# 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 details such as name, description, purchase date, status, category, and location.   
 Input: Asset details including Name, Description, PurchaseDate, Status, Category, and Location.   
 Output: A new Asset record in the database and an email confirmation sent to the Administrator.  
  
1.2 Asset Management Function   
 Function ID: FR-02   
 Description: Administrators can update or delete existing asset records in the system.   
 Input: Selected AssetID and updated or deletion request data.   
 Output: Updated or deleted Asset record in the database and an email notification to the Administrator.  
  
1.3 Asset Details View Function   
 Function ID: FR-03   
 Description: Administrators can view detailed information of a specific asset.   
 Input: Selected AssetID.   
 Output: Displayed Asset details including Name, Description, PurchaseDate, Status, Category, and Location.  
  
1.4 Asset Information Modification Function   
 Function ID: FR-04   
 Description: Administrators can modify the information of an existing asset, including name, description, status, category, and location.   
 Input: Selected AssetID and updated asset information.   
 Output: Updated Asset record in the database and an email notification to the Administrator.  
  
1.5 Asset Removal Function   
 Function ID: FR-05   
 Description: Administrators can remove an asset from the system after verifying it is not in use.   
 Input: Selected AssetID and confirmation of deletion.   
 Output: Removed Asset record from the database and an email notification to the Administrator.  
  
1.6 Asset Usage Assignment Function   
 Function ID: FR-06   
 Description: Administrators can assign an asset for usage to a specific user or department by providing usage details such as date, type, and description.   
 Input: Selected AssetID and usage assignment details (UsageDate, UsageType, UsageDescription, RequestStatus).   
 Output: Updated AssetUsage record in the database and an email notification to the Administrator.  
  
1.7 Asset Usage History View Function   
 Function ID: FR-07   
 Description: Administrators can view the usage history of a specific asset, including usage dates, types, and descriptions.   
 Input: Selected AssetID.   
 Output: Displayed AssetUsage history including UsageDate, UsageType, UsageDescription, and RequestStatus.  
  
1.8 Asset Usage Reporting Function   
 Function ID: FR-08   
 Description: Administrators can generate reports on asset usage data, including filtering by date range or asset selection.   
 Input: Filter criteria such as AssetID, date range, and report format (e.g., PDF, Excel).   
 Output: Generated AssetReport and an optional exported file or email notification to the Administrator.  
  
1.9 Email Notification Sending Function   
 Function ID: FR-09   
 Description: The system automatically sends email notifications to administrators based on system events such as asset registration, modification, or deletion.   
 Input: Event data including AssetID, action performed, and Administrator email address.   
 Output: EmailNotification record in the database and an email sent to the Administrator.  
  
1.10 Email Notification View Function   
 Function ID: FR-10   
 Description: Administrators can view a list of previously sent email notifications, including details such as title, content, send date, and recipient.   
 Input: None.   
 Output: List of EmailNotification records displayed to the Administrator.  
  
1.11 Administrator Account Management Function   
 Function ID: FR-11   
 Description: Administrators can create, update, or delete other administrator accounts in the system.   
 Input: Administrator details including Name, Email, Role, Department, and AdminID (for updates and deletions).   
 Output: Updated or deleted Administrator record in the database and an email notification to the Administrator.  
  
1.12 Administrator Profile Update Function   
 Function ID: FR-12   
 Description: Administrators can update their own profile information, such as name and contact details.   
 Input: Updated Administrator profile data including Name, Email, and Role.   
 Output: Updated Administrator record in the database and an email notification to the Administrator.  
  
1.13 Administrator Account Deletion Function   
 Function ID: FR-13   
 Description: Administrators can delete another administrator account after verifying it is not in use.   
 Input: Selected AdminID and confirmation of deletion.   
 Output: Deleted Administrator record from the database and an email notification to the Administrator.  
  
1.14 Asset Archive Log Management Function   
 Function ID: FR-14   
 Description: Administrators can view, filter, or export logs of assets that have been archived.   
 Input: Filter criteria such as ArchiveID, ArchiveDate, Reason, and AdminID.   
 Output: Displayed or exported AssetArchiveLog records including ArchiveDate, Reason, and AdminID who performed the action.  
  
1.15 Asset Usage Request Management Function   
 Function ID: FR-15   
 Description: Administrators can review and process asset usage requests by approving or rejecting them.   
 Input: Selected RequestID, approval or rejection decision, and optional reason for rejection.   
 Output: Updated AssetUsageRequest record in the database, updated AssetUsage status, and email notifications sent to the requestor and Administrator.  
  
1.16 Email Notification Configuration Function   
 Function ID: FR-16   
 Description: Administrators can configure email notification settings, such as enabling/disabling notifications, selecting event types, and specifying recipient preferences.   
 Input: Email notification configuration data including NotificationType, Enabled status, and Recipient email address.   
 Output: Updated EmailNotification settings in the database and an optional confirmation email to the Administrator.

# External Description

\*\*Chapter 2: External Interfaces\*\*  
  
This chapter describes the external interfaces of the system, including the interactions with users, hardware, software components, and communication channels. These interfaces are essential for ensuring the system can effectively exchange data and information with external entities.  
  
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### 2.1 User Interface Output  
  
The system provides a graphical user interface (GUI) for administrators to interact with asset and user data. All user interface outputs are designed to be intuitive and informative, ensuring administrators can efficiently manage the system.  
  
- \*\*Asset Details View (FR-03, FR-07)\*\*:   
 Displays detailed information of an asset, including \*\*Name\*\*, \*\*Description\*\*, \*\*PurchaseDate\*\*, \*\*Status\*\*, \*\*Category\*\*, \*\*Location\*\*, and \*\*Usage History\*\* (UsageDate, UsageType, UsageDescription, RequestStatus). This is presented in a structured format to allow easy reading and modification.  
  
- \*\*Email Notification View (FR-10)\*\*:   
 Displays a list of all sent email notifications to the administrator, including \*\*Title\*\*, \*\*Content\*\*, \*\*Send Date\*\*, and \*\*Recipient\*\*. This allows administrators to review the communication history of the system.  
  
- \*\*Administrator Profile and Account Management (FR-11, FR-12, FR-13)\*\*:   
 Provides forms and displays for creating, updating, or deleting administrator accounts. Information such as \*\*Name\*\*, \*\*Email\*\*, \*\*Role\*\*, \*\*Department\*\*, and \*\*AdminID\*\* is presented for modification and confirmation.  
  
- \*\*Asset Usage Reporting (FR-08)\*\*:   
 Presents the generated asset usage report to the administrator, including filtered data based on \*\*AssetID\*\*, \*\*Date Range\*\*, and \*\*Report Format\*\* (e.g., PDF, Excel). The interface allows the user to choose the format and initiate the export or send it via email.  
  
- \*\*Asset Archive Log Management (FR-14)\*\*:   
 Displays a list of archived asset logs, including \*\*ArchiveID\*\*, \*\*ArchiveDate\*\*, \*\*Reason\*\*, and \*\*AdminID\*\* of the administrator who performed the archive action. This allows administrators to review and export the archive logs.  
  
- \*\*Asset Usage Request Management (FR-15)\*\*:   
 Displays asset usage requests to the administrator, including \*\*RequestID\*\*, \*\*Approval or Rejection Decision\*\*, and \*\*Optional Rejection Reason\*\*. This interface allows administrators to process and manage requests.  
  
- \*\*Email Notification Configuration (FR-16)\*\*:   
 Provides a configuration interface for email notifications, allowing the administrator to set \*\*NotificationType\*\*, \*\*Enabled Status\*\*, and \*\*Recipient Preferences\*\*. This ensures that administrators can customize the notification behavior of the system.  
  
All user interfaces are accessible through a secure, web-based portal and are designed to be responsive to different screen sizes and devices.  
  
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### 2.2 Hardware Interface Output  
  
The system does not require direct interaction with external hardware devices. Therefore, there are no hardware interfaces defined in this section.  
  
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### 2.3 Software Interface Output  
  
The system interacts with the following software components and databases to manage asset data and notifications.  
  
#### 2.3.1 Database Interface  
  
The system interacts with a relational database to store and retrieve asset, user, and notification records. The following data is managed via the database:  
  
- \*\*Asset Table\*\*: Stores \*\*AssetID\*\*, \*\*Name\*\*, \*\*Description\*\*, \*\*PurchaseDate\*\*, \*\*Status\*\*, \*\*Category\*\*, \*\*Location\*\*.   
- \*\*AssetUsage Table\*\*: Records \*\*UsageDate\*\*, \*\*UsageType\*\*, \*\*UsageDescription\*\*, \*\*RequestStatus\*\*, and \*\*AssetID\*\*.   
- \*\*EmailNotification Table\*\*: Logs \*\*NotificationTitle\*\*, \*\*NotificationContent\*\*, \*\*SendDate\*\*, \*\*RecipientEmail\*\*, and \*\*AssetID\*\* or \*\*AdminID\*\*.   
- \*\*Administrator Table\*\*: Stores \*\*AdminID\*\*, \*\*Name\*\*, \*\*Email\*\*, \*\*Role\*\*, \*\*Department\*\*.   
- \*\*AssetArchiveLog Table\*\*: Logs \*\*ArchiveID\*\*, \*\*ArchiveDate\*\*, \*\*Reason\*\*, \*\*AdminID\*\*.   
- \*\*AssetUsageRequest Table\*\*: Records \*\*RequestID\*\*, \*\*AssetID\*\*, \*\*Requestor\*\*, \*\*RequestDate\*\*, \*\*ApprovalStatus\*\*, and \*\*RejectionReason\*\* (if applicable).  
  
The database is accessed through standard SQL queries or via an ORM (Object-Relational Mapping) layer to ensure data integrity and security. It is assumed that the database supports transactions and rollbacks to handle concurrent updates and deletions safely.  
  
#### 2.3.2 Email Notification Interface (FR-09, FR-10, FR-15, FR-16)  
  
The system sends and receives email notifications using an email service. The following interactions are defined:  
  
- \*\*Email Sending\*\*:   
 The system sends email notifications to administrators upon asset registration (FR-01), modification (FR-04), deletion (FR-05), and other configured events (FR-16). Each email contains a \*\*title\*\*, \*\*content\*\*, and references to \*\*AssetID\*\* or \*\*AdminID\*\*.  
  
- \*\*Email Configuration\*\*:   
 Administrators can configure email settings, including \*\*NotificationType\*\*, \*\*Enabled Status\*\*, and \*\*Recipient Preferences\*\* (FR-16). These settings are stored in the \*\*EmailNotification\*\* table and used to control the sending behavior of the system.  
  
- \*\*Email Viewing\*\*:   
 The system provides a list of previously sent emails, including \*\*Title\*\*, \*\*Content\*\*, \*\*Send Date\*\*, and \*\*Recipient\*\* (FR-10). This is retrieved from the \*\*EmailNotification\*\* table and displayed in the user interface.  
  
The email service is assumed to support standard protocols such as SMTP and to provide a REST API for sending and receiving messages. The system uses an email API to send and retrieve emails, ensuring compatibility with various email service providers.  
  
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### 2.4 Communication Interface Output  
  
The system communicates with external systems and users via network-based methods, primarily through email notifications.  
  
#### 2.4.1 Email Communication (FR-09, FR-10, FR-15, FR-16)  
  
- \*\*Functionality\*\*:   
 The system sends email notifications to administrators and users based on system events. These emails include confirmation of asset registration, modification, deletion, and usage requests.  
  
- \*\*Inputs\*\*:   
 - \*\*AssetID\*\* or \*\*AdminID\*\* for identifying the relevant asset or administrator.   
 - \*\*Action Performed\*\* (e.g., registration, modification, deletion).   
 - \*\*Recipient Email Address\*\* (e.g., administrator's email).   
 - \*\*Optional Reason for Rejection\*\* in the case of usage requests (FR-15).  
  
- \*\*Outputs\*\*:   
 - \*\*EmailNotification Record\*\* in the database.   
 - \*\*Email Message\*\* sent to the specified recipient.  
  
- \*\*Interaction Method\*\*:   
 The system uses an email API to send and receive messages. The API is responsible for formatting the email content, handling SMTP communication, and logging the email in the database.  
  
- \*\*Configuration\*\*:   
 Email notification settings can be configured by the administrator (FR-16). These settings include \*\*NotificationType\*\*, \*\*Enabled Status\*\*, and \*\*Recipient Preferences\*\*, which are used to control the email sending behavior.  
  
#### 2.4.2 Web Communication  
  
- \*\*Functionality\*\*:   
 The system is accessed via a web browser and communicates with the server using HTTP/HTTPS protocols. This includes user authentication, asset management, and report generation.  
  
- \*\*Inputs/Outputs\*\*:   
 - \*\*Asset Management\*\*: Asset data is sent from the client to the server for registration, modification, deletion, and viewing.   
 - \*\*Email Notification Configuration\*\*: Configuration data is sent from the client to the server for updating notification settings.   
 - \*\*Asset Reports\*\*: Reports are generated on the server and sent back to the client in the requested format (e.g., PDF, Excel).  
  
- \*\*Interaction Method\*\*:   
 The system uses RESTful APIs for all web-based communication. Each functional requirement corresponds to one or more API endpoints that accept input data and return structured output data in JSON or XML format.  
  
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### Summary of External Interfaces  
  
| Interface Type | Interface Description | Related Functional Requirements (FR) |  
|------------------------|---------------------------------------------------------------------------------------|-------------------------------------|  
| \*\*User Interface\*\* | Web-based GUI for managing assets, users, and notifications | FR-01, FR-02, FR-03, FR-04, FR-05, FR-06, FR-07, FR-08, FR-10, FR-11, FR-12, FR-13, FR-14, FR-15, FR-16 |  
| \*\*Software Interface\*\* | Interaction with the relational database for storing and retrieving asset and user data | FR-01, FR-02, FR-03, FR-04, FR-05, FR-06, FR-07, FR-08, FR-10, FR-11, FR-12, FR-13, FR-14, FR-15 |  
| \*\*Email Interface\*\* | Sending and receiving email notifications via an email API | FR-09, FR-10, FR-15, FR-16 |  
| \*\*Web Communication\*\* | RESTful API for web-based user interactions and data exchange | All FRs |  
  
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This chapter ensures that all external interfaces are clearly defined and that the system can effectively communicate with users, databases, and external services. It provides a foundation for developers to implement the system with accurate data handling and user interaction.