# Functional Requirement

# Chapter 1: Functional Requirements  
  
## 1.1 Asset Registration Function   
\*\*Function ID:\*\* FR-01   
\*\*Description:\*\* Allows users with proper permissions to register new assets in the system.   
\*\*Input:\*\* Asset details (Name, Description, CategoryID, Location, PurchaseDate).   
\*\*Output:\*\* A new Asset record in the database with an assigned AssetID.  
  
## 1.2 View Asset Information Function   
\*\*Function ID:\*\* FR-02   
\*\*Description:\*\* Allows users with proper permissions to view detailed information about a specific asset.   
\*\*Input:\*\* Asset identifier (e.g., Name, AssetID, CategoryID).   
\*\*Output:\*\* Displayed asset details (Name, Description, CategoryID, Status, Location, PurchaseDate, Usage History).  
  
## 1.3 Modify Asset Details Function   
\*\*Function ID:\*\* FR-03   
\*\*Description:\*\* Enables users with proper permissions to update the information of an existing asset.   
\*\*Input:\*\* Asset identifier and updated details (e.g., Name, Description, CategoryID, Location).   
\*\*Output:\*\* Updated Asset record in the database, including a new AssetModification entry.  
  
## 1.4 Remove Asset Function   
\*\*Function ID:\*\* FR-04   
\*\*Description:\*\* Allows users with proper permissions to remove an asset from the system.   
\*\*Input:\*\* Asset identifier and confirmation of removal.   
\*\*Output:\*\* Asset is deleted from the database, and a new AssetDeletion record is created.  
  
## 1.5 User Registration Function   
\*\*Function ID:\*\* FR-05   
\*\*Description:\*\* Enables administrators to create new user accounts.   
\*\*Input:\*\* New user details (Name, Email, DepartmentID, Role).   
\*\*Output:\*\* A new User record in the database with a UserID and associated UserRegistration entry.  
  
## 1.6 Assign User Permissions Function   
\*\*Function ID:\*\* FR-06   
\*\*Description:\*\* Allows administrators to assign specific permissions to users based on their role or department.   
\*\*Input:\*\* User identifier and selected Permission(s).   
\*\*Output:\*\* Updated User record in the database and a new PermissionAssignment entry.  
  
## 1.7 Modify User Information Function   
\*\*Function ID:\*\* FR-07   
\*\*Description:\*\* Enables administrators to update the details of an existing user.   
\*\*Input:\*\* User identifier and updated details (Name, Email, DepartmentID, Role).   
\*\*Output:\*\* Updated User record in the database, including a new UserModification entry.  
  
## 1.8 Remove User Function   
\*\*Function ID:\*\* FR-08   
\*\*Description:\*\* Allows administrators to delete a user from the system.   
\*\*Input:\*\* User identifier and confirmation of removal.   
\*\*Output:\*\* User is deleted from the database, and a new UserDeletion record is created.  
  
## 1.9 Administrator Login Function   
\*\*Function ID:\*\* FR-09   
\*\*Description:\*\* Authenticates administrators and grants access to system management functions based on their assigned permissions.   
\*\*Input:\*\* Admin username and password.   
\*\*Output:\*\* Administrator login status and display of the main interface/dashboard.  
  
## 1.10 Manage Departments Function   
\*\*Function ID:\*\* FR-10   
\*\*Description:\*\* Enables administrators to create, update, or remove departments.   
\*\*Input:\*\* Department identifier and updated or new details (Name, Description).   
\*\*Output:\*\* Updated or deleted Department record in the database, including DepartmentMembership updates if necessary.  
  
## 1.11 Add Department Function   
\*\*Function ID:\*\* FR-11   
\*\*Description:\*\* Allows administrators to create a new department.   
\*\*Input:\*\* Department name and description.   
\*\*Output:\*\* A new Department record in the database with an assigned DepartmentID.  
  
## 1.12 Remove Department Function   
\*\*Function ID:\*\* FR-12   
\*\*Description:\*\* Allows administrators to delete a department and reassign or remove associated users and assets.   
\*\*Input:\*\* Department identifier and confirmation of removal.   
\*\*Output:\*\* Department record is deleted from the database, and DepartmentMembership entries are updated.  
  
## 1.13 Create Asset Category Function   
\*\*Function ID:\*\* FR-13   
\*\*Description:\*\* Enables administrators to define new asset categories.   
\*\*Input:\*\* Category name, description, and parent category identifier (if applicable).   
\*\*Output:\*\* A new AssetCategory record in the database with an assigned CategoryID.  
  
## 1.14 Modify Asset Category Function   
\*\*Function ID:\*\* FR-14   
\*\*Description:\*\* Allows administrators to update the details of an existing asset category.   
\*\*Input:\*\* Asset category identifier and updated details (Name, Description).   
\*\*Output:\*\* Updated AssetCategory record in the database and a new CategoryManagement entry.  
  
## 1.15 Remove Asset Category Function   
\*\*Function ID:\*\* FR-15   
\*\*Description:\*\* Enables administrators to delete an asset category and reassign or remove associated assets.   
\*\*Input:\*\* Asset category identifier and confirmation of removal.   
\*\*Output:\*\* AssetCategory record is deleted from the database, and Asset records are updated accordingly.  
  
## 1.16 View Asset Category Function   
\*\*Function ID:\*\* FR-16   
\*\*Description:\*\* Allows users or administrators to view details of an asset category.   
\*\*Input:\*\* Asset category identifier.   
\*\*Output:\*\* Displayed category details (Name, Description, ParentCategoryID, associated Assets).  
  
## 1.17 Manage Permission Assignment Function   
\*\*Function ID:\*\* FR-17   
\*\*Description:\*\* Enables administrators to assign, modify, or revoke permissions for a user.   
\*\*Input:\*\* User identifier and Permission(s) to be assigned, modified, or revoked.   
\*\*Output:\*\* Updated PermissionAssignment record in the database and associated AuditLog entry.  
  
## 1.18 Record Asset Usage Function   
\*\*Function ID:\*\* FR-18   
\*\*Description:\*\* Allows users or administrators to log the usage of an asset.   
\*\*Input:\*\* Asset identifier and usage details (UsageDate, UsageDuration, Purpose).   
\*\*Output:\*\* A new UsageRecord in the database and an AuditLog entry for the usage action.  
  
## 1.19 View Usage Records Function   
\*\*Function ID:\*\* FR-19   
\*\*Description:\*\* Enables users or administrators to view the usage history of a specific asset.   
\*\*Input:\*\* Asset identifier.   
\*\*Output:\*\* Displayed usage records (UsageDate, UsageDuration, Purpose, UserID).  
  
## 1.20 Modify Usage Records Function   
\*\*Function ID:\*\* FR-20   
\*\*Description:\*\* Allows users or administrators to update existing asset usage records.   
\*\*Input:\*\* UsageRecord identifier and updated details (UsageDate, UsageDuration, Purpose).   
\*\*Output:\*\* Updated UsageRecord in the database and an AuditLog entry for the modification.  
  
## 1.21 Delete Usage Records Function   
\*\*Function ID:\*\* FR-21   
\*\*Description:\*\* Enables administrators or users with permissions to delete a specific usage record.   
\*\*Input:\*\* UsageRecord identifier and confirmation of deletion.   
\*\*Output:\*\* UsageRecord is removed from the database and an AuditLog entry is created.  
  
## 1.22 View Audit Log Function   
\*\*Function ID:\*\* FR-22   
\*\*Description:\*\* Allows users or administrators with proper permissions to view audit logs.   
\*\*Input:\*\* Filtering criteria (e.g., timestamp range, affected entity, action type).   
\*\*Output:\*\* Displayed audit log entries (LogID, UserID, AssetID, RecordID, Action, Timestamp, Details).  
  
## 1.23 Generate Audit Report Function   
\*\*Function ID:\*\* FR-23   
\*\*Description:\*\* Enables administrators to generate and optionally send audit reports.   
\*\*Input:\*\* Report generation parameters (e.g., time range, action type).   
\*\*Output:\*\* A structured audit report and an AuditLog entry for the report generation.  
  
## 1.24 Send Email Notification Function   
\*\*Function ID:\*\* FR-24   
\*\*Description:\*\* Allows users or administrators to send email notifications to other users for various system events.   
\*\*Input:\*\* Recipient identifier, email content or template, and event details.   
\*\*Output:\*\* EmailNotification record in the database and an AuditLog entry for the email action.

# External Description

# Chapter 2: External Interfaces  
  
## 2.1 User Interface Output  
  
The system interacts with users through a graphical user interface (GUI), allowing for the input and display of asset, user, and department information, as well as the execution of administrative actions. The following user interface outputs are defined for the system:  
  
- \*\*Asset Registration Interface (FR-01):\*\*   
 Displays a form for entering asset details such as Name, Description, CategoryID, Location, and PurchaseDate. After submission, the system confirms the successful creation of a new asset with an assigned AssetID.  
  
- \*\*View Asset Information Interface (FR-02):\*\*   
 Provides a detailed view of an asset's information, including Name, Description, CategoryID, Status, Location, PurchaseDate, and Usage History. Users can search for an asset using its Name, AssetID, or CategoryID.  
  
- \*\*Modify Asset Details Interface (FR-03):\*\*   
 Allows users to edit asset fields such as Name, Description, CategoryID, and Location. Upon saving, the system updates the Asset record and creates a new AssetModification entry.  
  
- \*\*Remove Asset Interface (FR-04):\*\*   
 Presents a confirmation dialog for asset removal. After confirmation, the system deletes the asset and logs the deletion with an AssetDeletion record.  
  
- \*\*User Registration Interface (FR-05):\*\*   
 Offers a form for administrators to input new user details (Name, Email, DepartmentID, Role). A success message is displayed once a new user is created, including a UserID.  
  
- \*\*Assign User Permissions Interface (FR-06):\*\*   
 Enables administrators to select a user and assign specific permissions. The system updates the User record and logs the permission assignment in the PermissionAssignment table.  
  
- \*\*Modify User Information Interface (FR-07):\*\*   
 Provides fields for administrators to update user details such as Name, Email, DepartmentID, and Role. The system reflects these changes in the User record and logs the modification in a UserModification entry.  
  
- \*\*Remove User Interface (FR-08):\*\*   
 Displays a confirmation prompt for user deletion. Once confirmed, the system removes the user and logs the action in a UserDeletion record.  
  
- \*\*Administrator Login Interface (FR-09):\*\*   
 Presents a login form for administrators, accepting a username and password. Upon successful authentication, the system grants access to the main dashboard or interface.  
  
- \*\*Department Management Interface (FR-10, FR-11, FR-12):\*\*   
 Includes functionality for creating, updating, and deleting departments. The system reflects these changes in the Department record and updates DepartmentMembership as necessary.  
  
- \*\*Asset Category Management Interface (FR-13, FR-14, FR-15, FR-16):\*\*   
 Enables administrators to define, modify, or delete asset categories. The system updates the AssetCategory record and logs the action in a CategoryManagement entry.  
  
- \*\*Permission Assignment Management Interface (FR-17):\*\*   
 Provides a mechanism for administrators to assign, modify, or revoke permissions for a user. The system updates the PermissionAssignment record and logs the change in an AuditLog.  
  
- \*\*Asset Usage Logging Interface (FR-18):\*\*   
 Allows users or administrators to log the usage of an asset by entering UsageDate, UsageDuration, and Purpose. The system creates a new UsageRecord and logs the action in the AuditLog.  
  
- \*\*View Usage Records Interface (FR-19):\*\*   
 Displays a list of all usage records for a given asset, including UsageDate, UsageDuration, Purpose, and the associated UserID.  
  
- \*\*Modify Usage Records Interface (FR-20):\*\*   
 Provides a form for users or administrators to update an existing usage record. The system modifies the UsageRecord and logs the change in the AuditLog.  
  
- \*\*Delete Usage Records Interface (FR-21):\*\*   
 Presents a confirmation prompt for deleting a usage record. After confirmation, the system removes the record and logs the deletion in the AuditLog.  
  
- \*\*Audit Log Interface (FR-22):\*\*   
 Enables users or administrators to view audit logs with filtering options such as timestamp range, affected entity, and action type. The system displays a list of audit log entries including LogID, UserID, AssetID, RecordID, Action, Timestamp, and Details.  
  
- \*\*Audit Report Generation Interface (FR-23):\*\*   
 Provides a form for administrators to specify report generation parameters such as time range and action type. The system generates a structured audit report and logs the report generation in the AuditLog.  
  
- \*\*Email Notification Interface (FR-24):\*\*   
 Allows users or administrators to compose and send email notifications for system events. The system logs the email action in the AuditLog and stores the details in the EmailNotification table.  
  
## 2.2 Hardware Interface Output  
  
This system does not directly interact with external hardware devices. There are no hardware interface outputs defined at this stage. However, if future integration with hardware (e.g., asset tracking devices or scanners) is required, it will be specified in a subsequent revision of this document.  
  
## 2.3 Software Interface Output  
  
The system interacts with external software through its database and potentially via API calls for audit logging and email notifications. The following software interfaces are defined:  
  
- \*\*Database Interface:\*\*   
 The system communicates with a relational database to store and retrieve data. The database contains the following tables:   
 - \*\*Asset:\*\* Stores asset information (Name, Description, CategoryID, Location, PurchaseDate, Status).   
 - \*\*User:\*\* Maintains user data (Name, Email, DepartmentID, Role, UserID).   
 - \*\*Department:\*\* Holds department details (Name, Description, DepartmentID).   
 - \*\*AssetCategory:\*\* Defines asset categories (Name, Description, ParentCategoryID, CategoryID).   
 - \*\*PermissionAssignment:\*\* Tracks permissions assigned to users.   
 - \*\*UsageRecord:\*\* Logs asset usage (UsageDate, UsageDuration, Purpose, UserID, AssetID).   
 - \*\*AuditLog:\*\* Records system actions and changes (LogID, UserID, AssetID, RecordID, Action, Timestamp, Details).   
 - \*\*EmailNotification:\*\* Stores information about sent email notifications (RecipientID, Content, Timestamp, EventType).  
  
 The system performs operations such as inserting, updating, and deleting records in these tables. Developers must ensure that the database schema aligns with the functional requirements.  
  
- \*\*Email Notification Software Interface (FR-24):\*\*   
 The system sends email notifications via an external email service. The interface requires the following inputs:   
 - Recipient identifier (e.g., UserID or Email)   
 - Email content or template   
 - Event details (e.g., action performed, timestamp)   
 The system outputs an email message with the specified content and logs the action in the AuditLog and EmailNotification tables.  
  
- \*\*Audit Log Software Interface (FR-22, FR-23):\*\*   
 The system maintains an AuditLog table to record all actions and changes. The AuditLog entry includes:   
 - LogID   
 - UserID   
 - AssetID (if applicable)   
 - RecordID (if applicable)   
 - Action (e.g., register, modify, delete)   
 - Timestamp   
 - Details (description of the action)   
 This interface is used for internal tracking and reporting.  
  
- \*\*External API Interface (for Audit Report Generation, FR-23):\*\*   
 If the system is to generate reports in a structured format (e.g., PDF, Excel), it may interact with a third-party API or library for report generation. The system provides the data to be included in the report and receives a file output from the API. The interface must support input parameters such as time range and action type.  
  
## 2.4 Communication Interface Output  
  
The system communicates with external entities via network-based protocols for audit logging, email notifications, and potential remote access.  
  
- \*\*Email Communication Interface (FR-24):\*\*   
 The system sends email notifications using a configured SMTP server or email service. The communication interface handles the transmission of email content, recipient information, and event details. The system must ensure secure and reliable email delivery and log the communication in the AuditLog and EmailNotification tables.  
  
- \*\*Web Communication Interface (for Audit Report Generation, FR-23):\*\*   
 If the system is to generate reports in a structured format (e.g., PDF, Excel), it may communicate with a web service or API to perform the report generation. The system sends the required data and formatting instructions to the service and receives the completed report file as a response.  
  
- \*\*Audit Log Communication Interface (FR-22, FR-23):\*\*   
 The system logs all actions in the AuditLog table, which can be accessed via a web-based interface or API. Users or administrators can query the AuditLog using filtering criteria such as timestamp range, affected entity, and action type. This allows for remote auditing and monitoring of system activities.  
  
- \*\*Remote Access Communication Interface (FR-09):\*\*   
 The system supports remote access via web or mobile interfaces, allowing administrators to log in and perform system management functions. The interface must be secure, using encryption and authentication protocols to protect user credentials and data integrity.  
  
---  
  
This chapter provides a comprehensive overview of the external interfaces the system must support. Each interface is clearly defined and described in terms of its role, input/output, and interaction method. Developers should use this information to ensure the system integrates seamlessly with its environment and meets all functional and non-functional requirements.