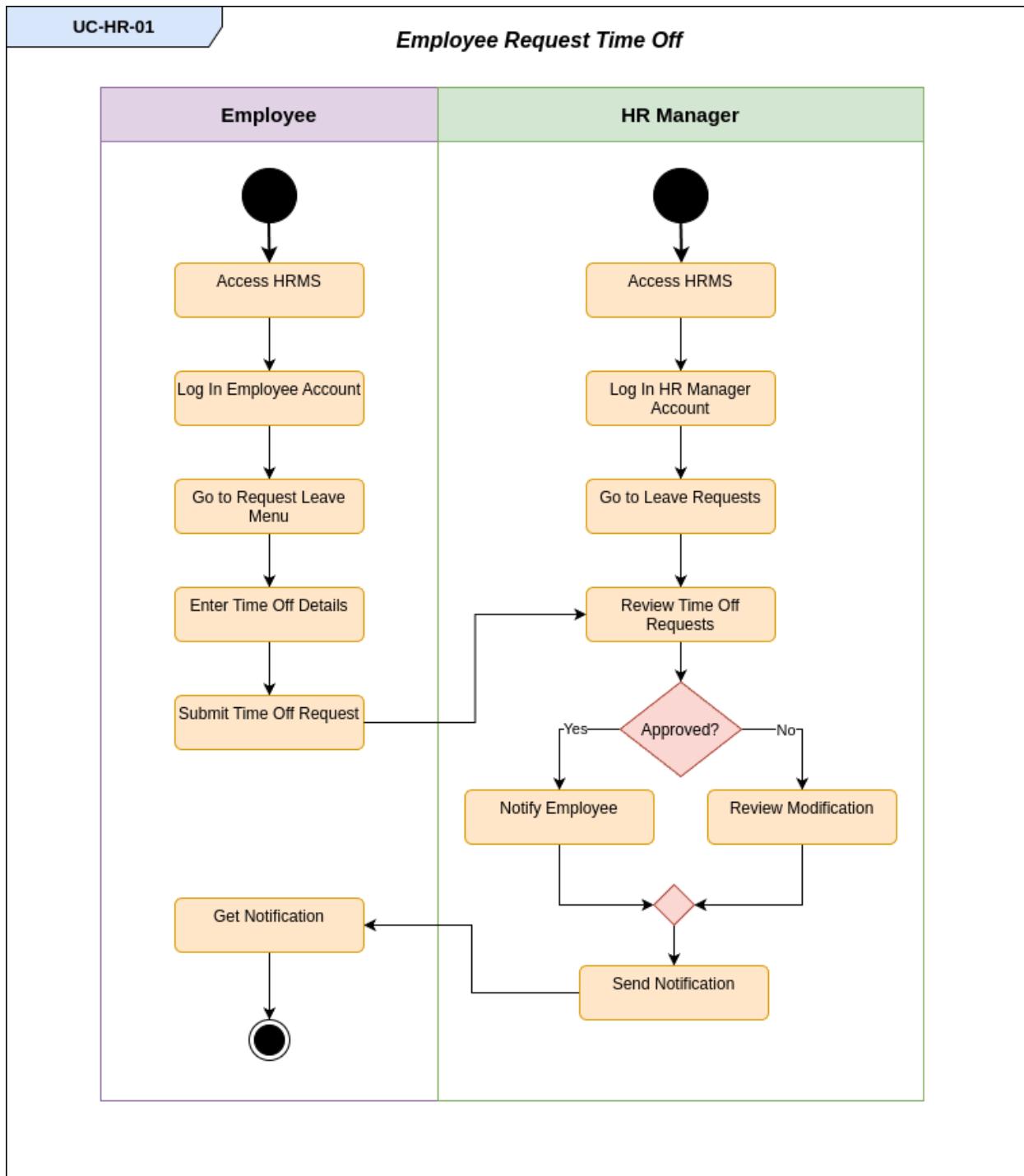
### 4.4.1 Use Case Diagrams



# HRMS

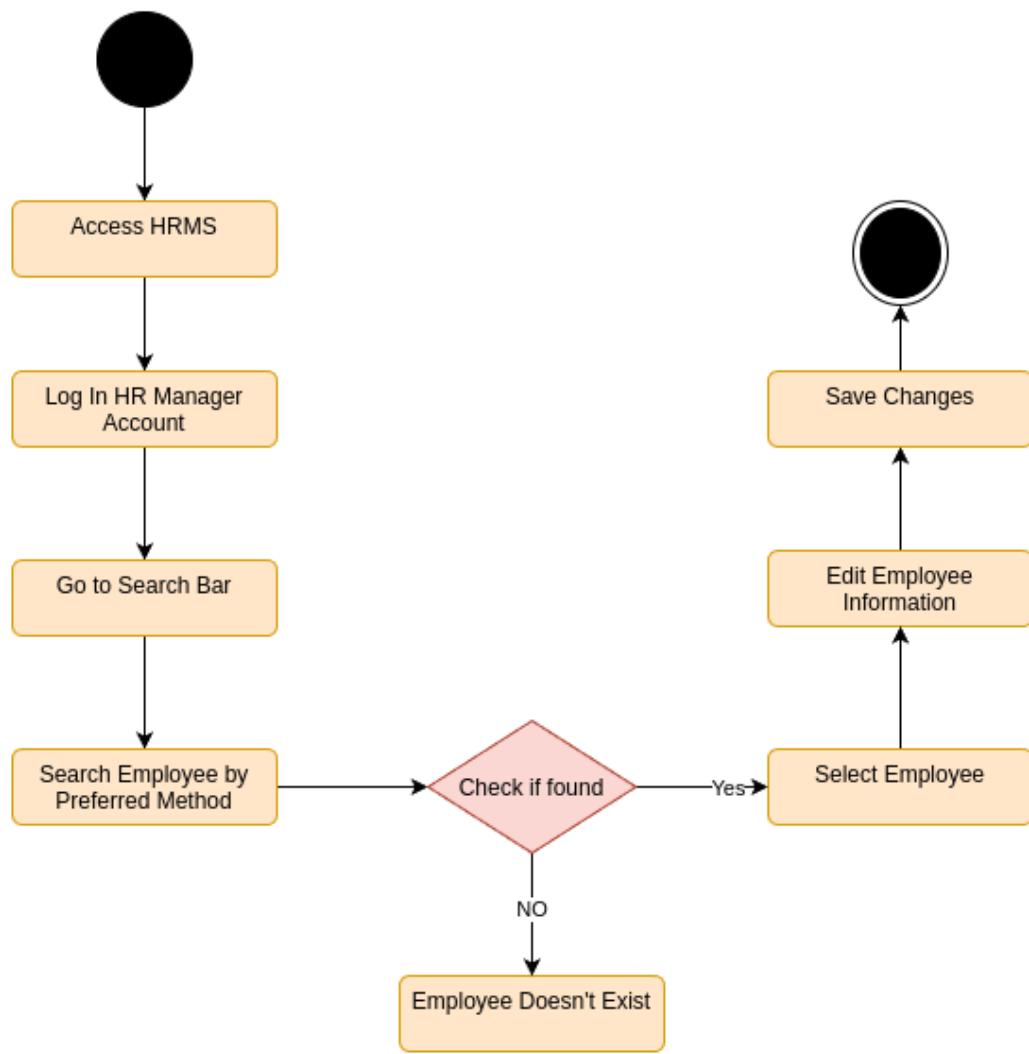


#### 4.4.2 Activity Diagrams



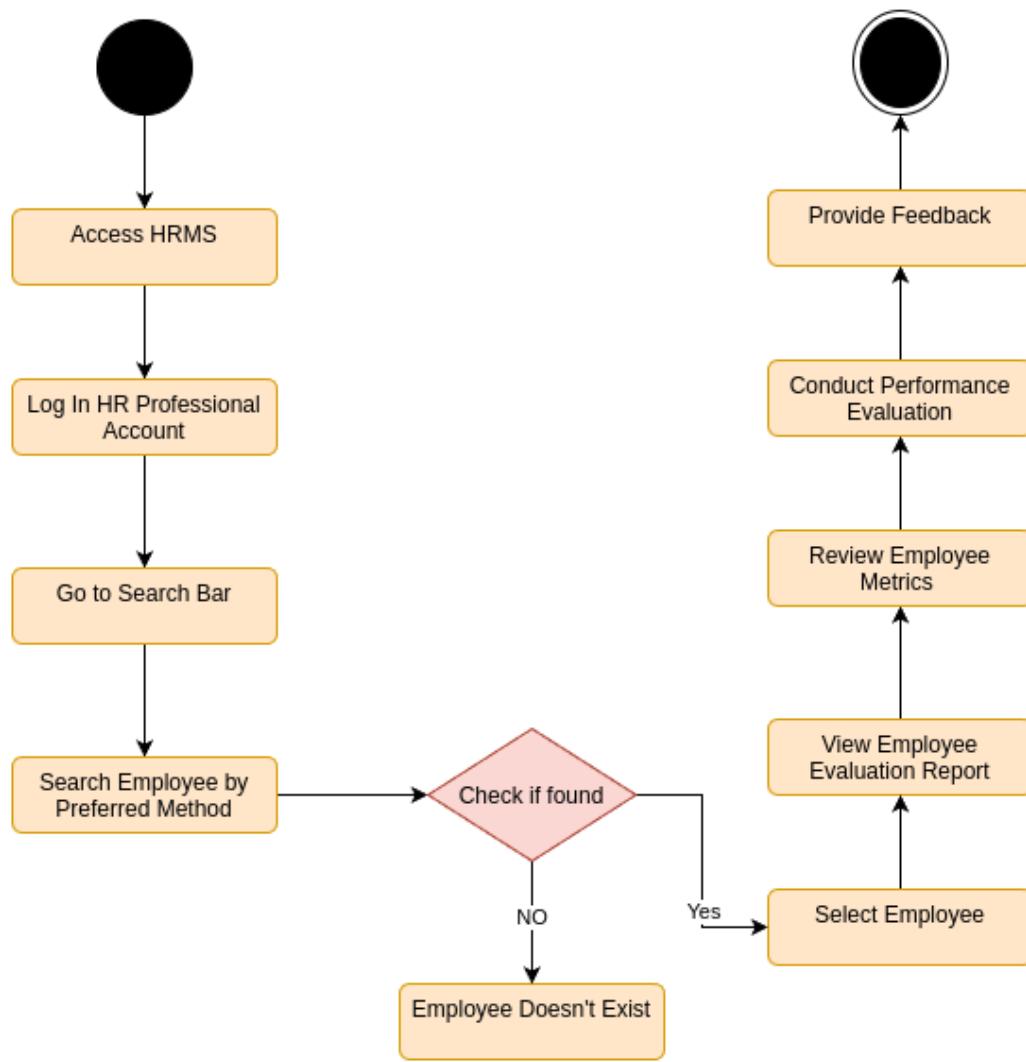
UC-HR-02

***HR Manager Updates Employee Information***



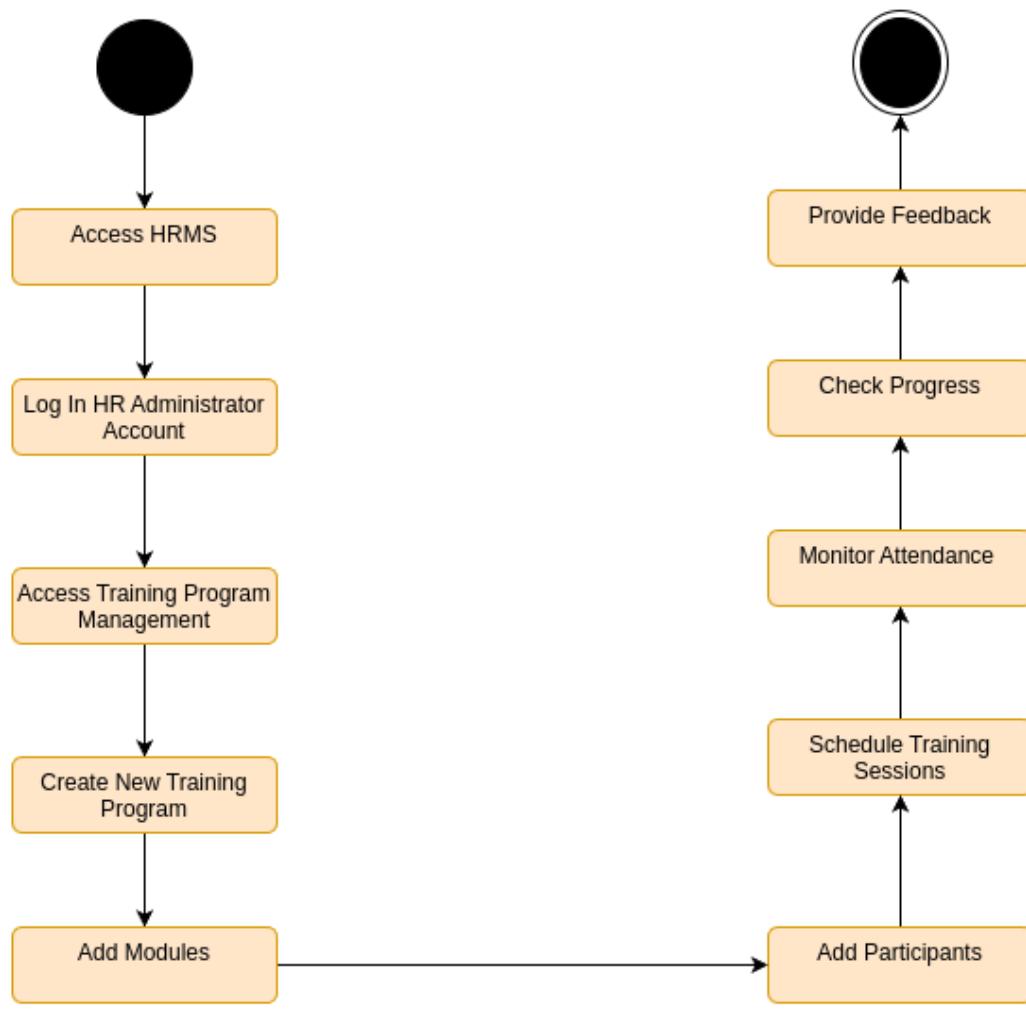
UC-HR-03

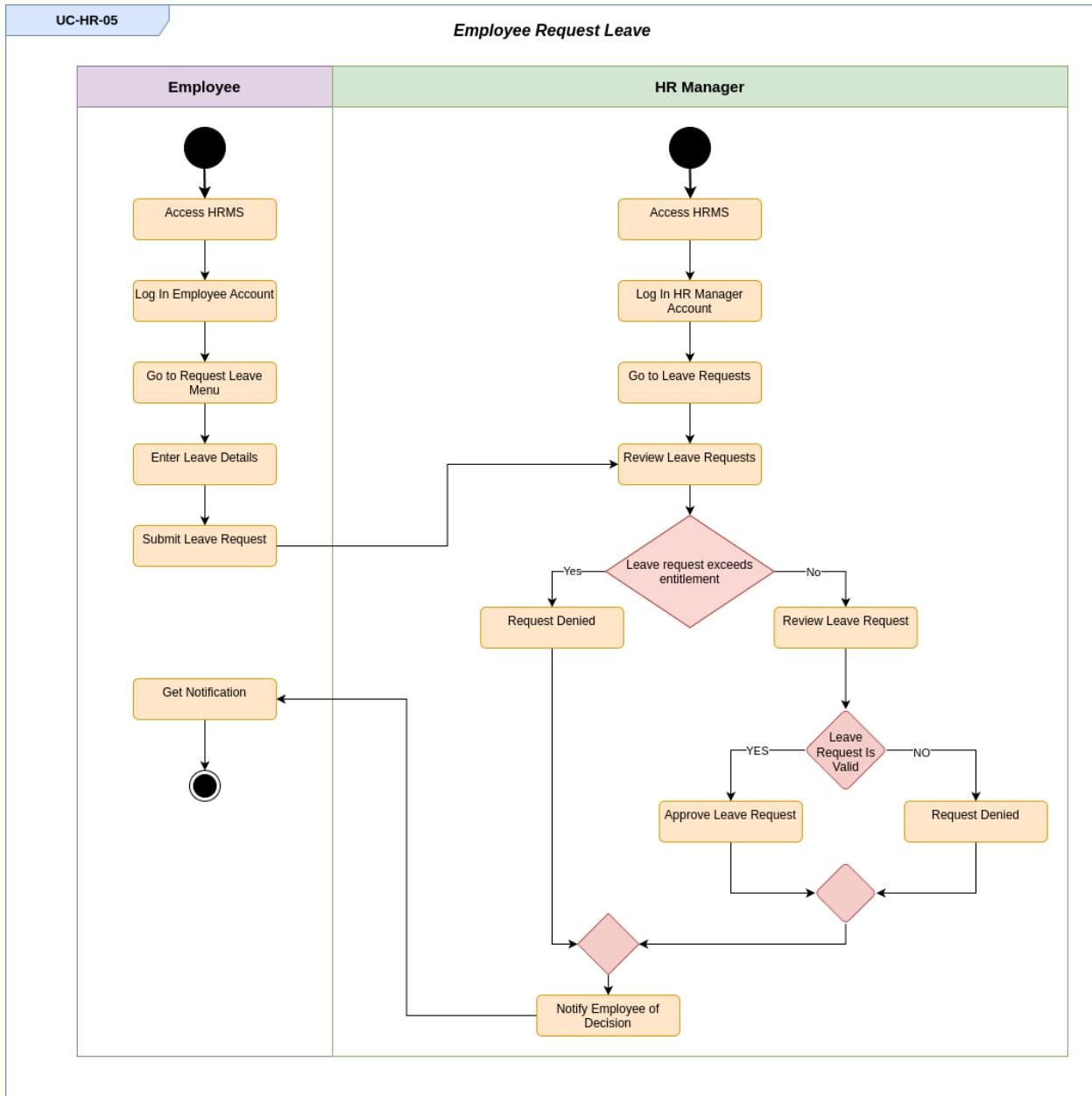
**HR Professional Conducts Performance Evaluation**

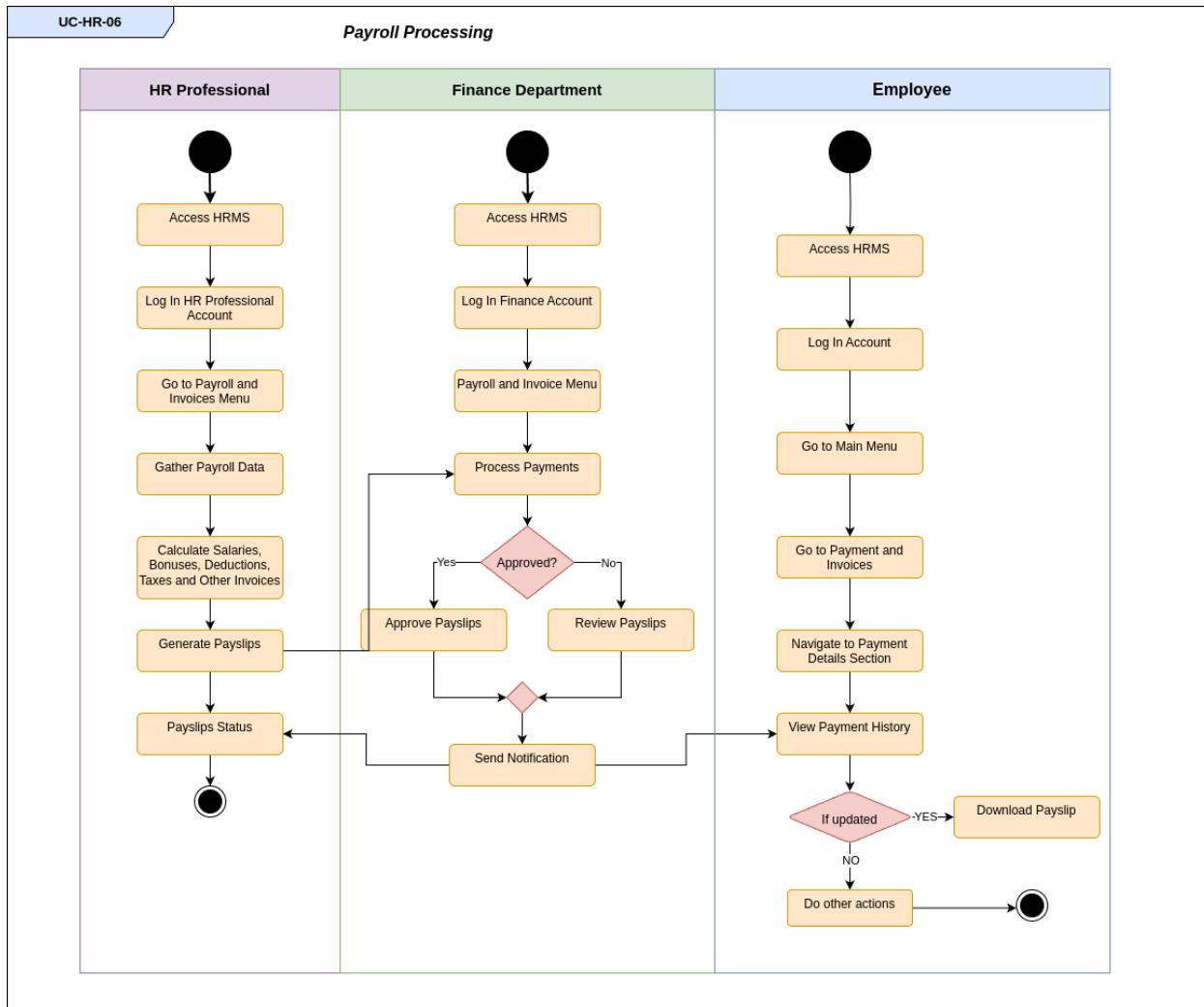


UC-HR-04

***HR Administrator Manages Training Programs***

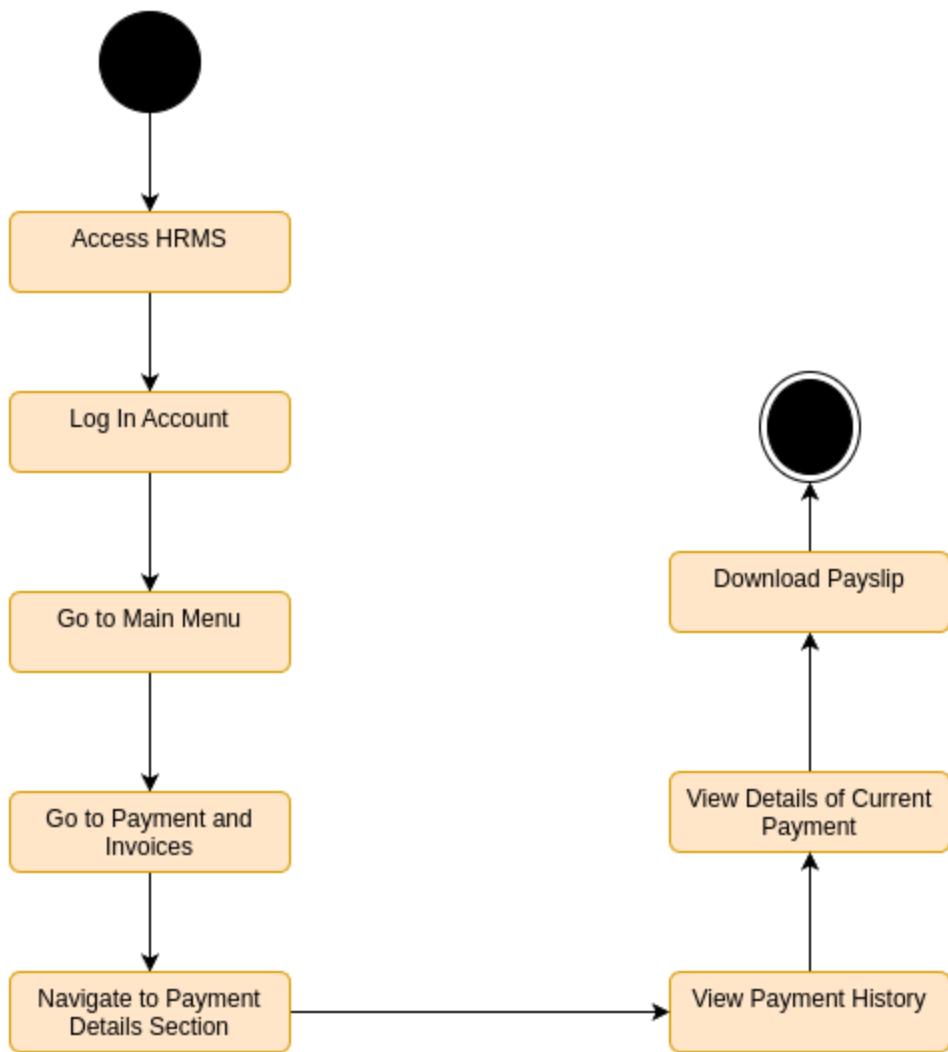




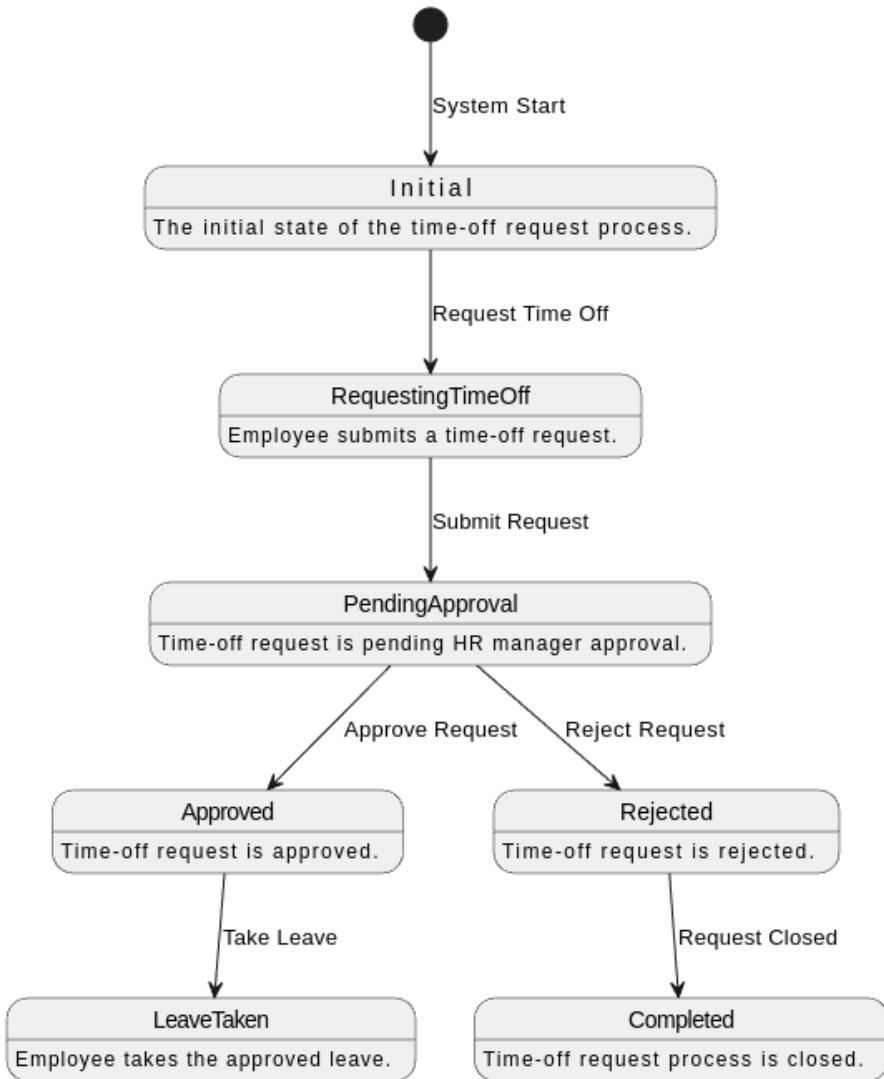


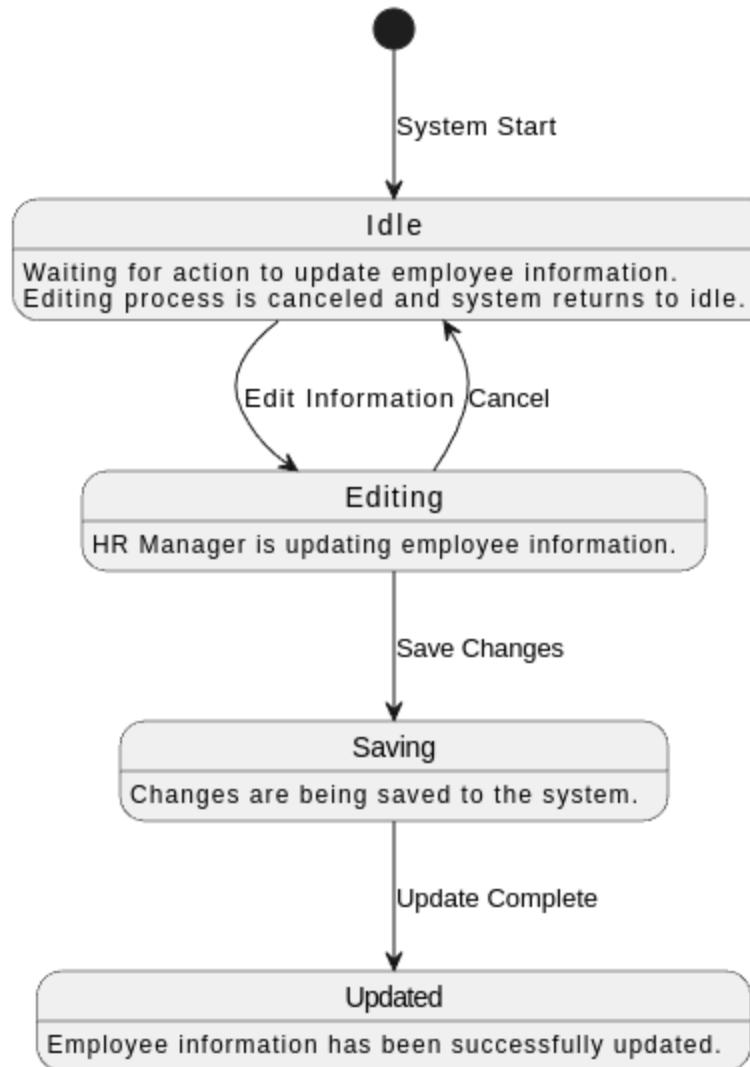
**UC-HR-08**

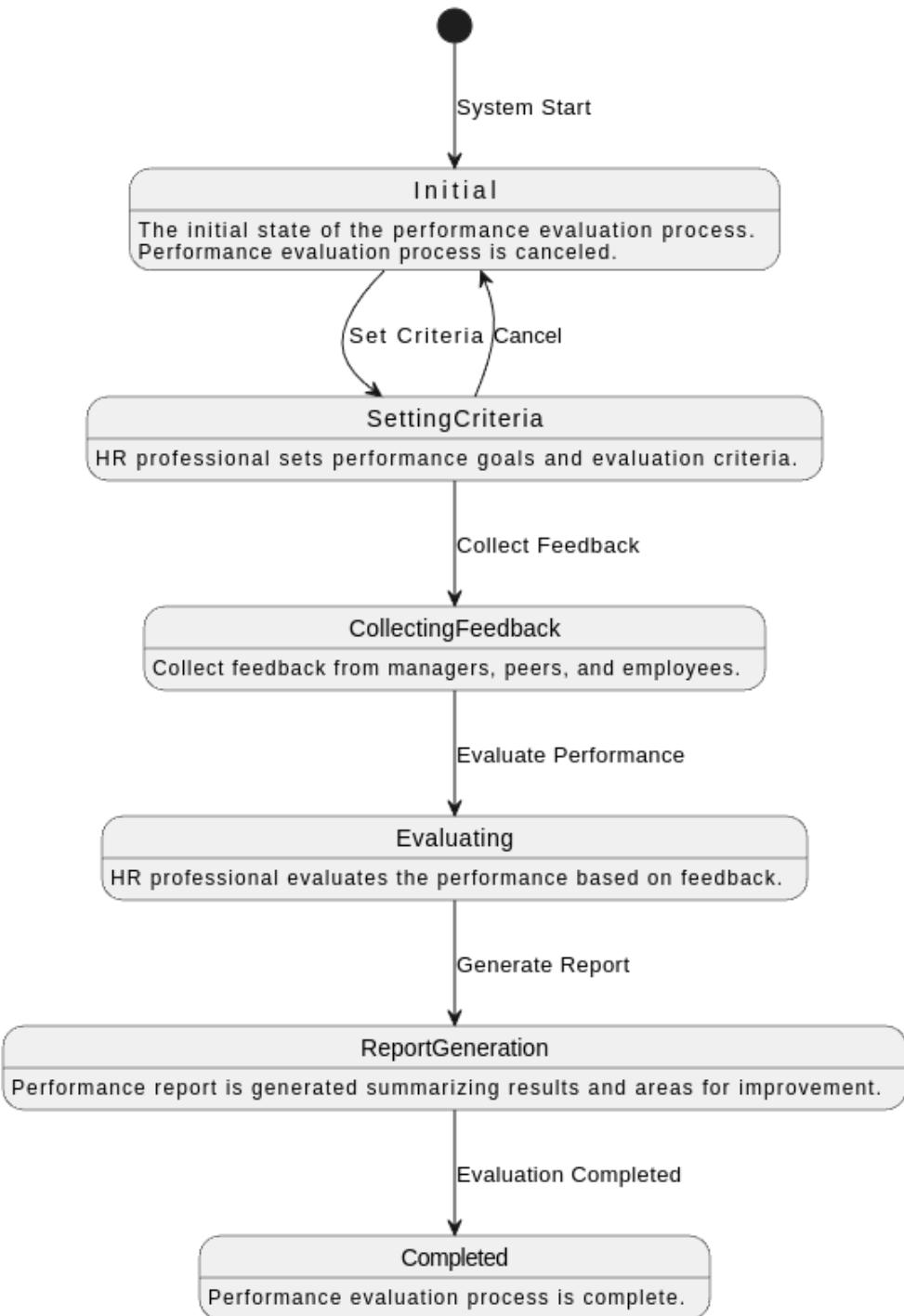
***View Payment Details***

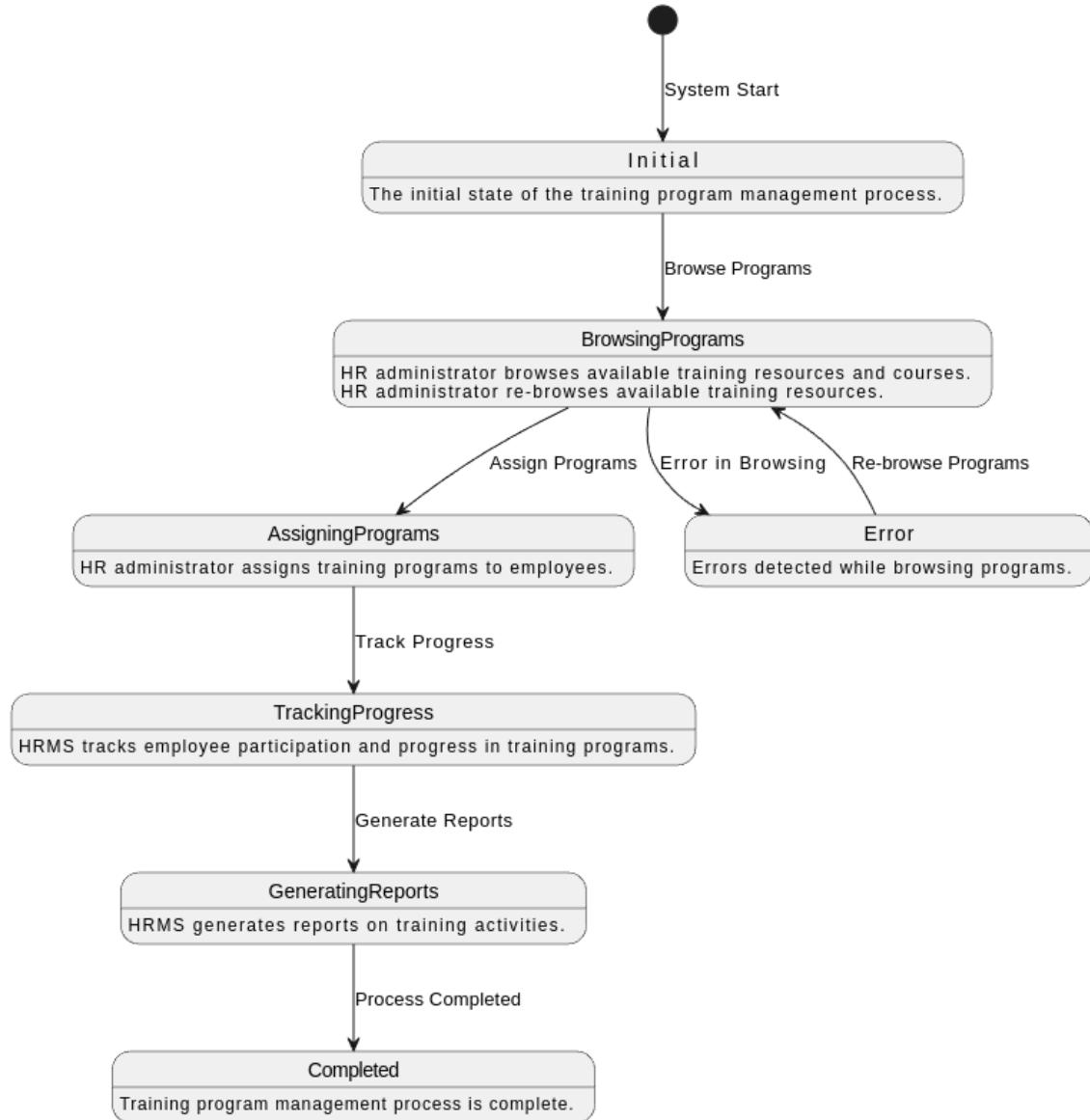


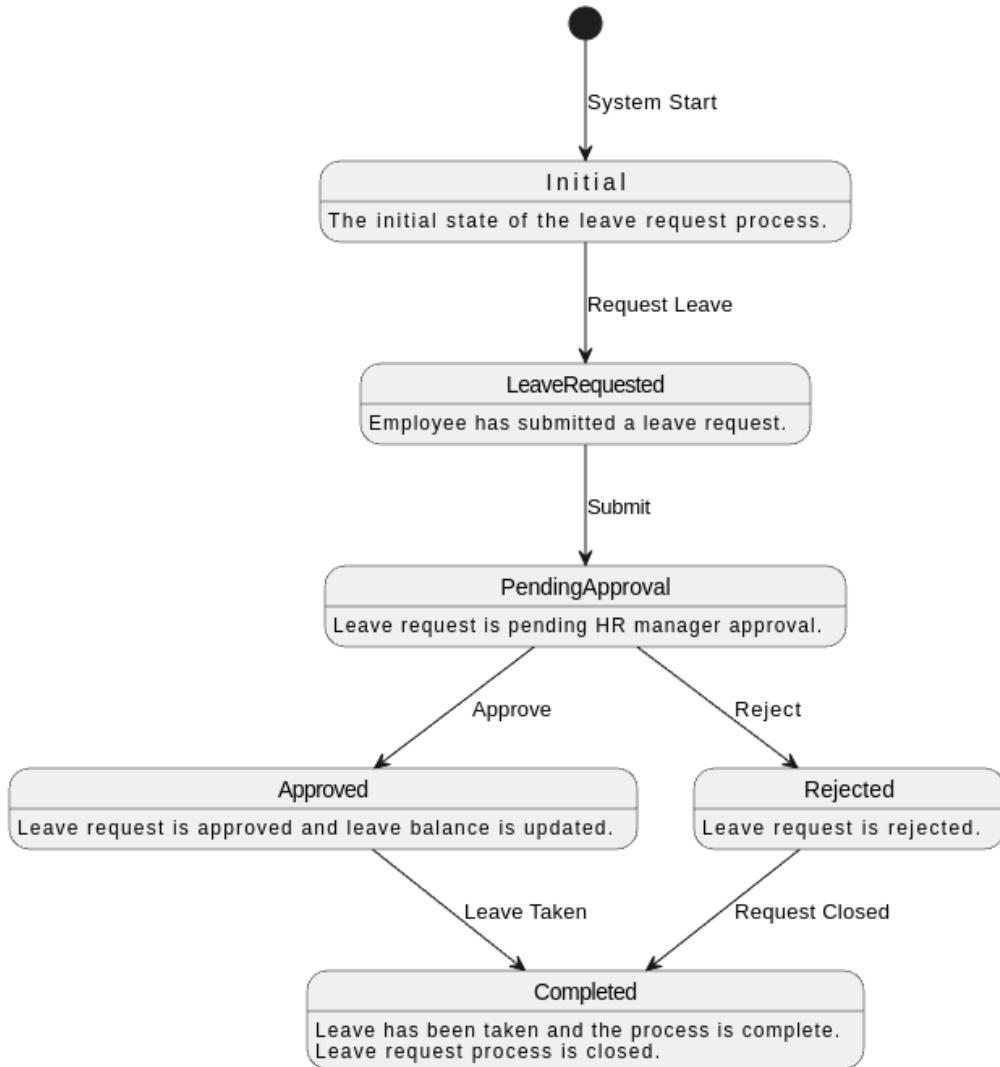
#### 4.4.3 State Machine Diagrams

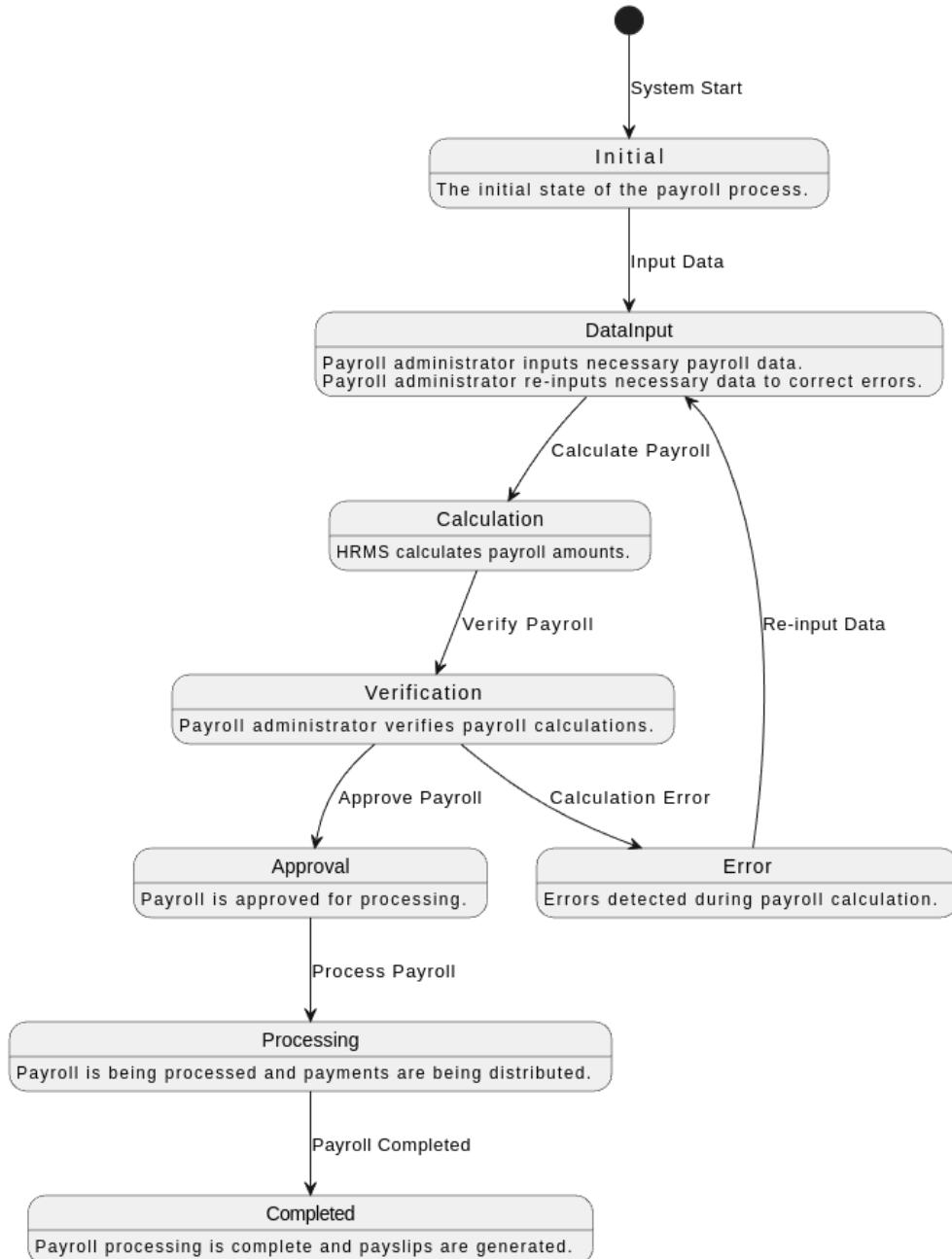
**Employee Requests Time Off State Machine Diagram**

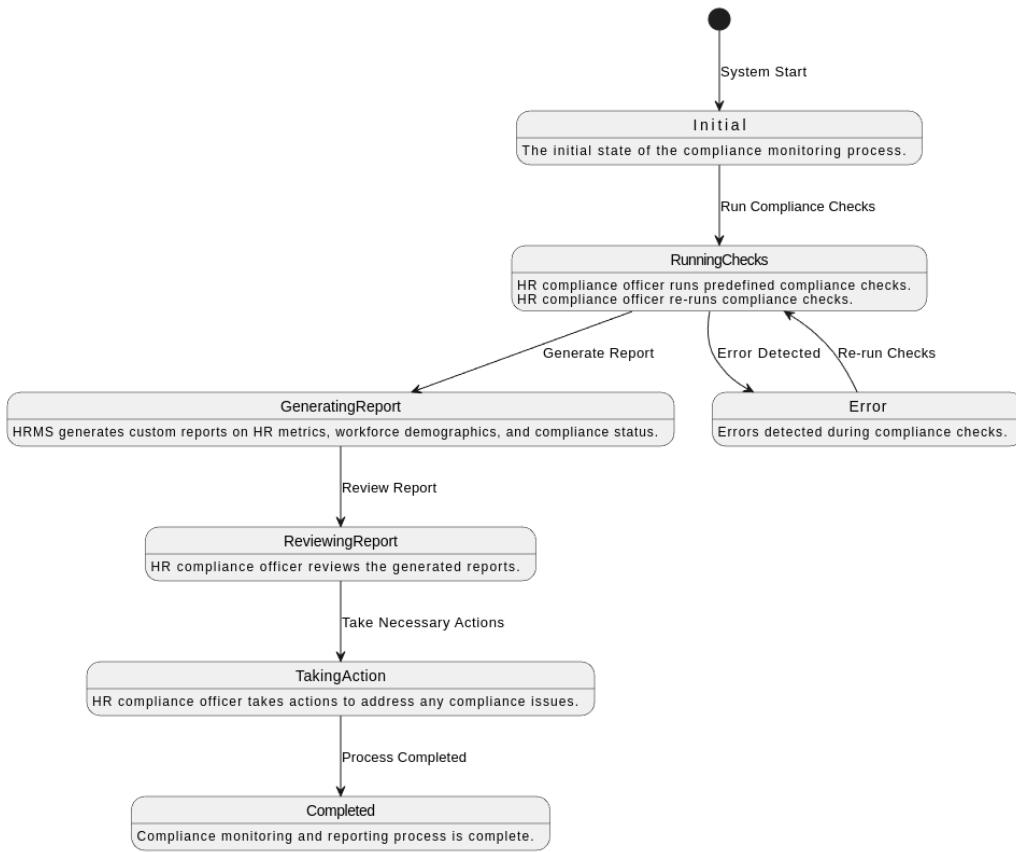
**HR Manager Updates Employee Information State Machine Diagram**

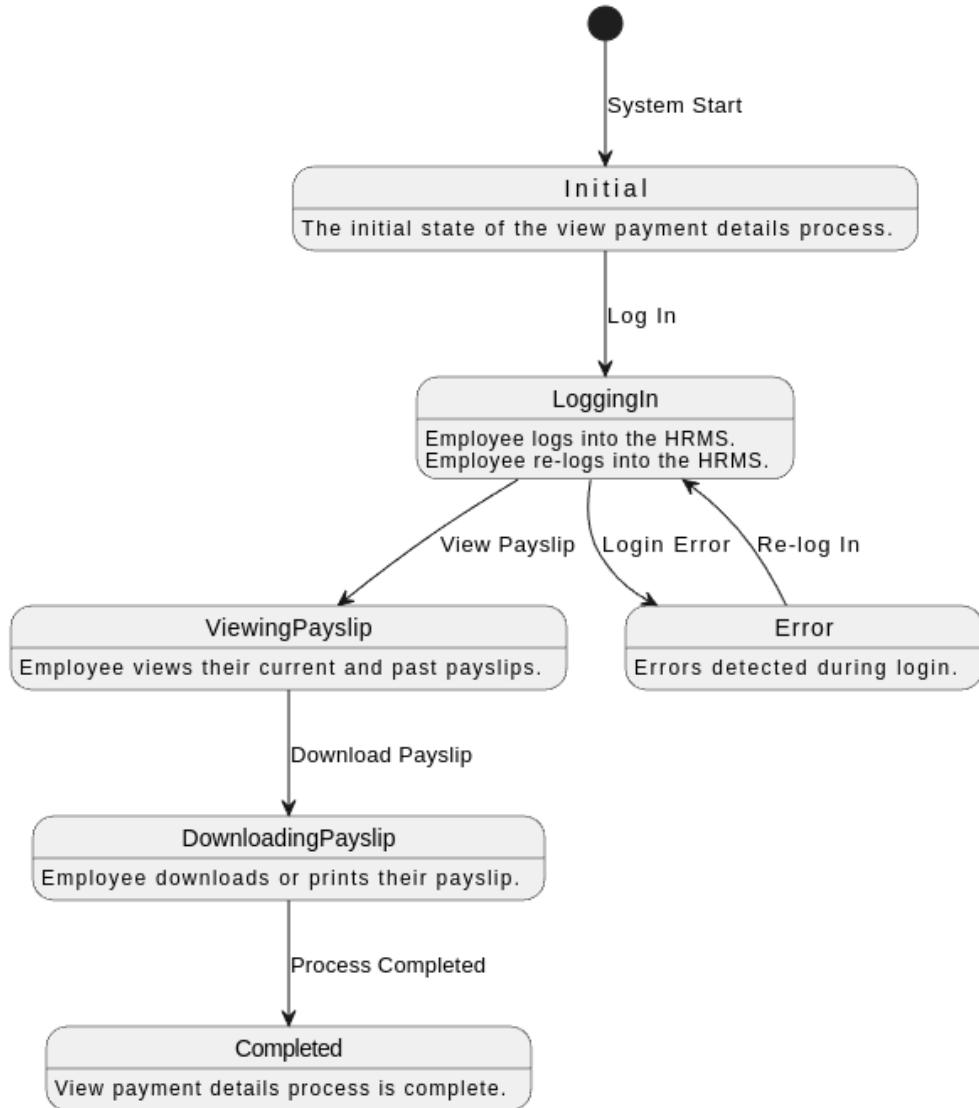
**HR Professional Conducts Performance Evaluation State Machine Diagram**

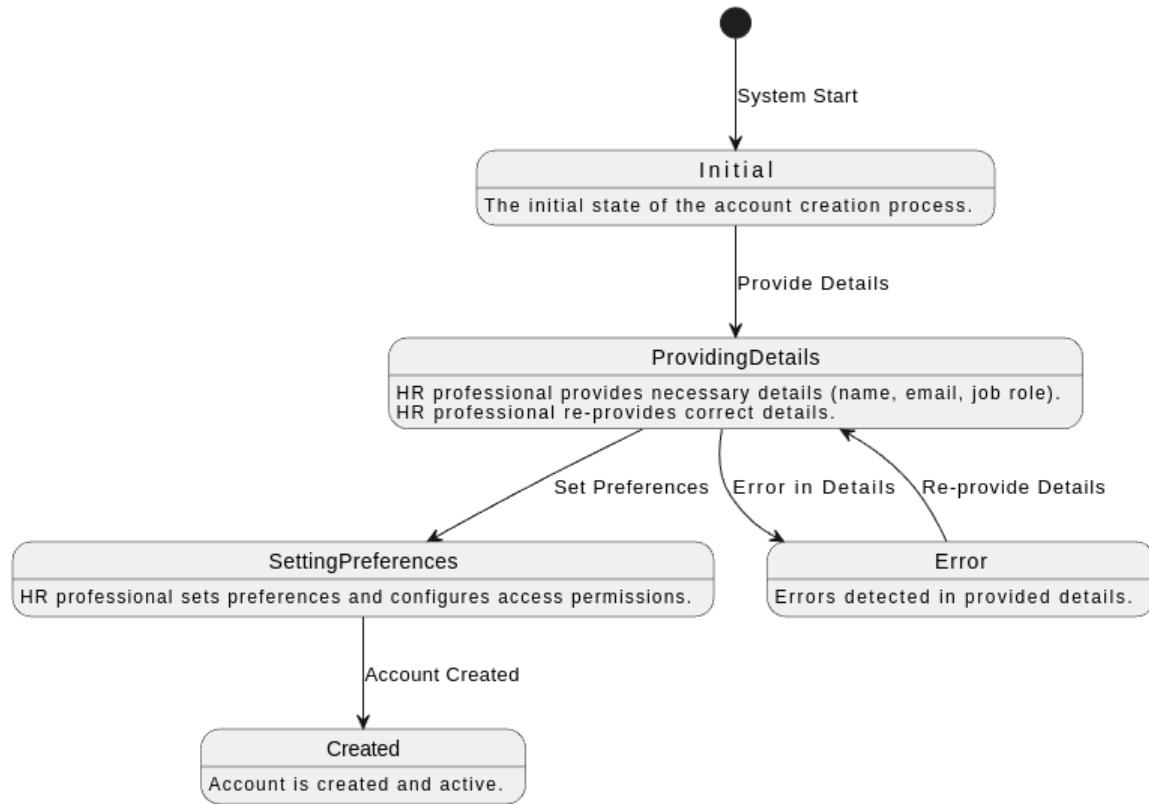
**HR Administrator Manages Training Programs State Machine Diagram**

**Employee Leave Request State Machine Diagram**

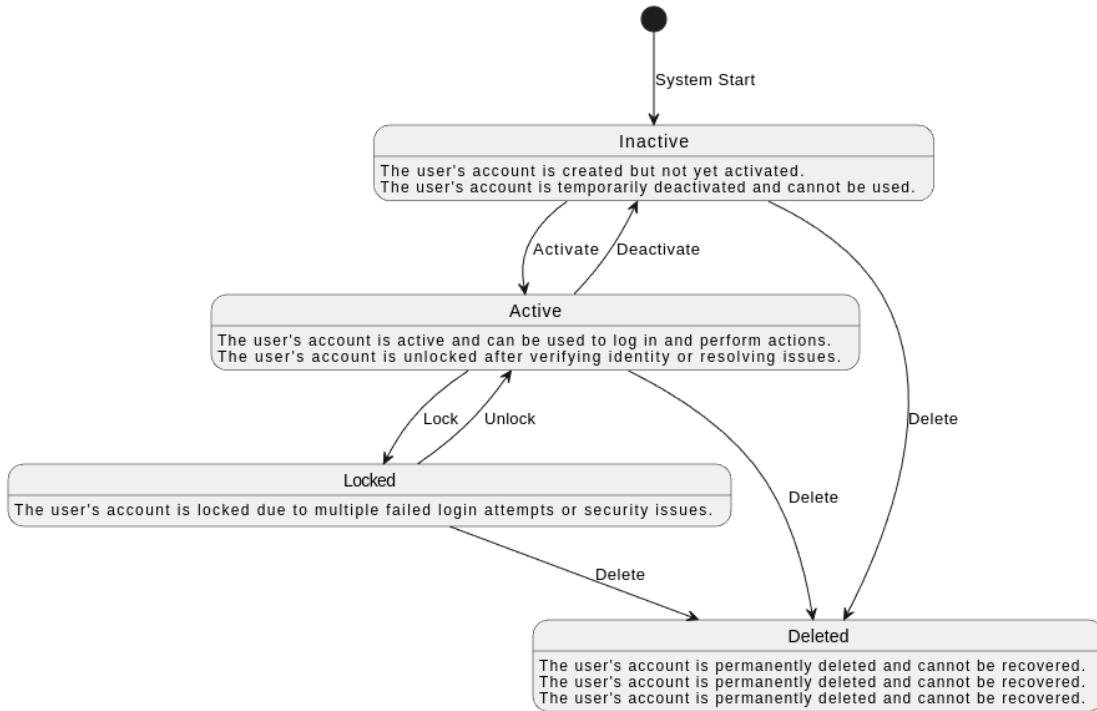
**Payroll Processing State Machine Diagram**

**Compliance Monitoring and Reporting State Machine Diagram**

**View Payment Details State Machine Diagram**

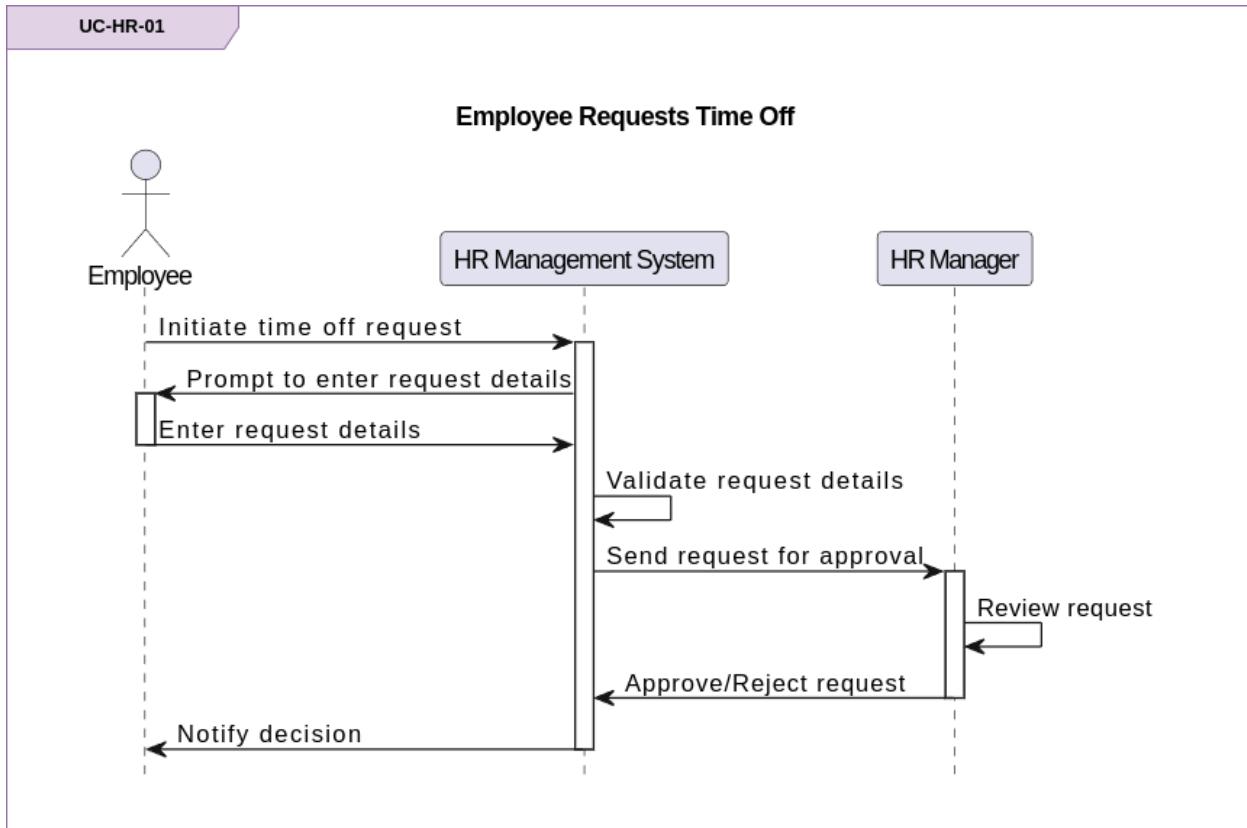
**HR Professional Creates a New Account State Machine Diagram**

User Account Management State Machine Diagram



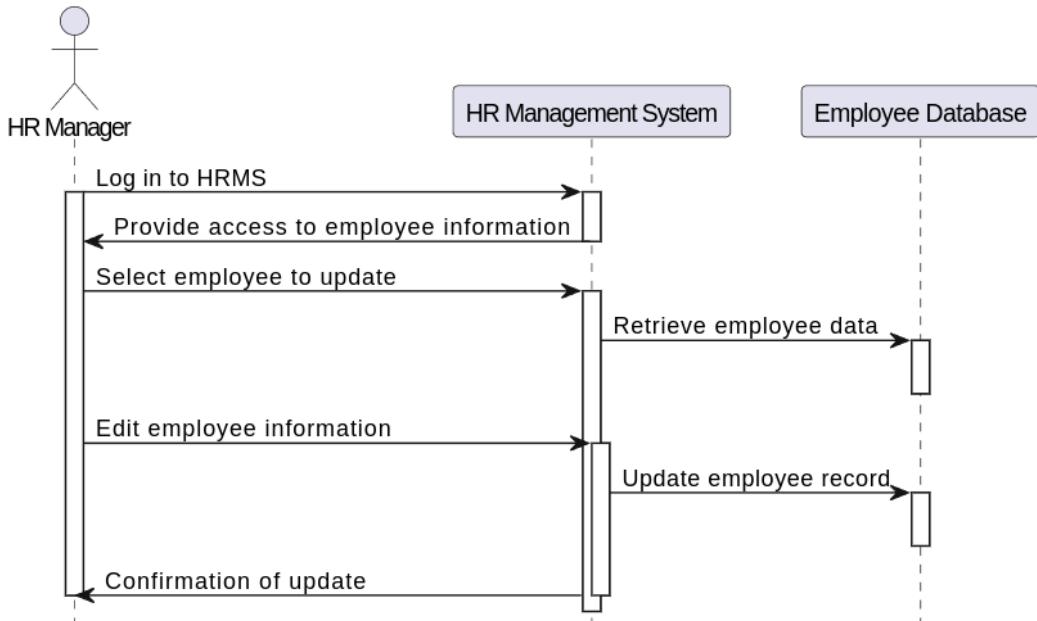
## 4.5 Interaction diagrams

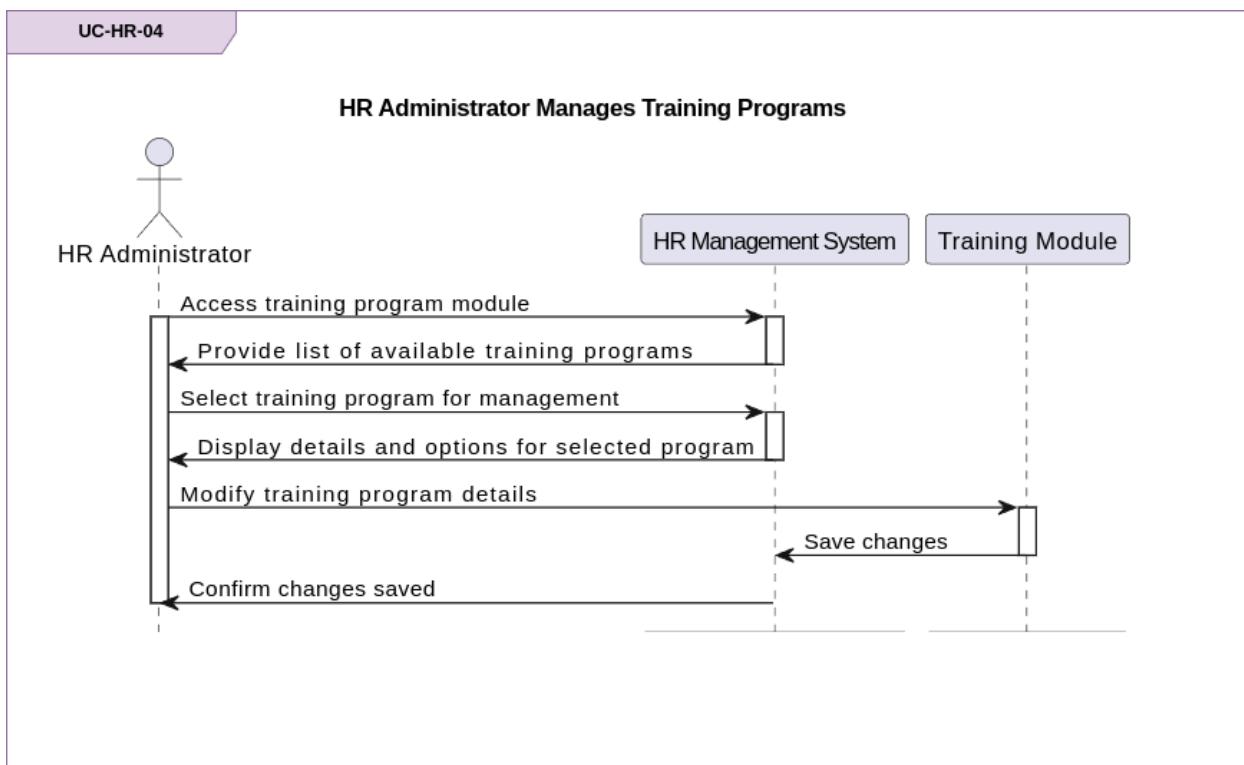
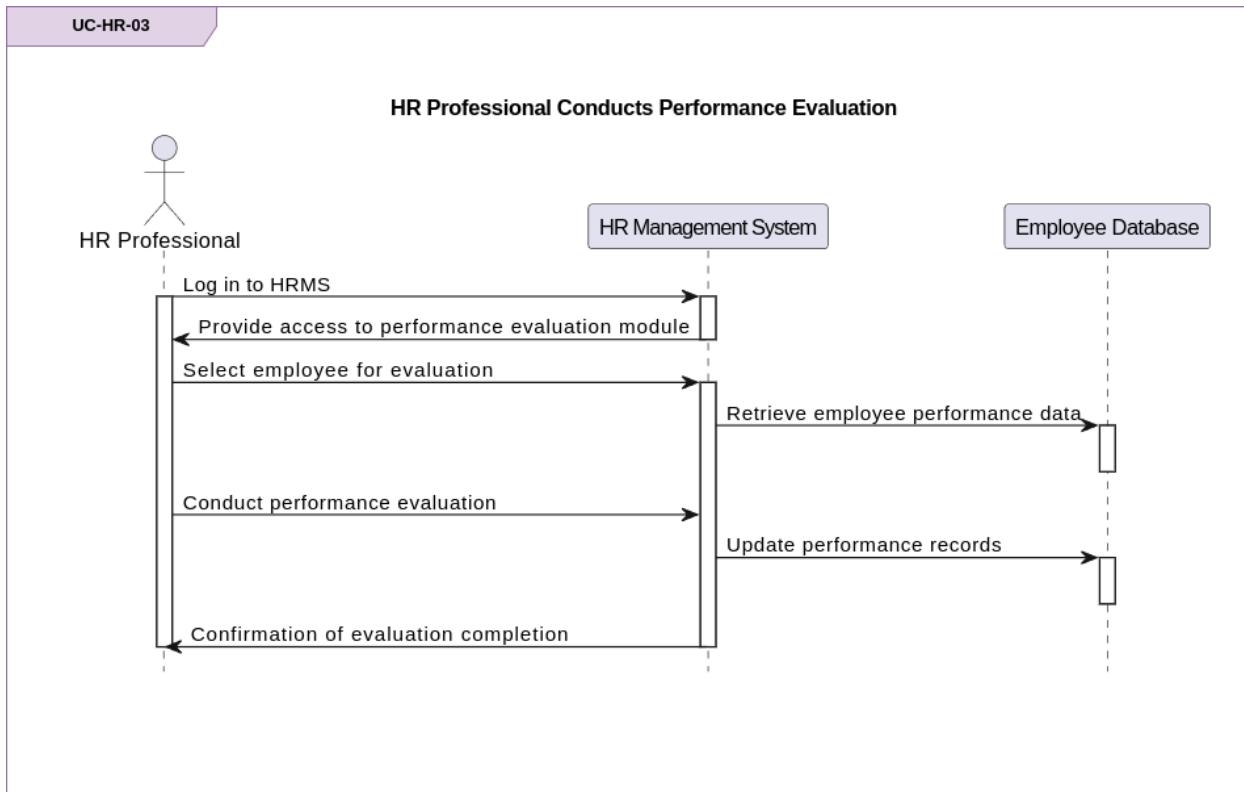
### 4.5.1 Sequence Diagrams

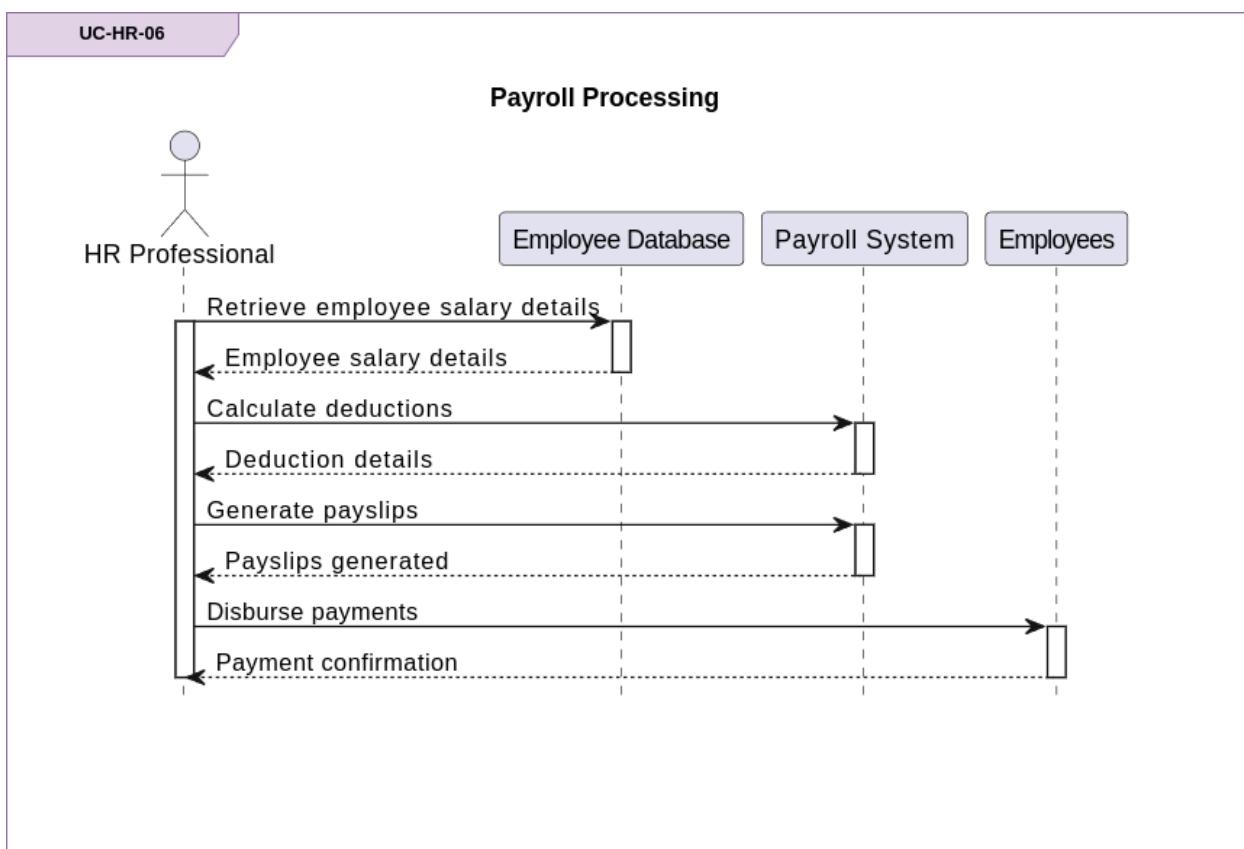
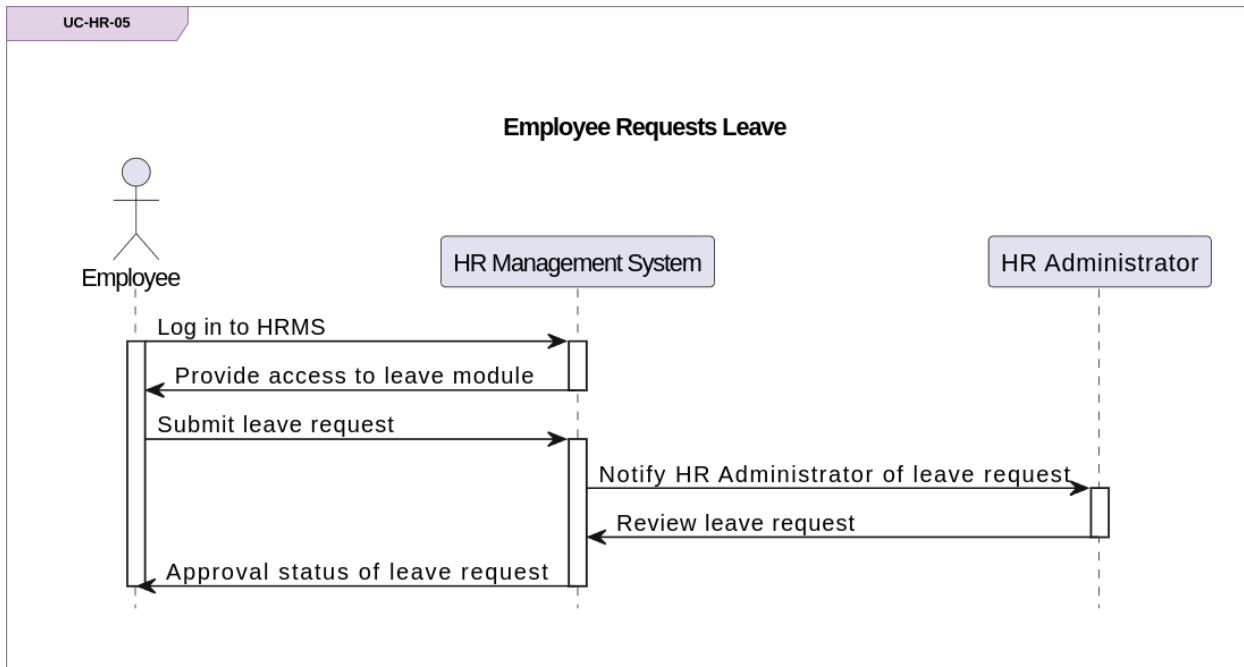


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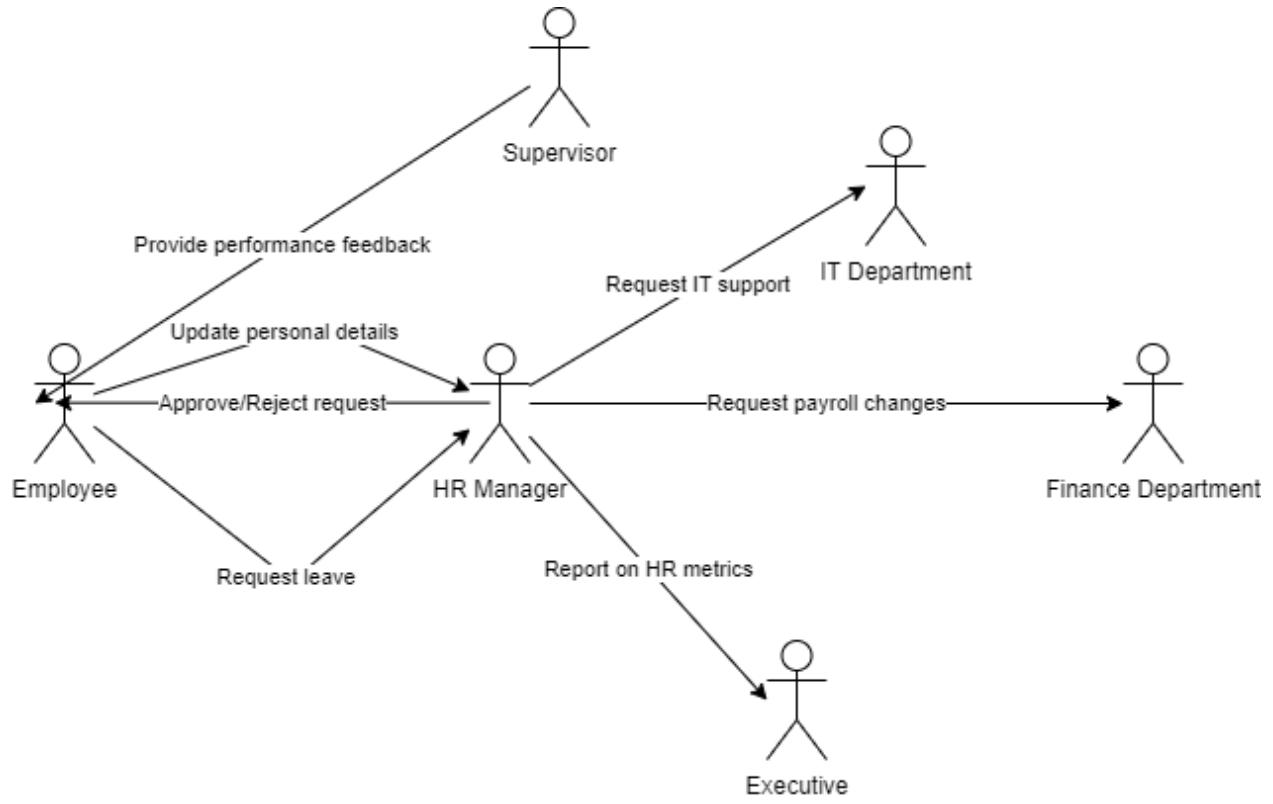
### HR Manager Updates Employee Information



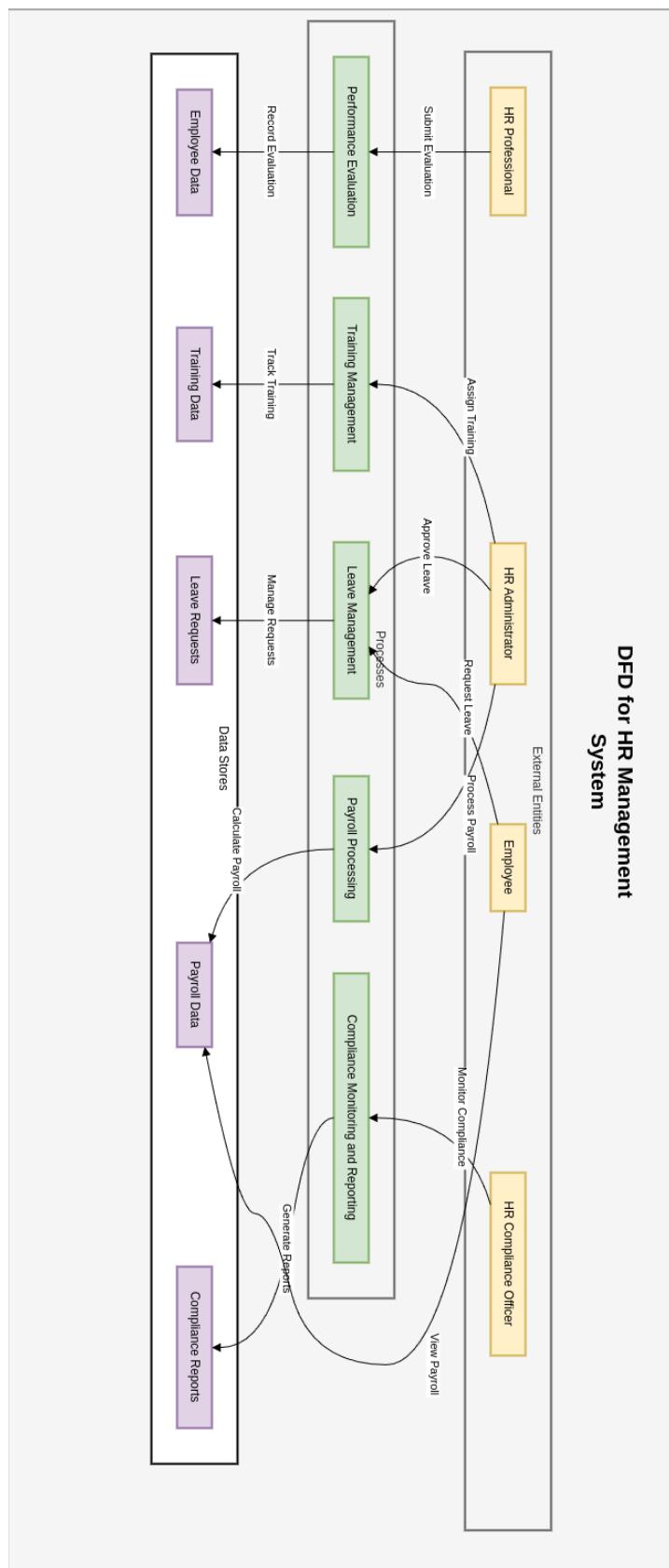




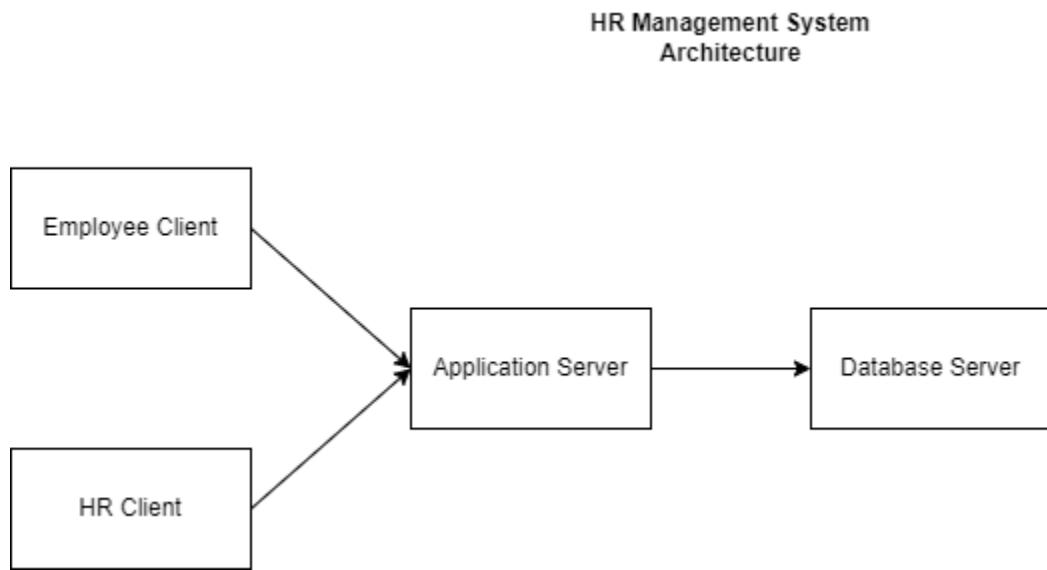
#### 4.5.2 Collaboration Diagrams



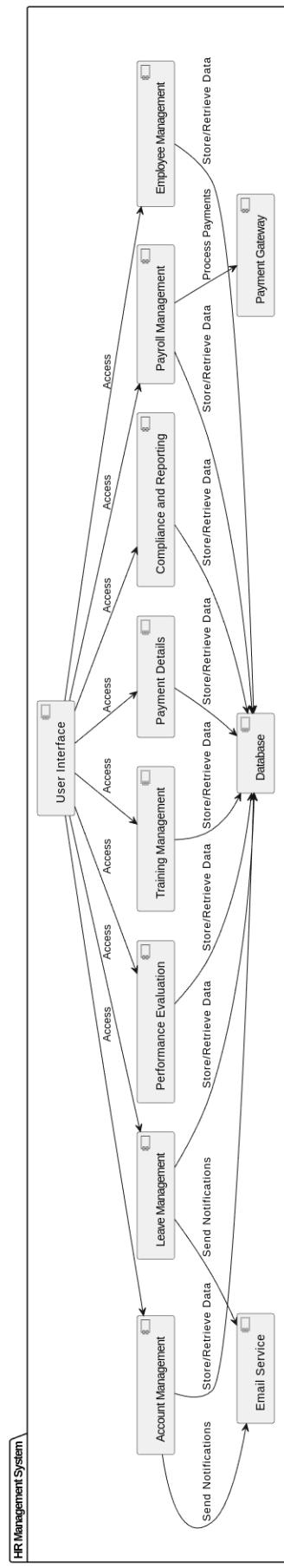
## 4.6 Data Flow Diagram (DFD)



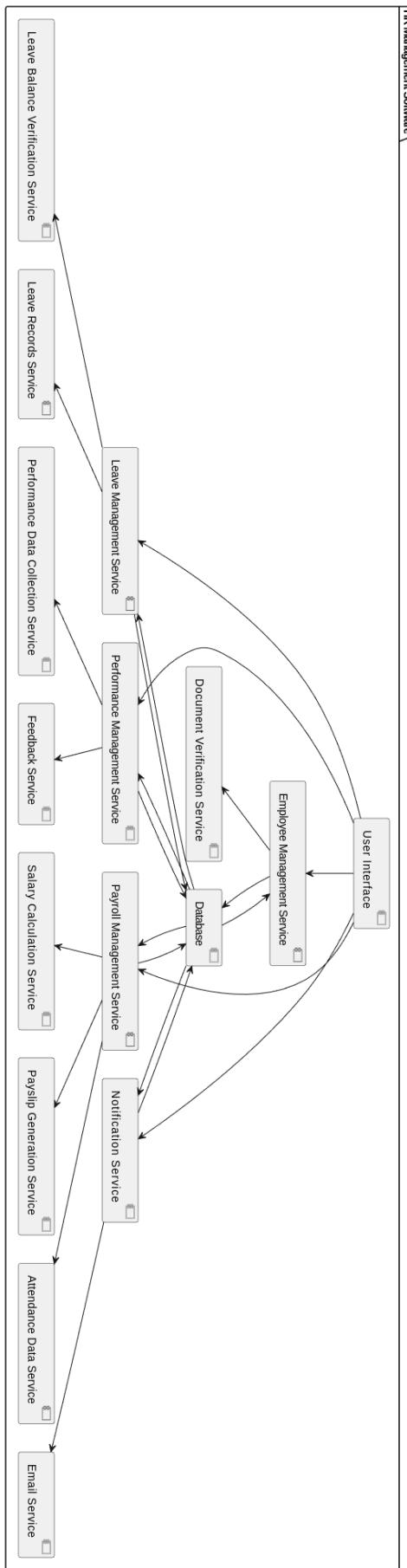
## 4.7 Architecture Diagram



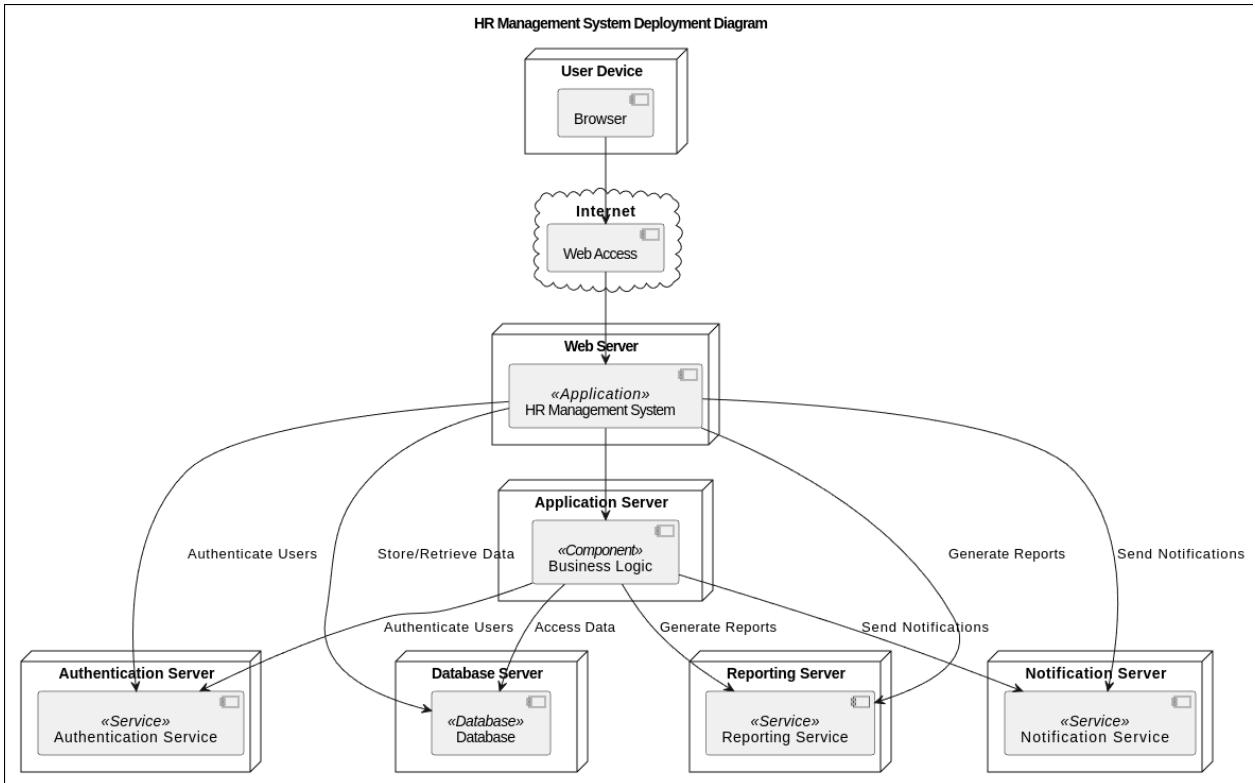
## 4.8 Component Diagram



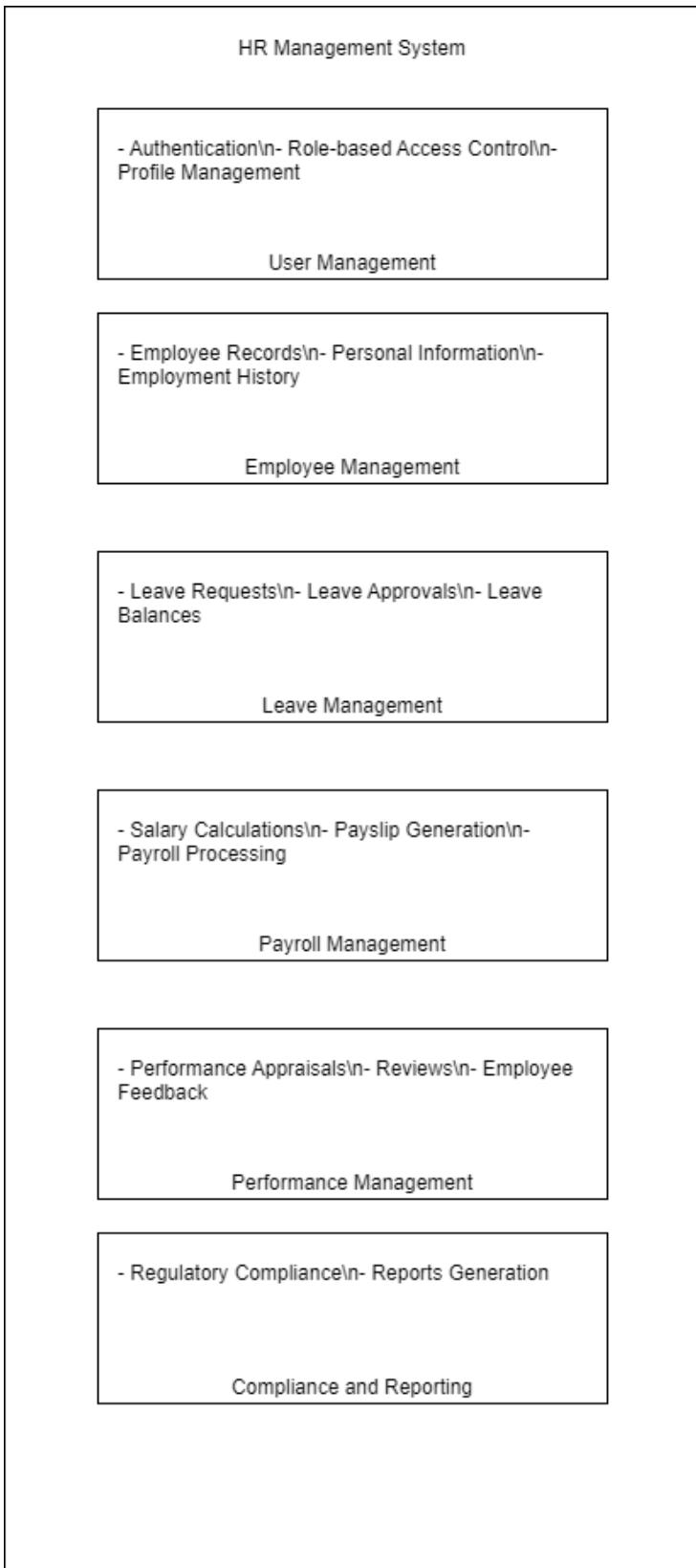
HR Management Software Component Diagram



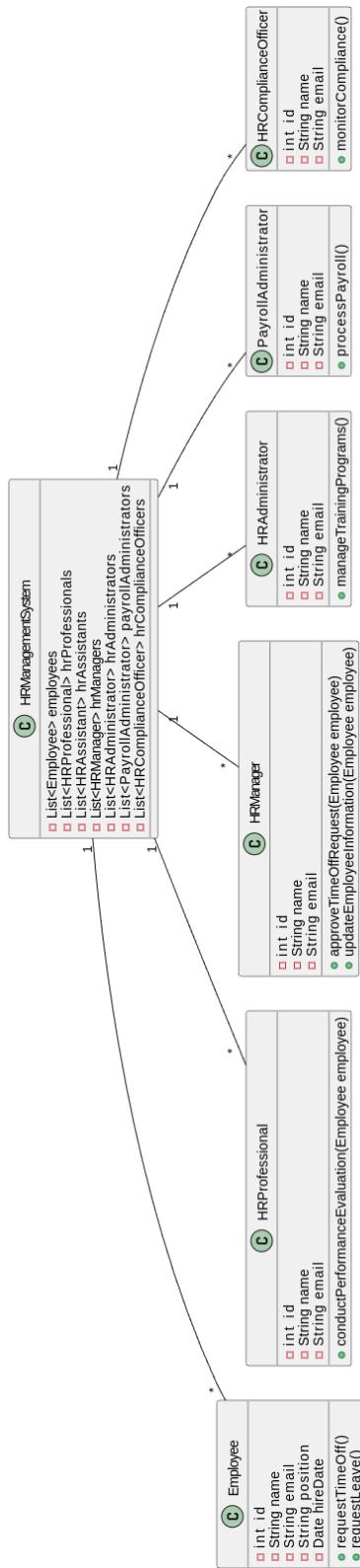
## 4.9 Deployment Diagram



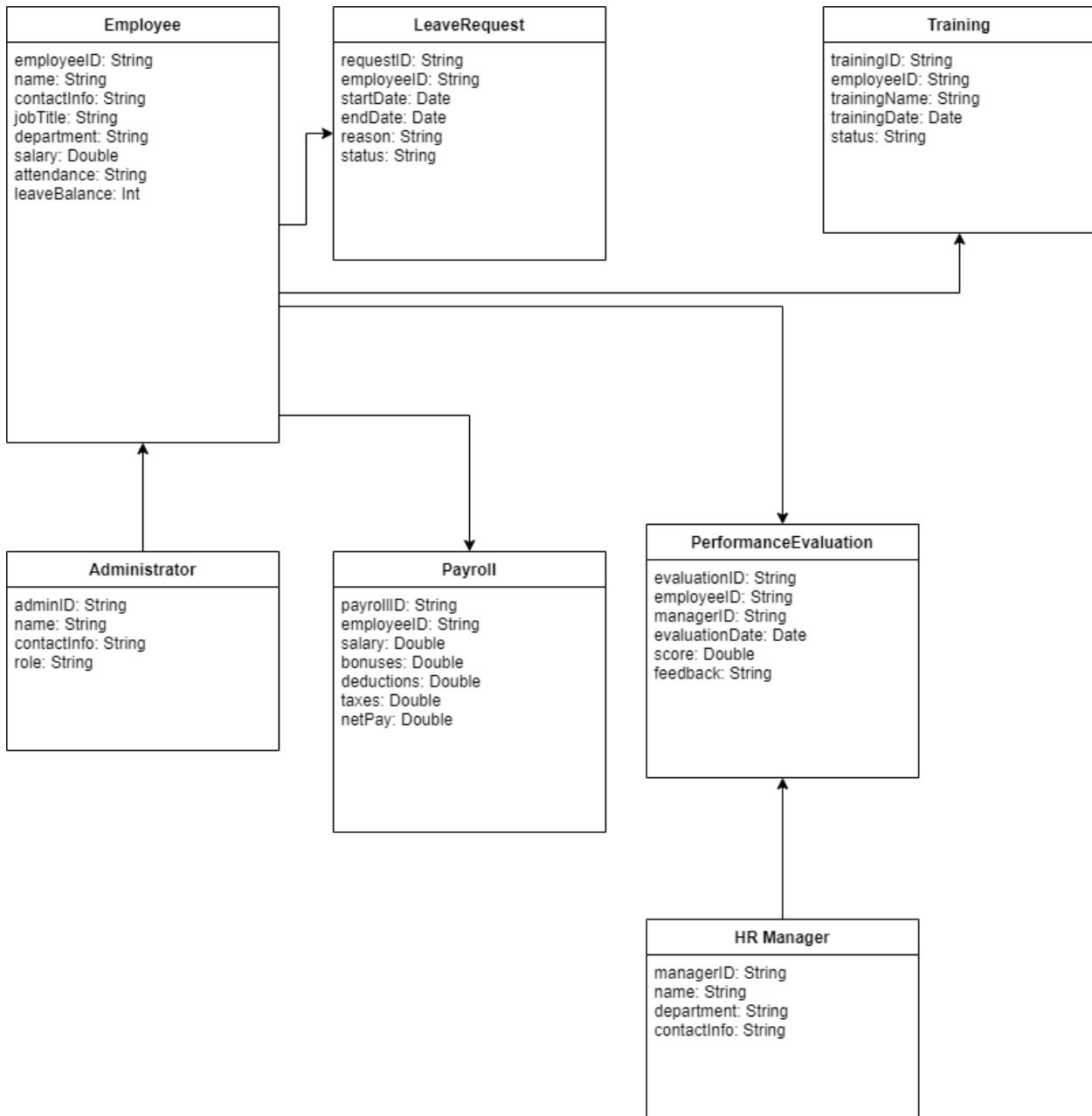
## 4.10 Package diagram



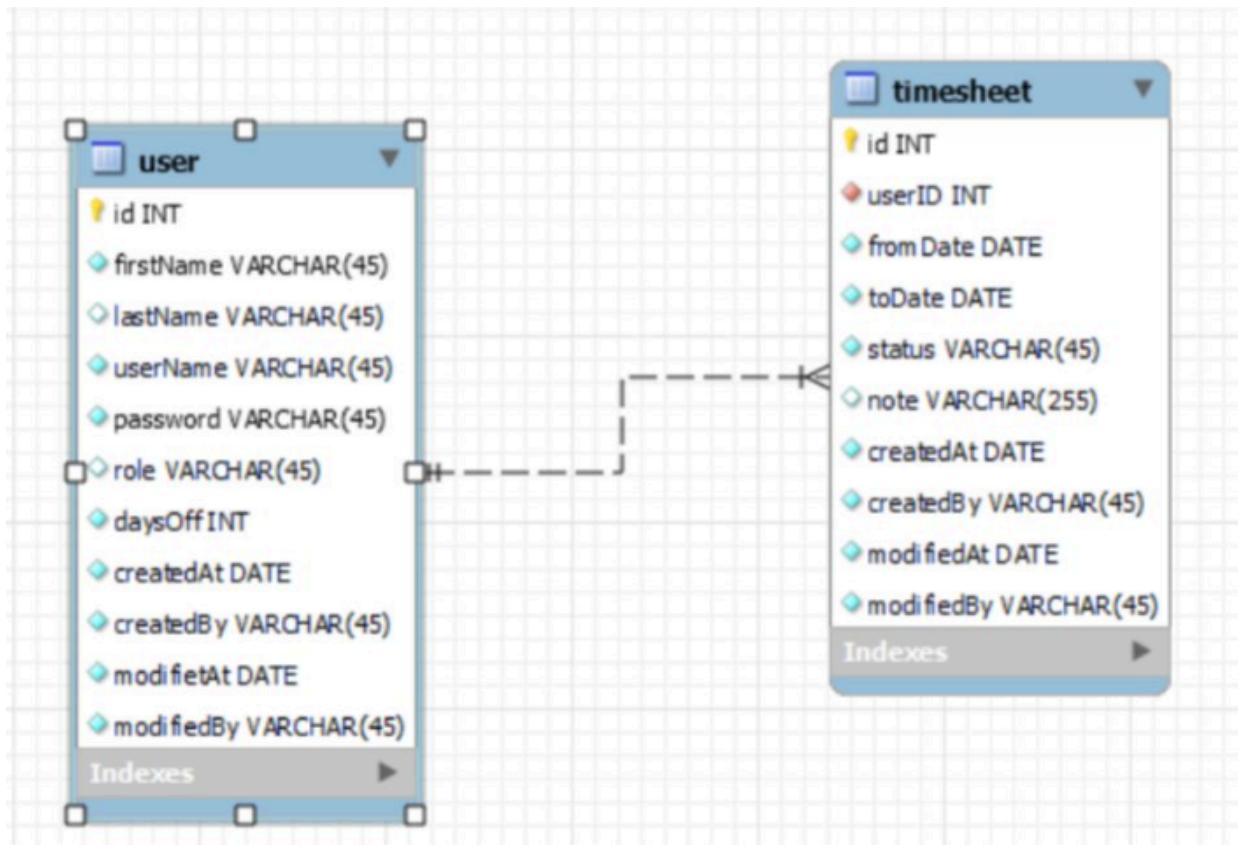
## 4.11 Class Diagram



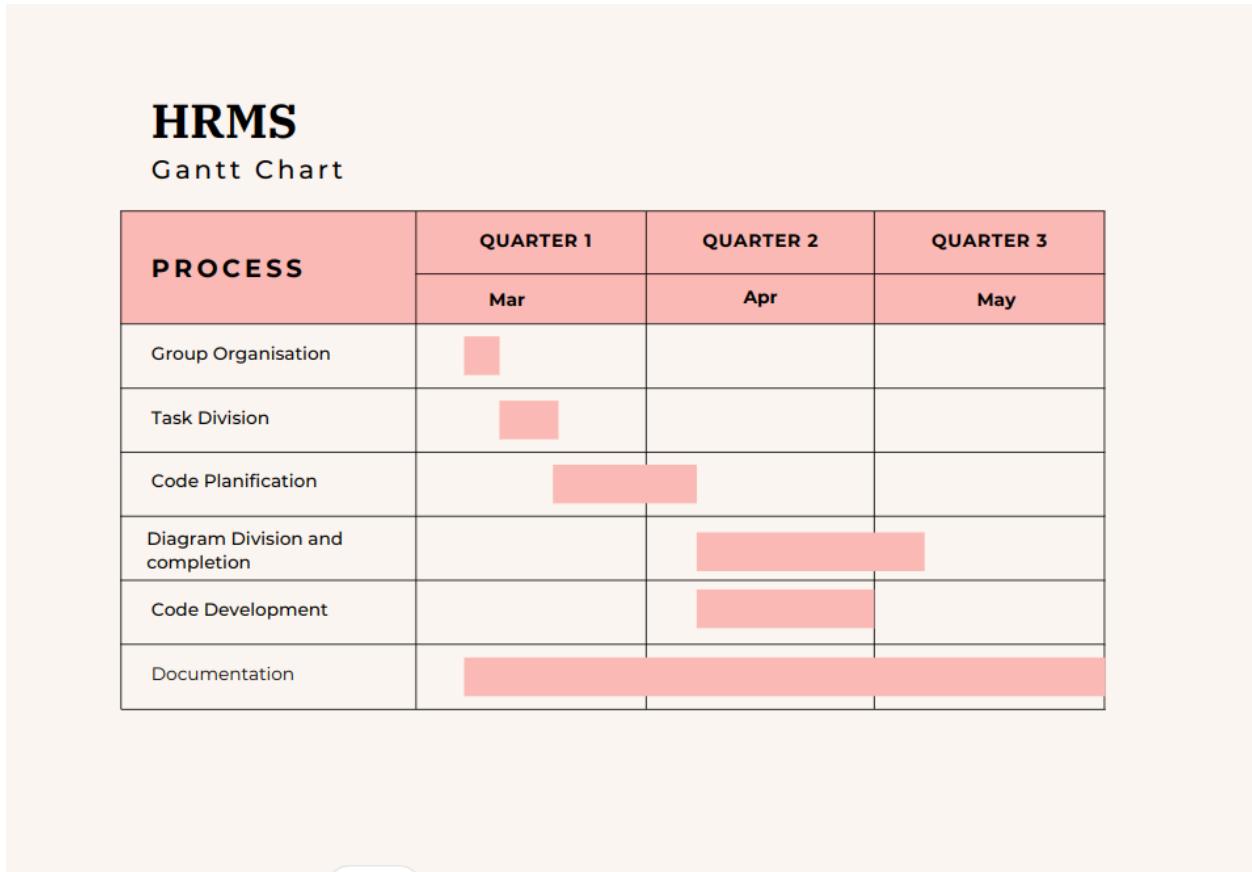
## 4.12 Object Diagram



#### 4.13 Entity-Relationship Diagram (ERD)



## 4.14 Gantt Chart



## 4.15 Risk Matrix

| HR Management System Risk Matrix |            |        |  |
|----------------------------------|------------|--------|--|
| Risk                             | Likelihood | Impact | Mitigation   |
| System Integration Failure       | Medium     | High   | Ensure thorough testing and integration planning   |
| Data Loss                        | Medium     | High   | Implement robust backup and disaster recovery processes  |
| Security Breach                  | High       | High   | Implement robust security measures, including encryption, access controls, and regular security audits |

## 5. Design Patterns

Design patterns are recurring solutions to common design problems in software engineering. They provide a structured approach to solving design challenges and can improve the overall architecture, maintainability, and scalability of a software system. In our HR Management System, we have incorporated several design patterns to address various aspects of the system's design and functionality.

### 1. Singleton Pattern

The Singleton pattern ensures that a class has only one instance and provides a global point of access to that instance. We have applied the Singleton pattern to classes such as `HRManagementSystem` and `DatabaseConnection` to ensure that there's only one instance of these classes throughout the system, facilitating centralized control and resource management.

### 2. Factory Method Pattern

The Factory Method pattern provides an interface for creating objects but allows subclasses to alter the type of objects that will be created. In our HR Management System, we utilize the Factory Method pattern to create different types of employees, such as `FullTimeEmployee` and `PartTimeEmployee`, based on certain conditions or parameters.

### 3. Abstract Factory Pattern

The Abstract Factory pattern provides an interface for creating families of related or dependent objects without specifying their concrete classes. We have employed the Abstract Factory pattern to create different types of HR-related objects, such as `Employee`, `Department`, or `Payroll`, based on different criteria, ensuring flexibility and extensibility in object creation.

### 4. Observer Pattern

The Observer pattern defines a one-to-many dependency between objects, allowing automatic notification and update of dependents when one object changes state. In our HR Management System, we utilize the Observer pattern to notify HR professionals or managers when certain events occur, such as an employee requesting time off or a new employee joining the company, facilitating real-time communication and decision-making.

### 5. Strategy Pattern

The Strategy pattern defines a family of algorithms, encapsulates each one, and makes them interchangeable. We have applied the Strategy pattern to define different strategies for performance evaluation or training programs in our HR Management System, allowing HR professionals to choose the most appropriate strategy based on the situation, thereby enhancing adaptability and customization.

## 6. Decorator Pattern

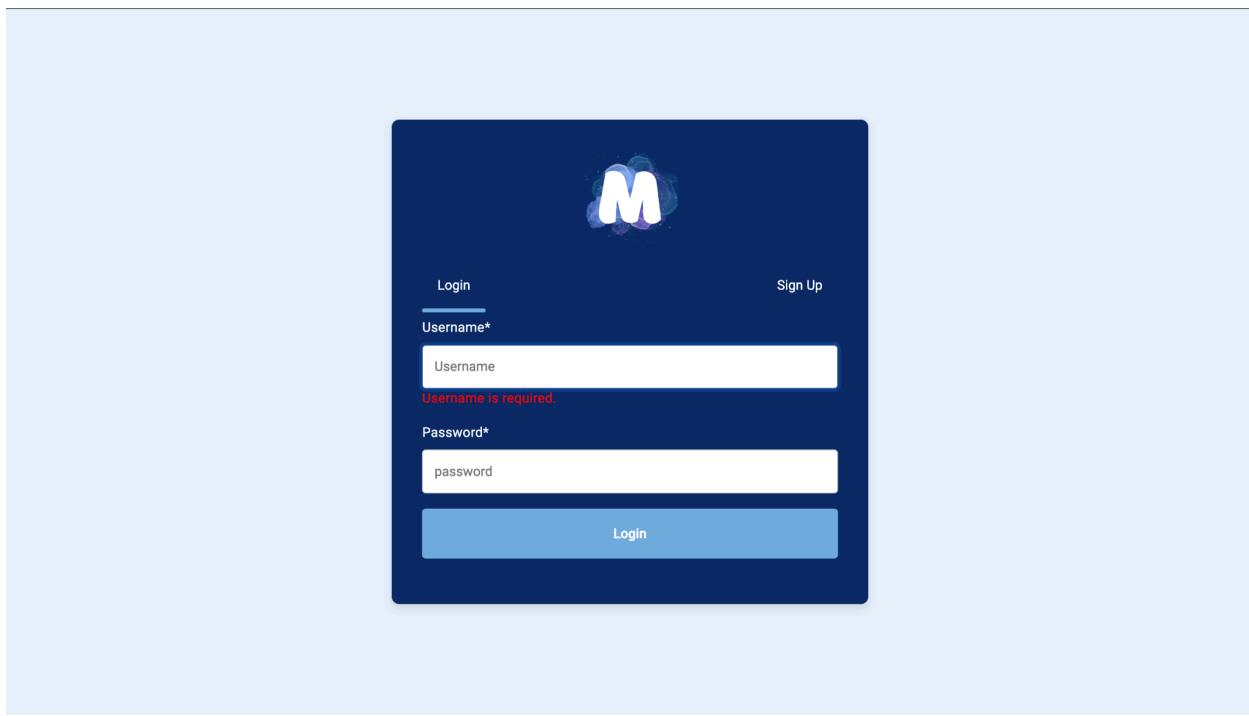
The Decorator pattern attaches additional responsibilities to an object dynamically, providing a flexible alternative to subclassing for extending functionality. In our HR Management System, we utilize the Decorator pattern to add additional features or functionalities to employee objects dynamically, such as adding new skills or certifications, enhancing versatility and customization.

## 7. Facade Pattern

The Facade pattern provides a simplified interface to a set of interfaces in a subsystem, making the subsystem easier to use. In our HR Management System, we employ the Facade pattern to provide a simplified interface for common HR tasks, such as managing employee information or processing payroll, enhancing usability and reducing complexity for end-users.

## 6. Appendix

Screenshots from our software

A screenshot of an employee vacation request interface. On the left is a sidebar with 'Eliada' and 'Welcome back!' at the top, followed by 'Dashboard' (selected), 'Vacations', and 'Logout'. The main area has a 'Employee' section showing 'FirstName: Eliada', 'LastName: Ballazhi', and 'Vacation Days: 20 DAYS'. It includes date pickers for 'dd.mm.yyyy' and a note input field. A large blue 'REQUEST' button is at the bottom. To the right is a calendar for June 2024. The 11th is highlighted in red. Below the calendar is a 'Vacation Days' summary table:

| Vacation Days               |         |
|-----------------------------|---------|
| Jun 12, 2024 - Jun 14, 2024 | PENDING |
| May 25, 2024 - May 25, 2024 | PENDING |

**Eliada**  
Welcome back!

- Dashboard
- Vacations
- Logout

**Employee**

FirstName: Eliada  
LastName: Ballazhi  
Vacation Days: 20 DAYS

dd.mm.yyyy    dd.mm.yyyy

June 2024

| M  | T  | W  | T  | F  | S  | S  |
|----|----|----|----|----|----|----|
| 27 | 28 | 29 | 30 | 31 | 1  | 2  |
| 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 1  | 2  | 3  | 4  | 5  | 6  | 7  |

Clear    Today

REQUEST

June 2024

| Su | Mo | Tu | We | Th | Fr | Sa |
|----|----|----|----|----|----|----|
|    |    |    |    |    |    | 1  |
| 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 |    |    |    |    |    |    |

Vacation Days

Jun 12, 2024 - Jun 14, 2024    PENDING

May 25, 2024 - May 25, 2024    PENDING

**Eliada**  
Welcome back!

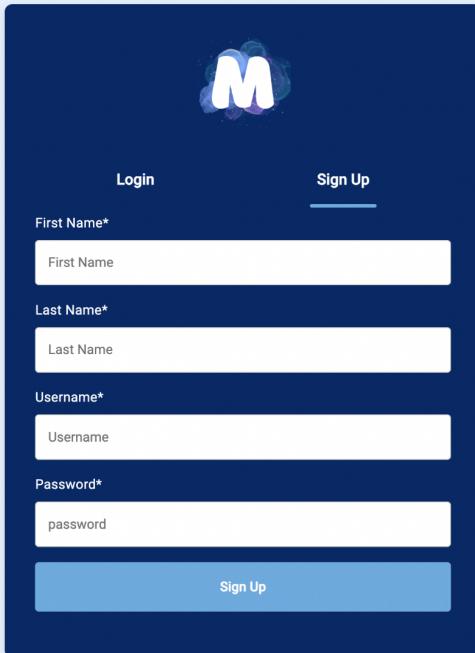
- Dashboard
- Vacations
- Logout

### All Vacation Requests

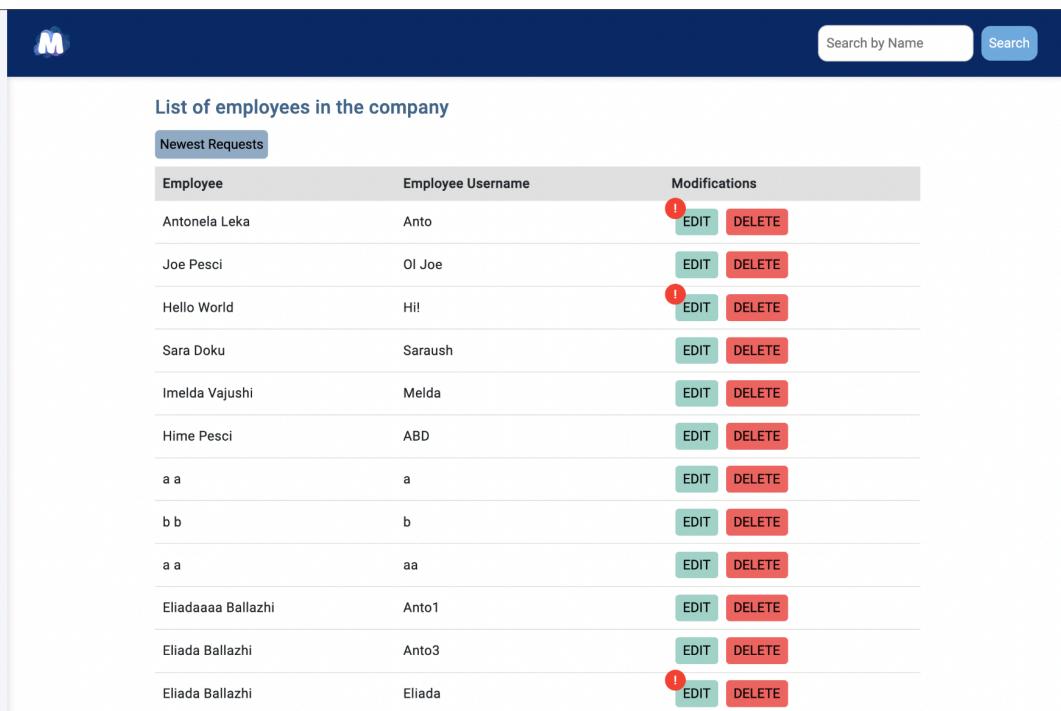
Approved    Pending    Rejected    Show All

May 25, 2024 - May 25, 2024    PENDING

Jun 12, 2024 - Jun 14, 2024    PENDING



A dark blue sign-up form with a large white stylized letter 'M' logo at the top center. The form has two tabs: 'Login' on the left and 'Sign Up' on the right, with 'Sign Up' being the active tab. Below the tabs are four input fields: 'First Name\*' with placeholder 'First Name', 'Last Name\*' with placeholder 'Last Name', 'Username\*' with placeholder 'Username', and 'Password\*' with placeholder 'password'. At the bottom is a large blue 'Sign Up' button.



A dashboard interface for managing employees. On the left, a sidebar shows the user is 'manager' and 'Welcome back!'. It has 'Dashboard' (selected) and 'Logout' buttons. The main area has a header with a blue 'M' logo, a search bar ('Search by Name') with a 'Search' button, and a title 'List of employees in the company'. Below is a table with columns 'Employee', 'Employee Username', and 'Modifications'. The table lists 13 employee entries with 'EDIT' and 'DELETE' buttons for each. A 'Newest Requests' button is also visible above the table.

| Employee            | Employee Username | Modifications                                 |
|---------------------|-------------------|---|
| Antonela Leka       | Anto              | <span style="color:red;">1</span> EDIT DELETE |
| Joe Pesci           | OI Joe            | EDIT DELETE                                   |
| Hello World         | Hi!               | <span style="color:red;">1</span> EDIT DELETE |
| Sara Doku           | Saraush           | EDIT DELETE                                   |
| Imelda Vajushi      | Melda             | EDIT DELETE                                   |
| Hime Pesci          | ABD               | EDIT DELETE                                   |
| a a                 | a                 | EDIT DELETE                                   |
| b b                 | b                 | EDIT DELETE                                   |
| a a                 | aa                | EDIT DELETE                                   |
| Eliadaaaaa Ballazhi | Anto1             | EDIT DELETE                                   |
| Eliada Ballazhi     | Anto3             | EDIT DELETE                                   |
| Eliada Ballazhi     | Eliada            | <span style="color:red;">1</span> EDIT DELETE |

manager  
Welcome back!

Dashboard

Logout

M

### List of employees in the company

Newest Requests

| Employee           | Employee Username | Modifications                                 |
|--------------------|-------------------|---|
| Eliadaaaa Ballazhi | Anto1             | <button>EDIT</button> <button>DELETE</button> |
| Eliada Ballazhi    | Anto3             | <button>EDIT</button> <button>DELETE</button> |
| Eliada Ballazhi    | Eliada            | <button>EDIT</button> <button>DELETE</button> |

manager  
Welcome back!

Dashboard

Logout

Edit Employee

Add Vacation Days Show Calendar

First Name: Hello

Last Name: World

Username: Hi!

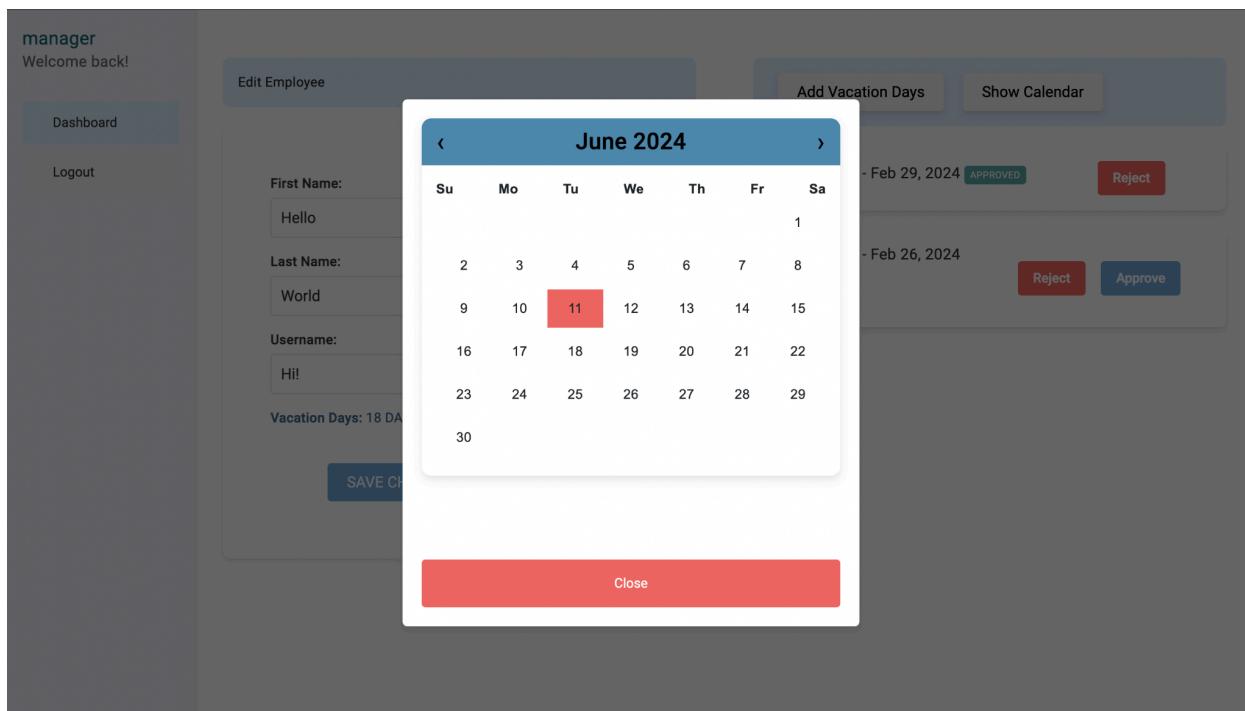
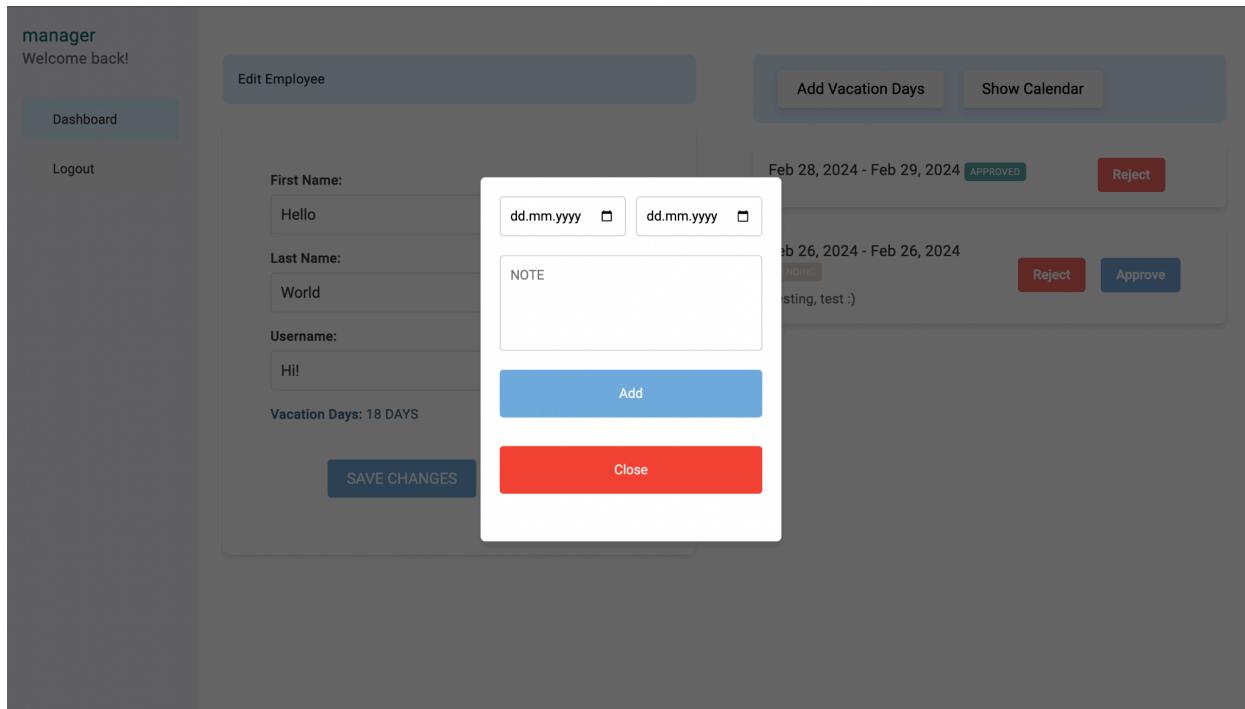
Vacation Days: 18 DAYS

Feb 28, 2024 - Feb 29, 2024 APPROVED

Feb 26, 2024 - Feb 26, 2024 PENDING

Testing, test :)

SAVE CHANGES CANCEL



**manager**  
Welcome back!

[Dashboard](#)

[Logout](#)

**Edit Employee**

First Name:

Last Name:

Username:

Vacation Days: 17 DAYS

[SAVE CHANGES](#) [CANCEL](#)

[Add Vacation Days](#) [Show Calendar](#)

Feb 28, 2024 - Feb 29, 2024 APPROVED [Reject](#)

Feb 26, 2024 - Feb 26, 2024 APPROVED   
Testing, test :)

[Reject](#)

**manager**  
Welcome back!

[Dashboard](#)

[Logout](#)

**Edit Employee**

First Name:

Last Name:

Username:

Vacation Days: 17 DAYS

[SAVE CHANGES](#) [CANCEL](#)

[Add Vacation Days](#) [Show Calendar](#)

Feb 28, 2024 - Feb 29, 2024 APPROVED [Reject](#)

Feb 26, 2024 - Feb 26, 2024 APPROVED   
Testing, test :)

[Reject](#)

Time Sheet approved successfully!

**manager**  
Welcome back!

[Dashboard](#)

[Logout](#)

**Edit Employee**

---

First Name:

Last Name:

Username:

Vacation Days: 17 DAYS

---

[SAVE CHANGES](#) [CANCEL](#)

Add Vacation Days
Show Calendar

Feb 28, 2024 - Feb 29, 2024
APPROVED
[Reject](#)

Feb 26, 2024 - Feb 26, 2024
APPROVED
Testing, test :)
[Reject](#)



**manager**  
Welcome back!

[Dashboard](#)

[Logout](#)

**List of employees in the company**

[Back to List](#)

| Employee        | Employee Username | Modifications   |
|-----------------|-------------------|---|
| Eliada Ballazhi | Eliada            | <span style="color: red;">EDIT</span> <span style="color: red;">DELETE</span>   |
| Antonela Leka   | Anto              | <span style="color: red;">EDIT</span> <span style="color: red;">DELETE</span>   |
| Eliada Ballazhi | Anto3             | <span style="color: green;">EDIT</span> <span style="color: red;">DELETE</span> |
| Hello World     | Hi!               | <span style="color: green;">EDIT</span> <span style="color: red;">DELETE</span> |
| Joe Pesci       | Ol Joe            | <span style="color: green;">EDIT</span> <span style="color: red;">DELETE</span> |

## **Important links:**

*Figma design:*

<https://www.figma.com/design/DBmBfLEsm5b7gEsrSHJFql/MetroHr?node-id=0-1&t=ELYbF8sR3UqwxcUe-1>

*Github repository:*

<https://github.com/justEliada/hrManagmentSystem>

*Specifications:*

**Version Control:**

Node: <https://nodejs.org/en/blog/release/v14.21.3>

Npm : npm i npm@9.7.2

Angular: npm i @angular/cli@15

Git: <https://www.git-scm.com/download/win>

VSC : <https://code.visualstudio.com/download>

Extension: Angular Language Service