项目文档

# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Asset Registration Function   
\*\*Function ID\*\*: FR-01   
\*\*Description\*\*: Administrators can register new assets in the system by providing detailed information about the asset.   
\*\*Input\*\*: Asset details including name, description, category, acquisition date, location, and status.   
\*\*Output\*\*: A new asset record stored in the Database with the provided information.  
  
## 1.2 Asset Lifecycle Management Function   
\*\*Function ID\*\*: FR-02   
\*\*Description\*\*: Administrators can update the lifecycle status of an asset, which includes stages such as Acquisition, Deployment, Maintenance, and Retirement.   
\*\*Input\*\*: Selected asset and new lifecycle stage.   
\*\*Output\*\*: Updated asset lifecycle data stored in the Database.  
  
## 1.3 Asset Information Modification Function   
\*\*Function ID\*\*: FR-03   
\*\*Description\*\*: Administrators can modify the information of an existing asset, including name, location, status, and other relevant fields.   
\*\*Input\*\*: Selected asset and updated information.   
\*\*Output\*\*: Modified asset record stored in the Database.  
  
## 1.4 Asset Record Deletion Function   
\*\*Function ID\*\*: FR-04   
\*\*Description\*\*: Administrators can delete an asset record from the system after confirmation.   
\*\*Input\*\*: Selected asset and confirmation of deletion.   
\*\*Output\*\*: Deleted asset record removed from the Database.  
  
## 1.5 Asset Detail View Function   
\*\*Function ID\*\*: FR-05   
\*\*Description\*\*: Administrators can view detailed information of a specific asset, including its name, description, category, acquisition date, location, and status.   
\*\*Input\*\*: Selected asset.   
\*\*Output\*\*: Display of asset details to the Administrator.  
  
## 1.6 Asset Request Management Function   
\*\*Function ID\*\*: FR-06   
\*\*Description\*\*: Administrators can approve or reject asset requests submitted by users, which includes specifying the request type, reason, and status.   
\*\*Input\*\*: Asset request details including requestor, asset involved, request type, and reason.   
\*\*Output\*\*: Updated asset request status stored in the Database.  
  
## 1.7 Asset Usage Management Function   
\*\*Function ID\*\*: FR-07   
\*\*Description\*\*: Administrators can manage asset usage records by adding, modifying, or deleting entries that include usage type, date, duration, and notes.   
\*\*Input\*\*: Selected asset and usage details (type, date, duration, etc.).   
\*\*Output\*\*: Updated asset usage data stored in the Database.  
  
## 1.8 Asset History Retrieval Function   
\*\*Function ID\*\*: FR-08   
\*\*Description\*\*: Administrators can view the history of lifecycle events for a selected asset, including event type, date, and details.   
\*\*Input\*\*: Selected asset.   
\*\*Output\*\*: Display of asset history data retrieved from the Database.  
  
## 1.9 Asset Usage Trend Analysis Function   
\*\*Function ID\*\*: FR-09   
\*\*Description\*\*: Administrators can analyze the usage trends of assets based on filters such as asset category, date range, and usage patterns.   
\*\*Input\*\*: Analysis criteria including asset category, date range, and trend type.   
\*\*Output\*\*: Asset usage trend analysis report generated and stored in the system.  
  
## 1.10 Report Generation Function   
\*\*Function ID\*\*: FR-10   
\*\*Description\*\*: Administrators can generate reports based on asset lifecycle and usage data, and choose to send them via email or download them.   
\*\*Input\*\*: Report type and filters (e.g., date range, asset category).   
\*\*Output\*\*: Generated report file (e.g., PDF, Excel) and stored report data in the Database.  
  
## 1.11 Permission Assignment Function   
\*\*Function ID\*\*: FR-11   
\*\*Description\*\*: Administrators can assign or modify permissions for assets to specific users or user groups.   
\*\*Input\*\*: Selected asset and permission details (e.g., user ID, permission level).   
\*\*Output\*\*: Updated asset permission data stored in the Database.  
  
## 1.12 User Permission Management Function   
\*\*Function ID\*\*: FR-12   
\*\*Description\*\*: Administrators can manage user access rights, including granting or revoking permissions for specific assets or features.   
\*\*Input\*\*: Selected user and permission details (e.g., asset ID, role, access level).   
\*\*Output\*\*: Updated user permission data stored in the Database.  
  
## 1.13 Email Notification Function   
\*\*Function ID\*\*: FR-13   
\*\*Description\*\*: The system can send email notifications to users and stakeholders for various asset-related events such as lifecycle transitions, request approvals, and report deliveries.   
\*\*Input\*\*: Notification details including recipient email addresses, subject, and message body.   
\*\*Output\*\*: Email notification sent to the specified recipients via the Email System.  
  
## 1.14 Database Integration Function   
\*\*Function ID\*\*: FR-14   
\*\*Description\*\*: The system can integrate with and synchronize data to a configured database.   
\*\*Input\*\*: Database connection settings and data to be synchronized.   
\*\*Output\*\*: Integration status and synchronized data stored in the Database.  
  
## 1.15 Audit Activity Function   
\*\*Function ID\*\*: FR-15   
\*\*Description\*\*: Administrators can audit asset activities such as modifications, access, and status changes, and generate audit reports.   
\*\*Input\*\*: Selected asset(s) for audit and filters (e.g., date range, activity type).   
\*\*Output\*\*: Audit report file (e.g., PDF, Excel) and stored audit data in the Database.  
  
## 1.16 Asset History Management Function   
\*\*Function ID\*\*: FR-16   
\*\*Description\*\*: Administrators can manage asset history records, including editing entries, exporting the history data, or applying filters.   
\*\*Input\*\*: Selected asset and management action (e.g., edit, export, filter).   
\*\*Output\*\*: Updated or exported asset history data stored in the Database or available for download.  
  
## 1.17 Asset Usage Trend Management Function   
\*\*Function ID\*\*: FR-17   
\*\*Description\*\*: Administrators can manage asset usage trend data, including viewing trend visualizations, exporting data, or setting analysis parameters.   
\*\*Input\*\*: Selected asset(s), trend analysis parameters, or export request.   
\*\*Output\*\*: Updated asset usage trend data stored in the Database or exported file for download.  
  
## 1.18 User Management Function   
\*\*Function ID\*\*: FR-18   
\*\*Description\*\*: Administrators can manage user accounts, including creating, modifying, or deleting user records and associated permissions.   
\*\*Input\*\*: User details (e.g., name, email, role) and management action (e.g., create, modify, delete).   
\*\*Output\*\*: Updated user data stored in the Database or notification emails sent to the affected user via the Email System.  
  
## 1.19 Asset Report and Analysis Management Function   
\*\*Function ID\*\*: FR-19   
\*\*Description\*\*: Administrators can manage report and analysis settings, including updating analysis parameters, reviewing analysis results, and exporting data.   
\*\*Input\*\*: Selected report, analysis parameters, or export request.   
\*\*Output\*\*: Updated report analysis data stored in the Database or exported file for download.  
  
## 1.20 Asset Lifecycle Stage Management Function   
\*\*Function ID\*\*: FR-20   
\*\*Description\*\*: Administrators can manage asset lifecycle stages by adding, modifying, or removing lifecycle events for an asset.   
\*\*Input\*\*: Selected asset and lifecycle stage details (e.g., stage name, transition date).   
\*\*Output\*\*: Updated asset lifecycle stage data stored in the Database.  
  
## 1.21 User Login and Access Function   
\*\*Function ID\*\*: FR-21   
\*\*Description\*\*: Users and Administrators can log in to the system using their credentials, and the system will verify their access rights and roles.   
\*\*Input\*\*: User credentials (e.g., email and password).   
\*\*Output\*\*: Verification of user identity and role, and granting access to the system.  
  
## 1.22 Access Logging Function   
\*\*Function ID\*\*: FR-22   
\*\*Description\*\*: The system logs all access and management activities performed by users and Administrators for auditing and traceability.   
\*\*Input\*\*: User or Administrator action (e.g., view asset, modify permission, generate report).   
\*\*Output\*\*: Record of the action stored in the system logs.

# External Description

# 2. External Interfaces   
  
This section outlines the external interfaces required for the system to function effectively. These interfaces include user interfaces, hardware interfaces, software interfaces, and communication interfaces. Each interface is described with its role, interaction method, and data flow to ensure clear understanding and implementation.   
  
## 2.1 User Interface   
  
The system provides a user interface that allows administrators and users to interact with the asset management functionalities. The interface is designed to be intuitive, supporting various management actions and information retrieval tasks.   
  
- \*\*Description\*\*:   
 The user interface includes a web-based dashboard and administrative panels where users can perform actions such as asset registration, modification, deletion, and view asset details, history, and usage trends. The interface also allows administrators to manage user access rights, permissions, and generate reports.   
  
- \*\*Inputs/Outputs\*\*:   
 - Input: User credentials (e.g., email and password) for login and access control.   
 - Output: Display of asset details, history records, usage trends, and audit reports to administrators.   
 - Input: Asset details (e.g., name, description, category, acquisition date, location, and status) for registration.   
 - Output: Confirmation of asset registration, modification, deletion, or lifecycle stage changes.   
 - Input: Filters and parameters for report generation (e.g., date range, asset category).   
 - Output: Generated reports (e.g., PDF, Excel) for download or email.   
  
- \*\*Role\*\*:   
 The user interface serves as the primary means for system users to interact with the asset management functions. It ensures a seamless experience for administrators to manage assets and for users to request and access asset information.   
  
## 2.2 Hardware Interface   
  
There are no direct hardware interfaces required for this system. However, the system may be accessed via various computing devices such as desktops, laptops, and mobile devices.   
  
- \*\*Description\*\*:   
 The system does not interact with any physical hardware components. It is designed to run on standard computing hardware and be accessed through web browsers on any device that supports them.   
  
- \*\*Role\*\*:   
 The hardware interface ensures that the system is accessible on a wide range of devices, enabling administrators and users to perform asset management tasks from different locations and platforms.   
  
## 2.3 Software Interface   
  
The system interacts with external software components, primarily a database for storing and retrieving asset, usage, and audit data. It also utilizes an email system for sending notifications.   
  
- \*\*Database Interface\*\*:   
 - \*\*Description\*\*: The system integrates with a configured database to store and retrieve all asset-related data, including asset records, usage history, audit logs, and reports.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: Asset details, usage records, audit logs, and report data.   
 - Output: Storage of updated or new asset records, retrieval of asset history and usage trends, and report generation.   
 - \*\*Role\*\*:   
 The database serves as the central repository for all system data. It ensures data persistence, integrity, and availability for querying and analysis.   
  
- \*\*Email Notification Interface\*\*:   
 - \*\*Description\*\*: The system interfaces with an external email service to send notifications to users and stakeholders regarding asset lifecycle changes, request approvals, and report deliveries.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: Notification details, including recipient email addresses, subject, and message body.   
 - Output: Email notification sent to the specified recipients.   
 - \*\*Role\*\*:   
 This interface facilitates real-time communication with users and stakeholders, ensuring timely updates and responses to asset-related events.   
  
- \*\*Report Generation Tools\*\*:   
 - \*\*Description\*\*: The system utilizes software tools or libraries to generate reports in formats such as PDF or Excel.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: Report type and filters (e.g., date range, asset category).   
 - Output: Generated report file in the specified format (e.g., PDF, Excel).   
 - \*\*Role\*\*:   
 The report generation tools enable administrators to create and export structured data reports for analysis and record-keeping.   
  
## 2.4 Communication Interface   
  
The system communicates with external systems through network-based interfaces, primarily via email for notifications and data synchronization with the database.   
  
- \*\*Email Communication Interface\*\*:   
 - \*\*Description\*\*: The system uses an email communication interface to send notifications to users and stakeholders.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: Notification details, including recipient email addresses, subject, and message body.   
 - Output: Email notification sent to the specified recipients.   
 - \*\*Role\*\*:   
 This interface ensures that users are informed of important events such as request approvals, asset lifecycle transitions, and report deliveries.   
  
- \*\*Database Communication Interface\*\*:   
 - \*\*Description\*\*: The system communicates with the database over a secure network connection to perform data synchronization, retrieval, and updates.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: Database connection settings and data to be synchronized.   
 - Output: Integration status and synchronized data stored in the database.   
 - \*\*Role\*\*:   
 This interface ensures that the system can consistently interact with the database to maintain accurate and up-to-date asset records.   
  
- \*\*Web Communication Interface\*\*:   
 - \*\*Description\*\*: The system uses a web-based communication interface to allow users to access it through a web browser.   
 - \*\*Inputs/Outputs\*\*:   
 - Input: User credentials and management actions (e.g., asset registration, modification, deletion).   
 - Output: Display of asset details, history, usage trends, and audit reports.   
 - \*\*Role\*\*:   
 The web communication interface provides the primary access point for users and administrators to interact with the system remotely.   
  
## Summary of External Interfaces   
  
| Interface Type | Name | Description | Inputs/Outputs |  
|------------------------|-----------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------|  
| User Interface | Web Dashboard and Admin Panels | Provides a web-based interface for managing assets and viewing reports. | User credentials, asset details, filters, report parameters, confirmation actions. |  
| Software Interface | Database | Stores and retrieves asset, usage, and audit data. | Asset details, usage records, audit logs, report data. |  
| Software Interface | Email Service | Sends email notifications to users and stakeholders. | Notification details (email, subject, message body). |  
| Software Interface | Report Generation Tools | Generates reports in formats such as PDF and Excel. | Report type, filters, and export requests. |  
| Communication Interface | Web Communication | Enables remote access to the system via web browsers. | User credentials and management actions. |  
| Communication Interface | Email Communication | Sends notifications via email to users and stakeholders. | Notification details and confirmation of email delivery. |  
| Communication Interface | Database Communication | Enables secure synchronization and interaction with the database. | Database connection settings and data to be synchronized. |

# Use Case

Use Case Name: Asset Lifecycle Management   
Use Case ID: UC-01   
Actors: Administrator, Email System, Database   
Preconditions:   
1. The system is accessible to the Administrator.   
2. Assets are registered in the Database.   
3. The Email System is properly configured.   
  
Postconditions:   
1. Asset lifecycle data is updated and stored in the Database.   
2. Notifications are sent via the Email System when asset lifecycle events occur.   
3. The Asset Usage Report is generated and available for viewing.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator selects an asset from the asset list.   
3. The system retrieves the asset's current lifecycle status from the Database.   
4. The Administrator updates the asset's lifecycle status (e.g., Acquisition, Deployment, Maintenance, Retirement).   
5. The system validates the new status and updates the asset record in the Database.   
6. The system triggers a notification to the Email System.   
7. The Email System sends a confirmation email to the Administrator and relevant stakeholders.   
8. The system updates the Asset Lifecycle Report with the new data.   
9. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the system cannot connect to the Database, it displays an error message and stops the process.   
2. If the new lifecycle status is invalid, the system displays an error message and prompts the Administrator to select a valid status.   
3. If the Email System is not available, the system logs the error and continues with the lifecycle update without sending the email.   
4. If no asset is selected, the system displays an error message and prompts the Administrator to choose an asset.  
  
Use Case Name: Register New Asset   
Use Case ID: UC-02   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The Database is available and properly configured.   
3. The Administrator has the necessary permissions to register new assets.   
  
Postconditions:   
1. A new asset record is successfully created and stored in the Database.   
2. The asset is added to the asset list for future management.   
3. An Asset Usage Report is updated to include the new asset.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Register New Asset" feature.   
3. The Administrator fills in the asset details (e.g., name, type, acquisition date, location).   
4. The system validates the input data.   
5. The system saves the new asset record to the Database.   
6. The system adds the asset to the asset list.   
7. The system updates the Asset Usage Report with the new asset information.   
8. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the input data is invalid, the system prompts the Administrator to correct the data.   
3. If the Administrator fails to provide required information, the system displays an error message and prevents registration.   
4. If the Asset Usage Report cannot be updated, the system logs the error but continues with the asset registration.  
  
Use Case Name: Modify Asset Information   
Use Case ID: UC-03   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset to be modified is already registered in the Database.   
3. The Administrator has the necessary permissions to modify asset information.   
  
Postconditions:   
1. The asset's information is updated in the Database.   
2. The Asset Usage Report reflects the changes made.   
3. A confirmation message is displayed to the Administrator.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator selects an asset from the asset list for modification.   
3. The system retrieves the current asset information from the Database.   
4. The Administrator updates the asset details (e.g., name, location, status).   
5. The system validates the updated information.   
6. The system updates the asset record in the Database.   
7. The system updates the Asset Usage Report with the modified asset information.   
8. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the updated information is invalid, the system prompts the Administrator to correct the data.   
3. If the Administrator fails to provide required information, the system displays an error message and prevents modification.   
4. If the Asset Usage Report cannot be updated, the system logs the error but continues with the asset modification.  
  
Use Case Name: Delete Asset Record   
Use Case ID: UC-04   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset to be deleted is registered in the Database.   
3. The Administrator has the necessary permissions to delete asset records.   
  
Postconditions:   
1. The asset record is removed from the Database.   
2. The asset is removed from the asset list.   
3. The Asset Usage Report is updated to exclude the deleted asset.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator selects an asset from the asset list for deletion.   
3. The system prompts the Administrator for confirmation.   
4. The Administrator confirms the deletion.   
5. The system deletes the asset record from the Database.   
6. The system removes the asset from the asset list.   
7. The system updates the Asset Usage Report to reflect the deletion.   
8. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the asset is referenced in other system records, the system displays a warning message and prevents deletion.   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator cancels the deletion, the system returns to the asset list without making any changes.   
4. If the Asset Usage Report cannot be updated, the system logs the error but continues with the deletion process.  
  
Use Case Name: View Asset Details   
Use Case ID: UC-05   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset to be viewed is registered in the Database.   
3. The Administrator has the necessary permissions to view asset details.   
  
Postconditions:   
1. The asset's detailed information is displayed to the Administrator.   
2. The system logs the access of the asset details.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Asset List" and selects an asset for viewing.   
3. The system retrieves the asset's detailed information from the Database.   
4. The system displays the asset's information (e.g., name, type, status, acquisition date, location).   
5. The system logs the viewing activity in the system.   
  
Alternative Flow:   
1. If the asset is not found in the Database, the system displays an error message.   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator does not have permission to view the asset details, the system displays an access denied message.  
  
Use Case Name: Generate Asset Report   
Use Case ID: UC-06   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Assets are registered in the Database.   
3. The Administrator has the necessary permissions to generate reports.   
4. The Email System is properly configured.   
  
Postconditions:   
1. The Asset Report is generated and stored in the system.   
2. The report is sent to the Administrator via the Email System.   
3. The report is available for download or viewing.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Generate Asset Report" feature.   
3. The Administrator selects the report type (e.g., Asset Lifecycle Report, Asset Usage Report).   
4. The Administrator specifies the date range or filters for the report.   
5. The system retrieves the relevant data from the Database.   
6. The system generates the report based on the selected criteria.   
7. The system sends the report to the Administrator via the Email System.   
8. The system displays a success message and provides the option to download the report.   
  
Alternative Flow:   
1. If the selected report type is invalid, the system displays an error message and prompts the Administrator to choose a valid report type.   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Email System is not available, the system logs the error and provides the report for download without sending it via email.   
4. If no assets match the selected criteria, the system generates a report with a "No Data Found" message and sends it to the Administrator.  
  
Use Case Name: Analyze Asset Usage Trends   
Use Case ID: UC-07   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Assets are registered in the Database with usage data.   
3. The Administrator has the necessary permissions to analyze asset usage.   
4. The Email System is properly configured for report delivery.   
  
Postconditions:   
1. The Asset Usage Analysis is generated based on the selected criteria.   
2. The analysis results are stored in the system and available for viewing or downloading.   
3. The analysis is sent to the Administrator via the Email System.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Analyze Asset Usage Trends" feature.   
3. The Administrator selects the type of analysis and specifies filters (e.g., date range, asset category).   
4. The system retrieves the relevant asset usage data from the Database.   
5. The system processes the data and generates the Asset Usage Analysis.   
6. The system sends the analysis report to the Administrator via the Email System.   
7. The system displays a success message and provides the option to download the report.   
  
Alternative Flow:   
1. If the selected analysis type is invalid, the system displays an error message and prompts the Administrator to choose a valid analysis type.   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Email System is not available, the system logs the error and provides the report for download without sending it via email.   
4. If no usage data matches the selected criteria, the system generates a report with a "No Data Found" message and sends it to the Administrator.  
  
Use Case Name: Assign Asset Permissions   
Use Case ID: UC-08   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset to which permissions are being assigned is registered in the Database.   
3. The Administrator has the necessary permissions to assign asset access rights.   
4. The Email System is properly configured.   
  
Postconditions:   
1. Asset permissions are updated and stored in the Database.   
2. Notifications are sent via the Email System to users whose permissions have been changed.   
3. The Asset Usage Report is updated to reflect the new permissions.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Asset Permissions" feature.   
3. The Administrator selects an asset from the asset list.   
4. The system retrieves the current permissions for the selected asset from the Database.   
5. The Administrator modifies the permissions (e.g., grant or revoke access to specific users).   
6. The system validates the permission changes and updates the asset record in the Database.   
7. The system triggers a notification to the Email System.   
8. The Email System sends a notification to affected users about the permission change.   
9. The system updates the Asset Usage Report with the new permissions data.   
10. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the selected asset is not found, the system displays an error message and prompts the Administrator to select a valid asset.   
3. If the permission changes are invalid (e.g., duplicate user assignment), the system displays an error and prompts for correction.   
4. If the Email System is not available, the system logs the error and continues with the permission update without sending the email.   
5. If the Asset Usage Report cannot be updated, the system logs the error but continues with the permission assignment.  
  
Use Case Name: Update User Permissions   
Use Case ID: UC-09   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The user whose permissions are being updated is registered in the Database.   
3. The Administrator has the necessary permissions to update user access rights.   
4. The Email System is properly configured.   
  
Postconditions:   
1. User permissions are updated and stored in the Database.   
2. Notifications are sent via the Email System to the affected user and Administrator.   
3. The updated permissions are reflected in the system for the user.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "User Permissions" feature.   
3. The Administrator selects a user from the user list.   
4. The system retrieves the user's current permissions from the Database.   
5. The Administrator modifies the permissions (e.g., grant or revoke access to certain assets or features).   
6. The system validates the permission changes and updates the user record in the Database.   
7. The system triggers a notification to the Email System.   
8. The Email System sends a confirmation email to the Administrator and the affected user.   
9. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the selected user is not found, the system displays an error message and prompts the Administrator to select a valid user.   
3. If the permission changes are invalid (e.g., invalid role assignment), the system displays an error message and prompts for correction.   
4. If the Email System is not available, the system logs the error and continues with the permission update without sending the email.  
  
Use Case Name: View Permission Settings   
Use Case ID: UC-10   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Permission settings are stored in the Database.   
3. The Administrator has the necessary permissions to view asset access rights.   
  
Postconditions:   
1. The current permission settings for the selected asset are displayed to the Administrator.   
2. The system logs the access of the permission settings.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Asset Permissions" section.   
3. The Administrator selects an asset from the asset list.   
4. The system retrieves the permission settings for the selected asset from the Database.   
5. The system displays the permission settings (e.g., users with access, roles, restrictions).   
6. The system logs the viewing activity in the system.   
  
Alternative Flow:   
1. If the selected asset is not found in the Database, the system displays an error message.   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator does not have permission to view the settings, the system displays an access denied message.  
  
Use Case Name: Send Asset Notification via Email   
Use Case ID: UC-11   
Actors: Administrator, Email System, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset is registered in the Database.   
3. The Email System is properly configured.   
4. The Administrator has the necessary permissions to send notifications.   
  
Postconditions:   
1. A notification email is sent to the Administrator and relevant stakeholders.   
2. The notification details are recorded in the Database.   
3. The system confirms the email has been sent or logs an error if it fails.   
  
Main Flow:   
1. The Administrator selects an asset from the asset list.   
2. The Administrator chooses to send a notification related to the asset (e.g., status change, maintenance alert).   
3. The system retrieves the asset details and relevant stakeholder email addresses from the Database.   
4. The system generates an email notification with the asset information and sends it to the Email System.   
5. The Email System sends the notification to the specified recipients.   
6. The system records the notification event in the Database.   
7. The system displays a success message to the Administrator confirming the email was sent.   
  
Alternative Flow:   
1. If the asset is not found in the Database, the system displays an error message and stops the process.   
2. If the Email System is not available, the system logs the error and displays a message to the Administrator that the email could not be sent.   
3. If the email address of a stakeholder is invalid, the system logs the error and skips sending the email to that recipient.   
4. If the Administrator cancels the notification, the system returns to the asset details view without sending the email.  
  
Use Case Name: Integrate with Database   
Use Case ID: UC-12   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The Database connection settings are configured and valid.   
3. The Administrator has the necessary permissions to perform integration tasks.   
  
Postconditions:   
1. The system is successfully connected to the Database.   
2. Integration status is updated in the system.   
3. The Administrator is notified of the integration result.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Database Integration" feature.   
3. The Administrator selects the Database from the list of available data sources.   
4. The system verifies the connection to the Database using the stored credentials.   
5. If the connection is successful, the system updates the integration status.   
6. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database connection fails, the system displays an error message and logs the failure.   
2. If the selected Database is invalid or not configured, the system displays an error message and prompts the Administrator to select a valid Database.   
3. If the Administrator does not have permission to perform the integration, the system displays an access denied message.   
4. If the system cannot update the integration status, it logs the error and informs the Administrator.  
  
Use Case Name: Audit Asset Activities   
Use Case ID: UC-13   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Assets are registered in the Database with activity logs.   
3. The Email System is properly configured for audit-related notifications.   
4. The Administrator has the necessary permissions to audit asset activities.   
  
Postconditions:   
1. Asset activity logs are retrieved and displayed to the Administrator.   
2. An audit report is generated and available for viewing or downloading.   
3. Notifications are sent via the Email System if specified by the Administrator.   
4. The audit activity is recorded in the system logs.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Audit Asset Activities" feature.   
3. The Administrator selects an asset or a group of assets to audit.   
4. The system retrieves the asset activity logs from the Database.   
5. The system displays the activity details (e.g., modification history, access logs, status changes).   
6. The Administrator generates an audit report based on the selected data.   
7. The system creates and saves the audit report.   
8. The Administrator chooses to send the report via the Email System.   
9. The system sends the audit report to the specified recipients.   
10. The system logs the audit action and displays a success message.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If no activity is found for the selected asset(s), the system generates a report with a "No Activity Found" message.   
3. If the selected asset(s) do not exist, the system displays an error message and prompts the Administrator to select a valid asset.   
4. If the Email System is not available, the system logs the error and provides the report for download without sending it.   
5. If the Administrator does not select an option to send the email, the system skips sending and only provides the report for viewing/downloading.  
  
Use Case Name: Retrieve Asset History   
Use Case ID: UC-14   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset has a history of lifecycle events stored in the Database.   
3. The Administrator has the necessary permissions to view asset history.   
  
Postconditions:   
1. The asset's historical data is retrieved and displayed to the Administrator.   
2. The system logs the retrieval of the asset history.   
3. The Administrator can review and analyze the asset's lifecycle history.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator selects an asset from the asset list.   
3. The Administrator clicks on "View History" for the selected asset.   
4. The system retrieves the asset's historical data from the Database.   
5. The system displays the history (e.g., previous status, modification dates, responsible users).   
6. The system logs the viewing activity in the system.   
  
Alternative Flow:   
1. If the selected asset has no history, the system displays a message indicating "No history available."   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator does not have permission to view the history, the system displays an access denied message.   
4. If the asset is not found, the system displays an error and prompts the Administrator to select a valid asset.  
  
Use Case Name: Approve Asset Requests   
Use Case ID: UC-15   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Asset requests are stored in the Database.   
3. The Administrator has the necessary permissions to approve or reject asset requests.   
4. The Email System is properly configured to send notifications.   
  
Postconditions:   
1. The asset request is updated in the Database with the approval or rejection status.   
2. Notifications are sent via the Email System to the requestor and relevant stakeholders.   
3. The Asset Usage Report is updated to reflect approved or rejected requests.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Asset Requests" section.   
3. The system retrieves pending asset requests from the Database.   
4. The Administrator selects a request to review.   
5. The system displays the request details (e.g., requester, asset, reason, requested action).   
6. The Administrator approves or rejects the request.   
7. The system updates the request status in the Database.   
8. The system triggers a notification to the Email System.   
9. The Email System sends a confirmation email to the requestor and relevant stakeholders.   
10. The system updates the Asset Usage Report to reflect the decision.   
11. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If no pending requests are found, the system displays a message indicating "No requests available."   
3. If the request is invalid or already processed, the system displays an error message and prevents further action.   
4. If the Email System is not available, the system logs the error and continues with the approval or rejection without sending the email.   
5. If the Asset Usage Report cannot be updated, the system logs the error but continues with the request approval or rejection.  
  
Use Case Name: Manage Asset Request   
Use Case ID: UC-16   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. An Asset Request is submitted and stored in the Database.   
3. The Administrator has the necessary permissions to manage asset requests.   
4. The Email System is properly configured for sending notifications.   
  
Postconditions:   
1. The Asset Request is updated in the Database with the latest action (e.g., approved, rejected, pending).   
2. A notification is sent to the requestor and relevant stakeholders via the Email System.   
3. The system logs the management activity for the asset request.   
4. The Asset Usage Report is updated to reflect the outcome of the request.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage Asset Request" feature.   
3. The system displays a list of all submitted asset requests.   
4. The Administrator selects a specific asset request for review.   
5. The system retrieves the request details from the Database (e.g., requester, asset involved, request type, reason).   
6. The Administrator evaluates the request and selects an action (e.g., approve, reject, defer).   
7. The system updates the request status in the Database.   
8. The system sends a notification to the requestor and relevant stakeholders through the Email System.   
9. The system logs the action taken by the Administrator.   
10. The system updates the Asset Usage Report with the new status of the request.   
11. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and halts the process.   
2. If the selected request is invalid or no longer exists, the system displays an error and prompts the Administrator to choose a valid request.   
3. If the Email System is unavailable, the system logs the error and continues the process without sending the email notification.   
4. If the Administrator cancels the request management, the system returns to the asset request list without making any changes.   
5. If the Asset Usage Report cannot be updated, the system logs the error but proceeds with the status update in the Database.  
  
Use Case Name: Manage Asset History   
Use Case ID: UC-17   
Actors: Administrator, Database   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset has a history of lifecycle events stored in the Database.   
3. The Administrator has the necessary permissions to manage asset history.   
4. The selected asset exists in the system.   
  
Postconditions:   
1. The asset history is updated based on the Administrator's action (e.g., editing, exporting, filtering).   
2. The system logs the management activity related to the asset history.   
3. If exported, the history data is available for download.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Asset List" and selects an asset for history management.   
3. The system displays the asset history interface, including options to filter, edit, or export the history.   
4. The Administrator selects an action (e.g., edit an entry, export the history, apply filters).   
5. If editing, the Administrator modifies a specific history entry (e.g., correction of status or date).   
6. If exporting, the system generates a file (e.g., CSV or PDF) containing the history data.   
7. The system validates the action and updates the asset history record in the Database if necessary.   
8. The system logs the management activity in the system.   
9. If exporting, the system provides the file for download.   
10. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the selected asset has no history, the system displays a message indicating "No history available."   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator does not have permission to manage asset history, the system displays an access denied message.   
4. If the selected asset does not exist, the system displays an error message and prompts the Administrator to select a valid asset.   
5. If the export file cannot be generated, the system logs the error and displays a message to the Administrator.  
  
Use Case Name: Manage Asset Usage Trends   
Use Case ID: UC-18   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Assets are registered in the Database with usage records.   
3. The Administrator has the necessary permissions to manage asset usage trends.   
4. The Email System is properly configured for sending notifications if required.   
  
Postconditions:   
1. The asset usage trends are analyzed, updated, or exported based on the Administrator's action.   
2. The system logs the management activity related to asset usage trends.   
3. If applicable, the analysis or export results are sent to the Administrator via the Email System.   
4. The Asset Usage Trends Report is updated to reflect any changes or new data.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage Asset Usage Trends" feature.   
3. The system displays a list of assets with available usage data and provides options for trend analysis or export.   
4. The Administrator selects an asset or group of assets for trend management.   
5. The system retrieves the asset usage data from the Database.   
6. The Administrator chooses an action (e.g., view trends, export data, set trend analysis parameters).   
7. If viewing trends, the system displays visualizations or summaries of the usage patterns.   
8. If exporting data, the system generates a file (e.g., CSV, Excel) with the usage trend data.   
9. The system validates the action and updates or logs the trend management activity in the Database.   
10. The system logs the Administrator’s activity in the system.   
11. If the Administrator chooses to send the report or export file via Email, the system sends it through the Email System.   
12. The system updates the Asset Usage Trends Report with the latest data or analysis.   
13. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the selected asset(s) have no usage data, the system displays a message indicating "No usage data available."   
2. If the Database is unavailable, the system displays an error message and stops the process.   
3. If the Administrator does not have permission to manage asset usage trends, the system displays an access denied message.   
4. If the Email System is not available and the Administrator chooses to send the report, the system logs the error and provides the report/export file for download instead.   
5. If the export file cannot be generated, the system logs the error and displays a message to the Administrator.   
6. If the system cannot update the Asset Usage Trends Report, it logs the error but continues with the trend management action.  
  
Use Case Name: Manage User   
Use Case ID: UC-19   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The Database is available and contains user records.   
3. The Administrator has the necessary permissions to manage user accounts.   
4. The Email System is properly configured for sending user-related notifications.   
  
Postconditions:   
1. The user account is updated, created, or deleted in the Database based on the Administrator's action.   
2. Notifications are sent via the Email System to the affected user and relevant stakeholders if applicable.   
3. The system logs the management action performed by the Administrator.   
4. The user list in the system is updated to reflect the changes.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage User" feature.   
3. The system displays a list of existing users and provides options to create, edit, or delete a user.   
4. The Administrator selects an action (e.g., create a new user, modify an existing user's information, or delete a user account).   
5. If creating a new user, the Administrator enters the user details (e.g., name, email, role, permissions).   
6. If modifying an existing user, the system retrieves the current user information from the Database, and the Administrator makes the necessary changes.   
7. If deleting a user, the system prompts the Administrator for confirmation.   
8. The system validates the inputs and checks for any constraints (e.g., user dependencies, permissions).   
9. The system updates or modifies the user record in the Database.   
10. If the action is a deletion, the system removes the user account and any associated permissions.   
11. If the action is a modification or creation, the system sends a notification email to the affected user via the Email System.   
12. The system logs the management activity in the system.   
13. The system updates the user list to reflect the changes.   
14. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the input data is invalid (e.g., duplicate email, missing required fields), the system prompts the Administrator to correct the data.   
3. If the user account is referenced in other system records (e.g., asset permissions, audit logs), the system displays a warning and prevents deletion until dependencies are resolved.   
4. If the Email System is not available, the system logs the error and continues with the management action without sending the email notification.   
5. If the Administrator cancels the action, the system returns to the user management interface without making any changes.   
6. If the user to be modified or deleted is not found, the system displays an error message and prompts the Administrator to select a valid user.  
  
Use Case Name: Manage Asset Lifecycle   
Use Case ID: UC-20   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset is registered in the Database with a defined lifecycle.   
3. The Administrator has the necessary permissions to manage asset lifecycle stages.   
4. The Email System is properly configured for sending lifecycle-related notifications if required.   
  
Postconditions:   
1. The asset lifecycle stages are updated, added, or removed in the Database based on the Administrator's action.   
2. Notifications are sent via the Email System to relevant stakeholders if applicable.   
3. The system logs the management action performed by the Administrator.   
4. The Asset Lifecycle Report is updated to reflect the changes in the lifecycle stages.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage Asset Lifecycle" feature.   
3. The system displays a list of assets and their current lifecycle stages.   
4. The Administrator selects an asset for lifecycle management.   
5. The system retrieves the asset's lifecycle stages and associated events from the Database.   
6. The Administrator chooses an action (e.g., add a new lifecycle stage, modify an existing stage, remove a stage).   
7. The system validates the action and updates the asset lifecycle stages in the Database.   
8. If the action involves a status change, the system triggers a notification to the Email System.   
9. The Email System sends a confirmation email to the Administrator and relevant stakeholders.   
10. The system updates the Asset Lifecycle Report to include the new lifecycle information.   
11. The system logs the lifecycle management action in the system.   
12. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the selected asset is not found, the system displays an error message and prompts the Administrator to select a valid asset.   
3. If the lifecycle stage modification is invalid (e.g., conflicting stages, invalid status transitions), the system displays an error message and prompts for correction.   
4. If the Email System is not available, the system logs the error and continues with the lifecycle management without sending the email.   
5. If the Administrator cancels the action, the system returns to the lifecycle management interface without making any changes.   
6. If the Asset Lifecycle Report cannot be updated, the system logs the error but proceeds with the lifecycle stage modification in the Database.  
  
Use Case Name: Manage Asset Usage   
Use Case ID: UC-21   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. The asset has usage records stored in the Database.   
3. The Administrator has the necessary permissions to manage asset usage.   
4. The Email System is properly configured for sending usage-related notifications if required.   
  
Postconditions:   
1. The asset usage records are updated, added, or removed in the Database based on the Administrator's action.   
2. Notifications are sent via the Email System to relevant stakeholders if applicable.   
3. The system logs the management action performed by the Administrator.   
4. The Asset Usage Report is updated to reflect the changes in usage records.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage Asset Usage" feature.   
3. The system displays a list of assets and their current usage records.   
4. The Administrator selects an asset for usage management.   
5. The system retrieves the asset's usage records from the Database.   
6. The Administrator chooses an action (e.g., add a new usage record, modify an existing usage entry, delete a usage record).   
7. If adding a new usage record, the Administrator inputs the relevant usage data (e.g., usage time, user, activity type).   
8. If modifying an existing usage record, the Administrator updates the specific fields and submits the changes.   
9. If deleting a usage record, the system prompts the Administrator for confirmation.   
10. The system validates the inputs and checks for any constraints (e.g., deletion of critical usage data).   
11. The system updates the asset usage records in the Database.   
12. If the action involves a significant usage change, the system triggers a notification to the Email System.   
13. The Email System sends a confirmation email to the Administrator and relevant stakeholders.   
14. The system updates the Asset Usage Report to include the new or modified usage information.   
15. The system logs the usage management action in the system.   
16. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the selected asset is not found, the system displays an error message and prompts the Administrator to select a valid asset.   
3. If the usage record modification is invalid (e.g., conflicting data, incorrect format), the system displays an error message and prompts for correction.   
4. If the Email System is not available, the system logs the error and continues with the usage management without sending the email.   
5. If the Administrator cancels the action, the system returns to the usage management interface without making any changes.   
6. If the Asset Usage Report cannot be updated, the system logs the error but proceeds with the usage record modification in the Database.  
  
Use Case Name: Manage Report Analysis   
Use Case ID: UC-22   
Actors: Administrator, Database, Email System   
  
Preconditions:   
1. The system is accessible to the Administrator.   
2. Reports and analysis data are stored in the Database.   
3. The Administrator has the necessary permissions to manage report analysis.   
4. The Email System is properly configured for sending analysis-related notifications if required.   
  
Postconditions:   
1. The report analysis data is updated, reviewed, or exported in the Database based on the Administrator's action.   
2. Notifications are sent via the Email System to relevant stakeholders if applicable.   
3. The system logs the management action performed by the Administrator.   
4. The Asset Report or Analysis Report is updated to reflect any changes made to the analysis data.   
  
Main Flow:   
1. The Administrator logs in to the system.   
2. The Administrator navigates to the "Manage Report Analysis" feature.   
3. The system displays a list of available reports and analysis data.   
4. The Administrator selects a report for analysis management.   
5. The system retrieves the report's analysis data and settings from the Database.   
6. The Administrator chooses an action (e.g., update analysis parameters, review analysis results, export analysis data).   
7. If updating parameters, the Administrator modifies the criteria for the analysis (e.g., filters, time range, asset types).   
8. If reviewing results, the system displays the current analysis results (e.g., charts, summaries, trends).   
9. If exporting data, the system generates a file (e.g., CSV, Excel, PDF) containing the analysis data.   
10. The system validates the action and updates the report analysis data in the Database if necessary.   
11. The system logs the analysis management action in the system.   
12. If exporting, the system provides the file for download.   
13. If the Administrator chooses to send the analysis report via Email, the system sends it through the Email System.   
14. The system updates the relevant report or analysis document to reflect the changes.   
15. The system displays a success message to the Administrator.   
  
Alternative Flow:   
1. If the Database is unavailable, the system displays an error message and stops the process.   
2. If the selected report has no analysis data, the system displays a message indicating "No analysis data available."   
3. If the Administrator does not have permission to manage report analysis, the system displays an access denied message.   
4. If the selected report is not found, the system displays an error message and prompts the Administrator to select a valid report.   
5. If the Email System is not available and the Administrator chooses to send the report, the system logs the error and provides the report/export file for download instead.   
6. If the export file cannot be generated, the system logs the error and displays a message to the Administrator.   
7. If the system cannot update the report or analysis document, it logs the error but continues with the analysis management action.   
8. If the Administrator cancels the action, the system returns to the report analysis interface without making any changes.