Project Design Phase-II

Data Flow Diagram & User Stories

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Team ID	NM2025TMID05757
Project Name	Lease Management System
Maximum Marks	4 Marks

Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It can be manual, automated or a combination of both. It shows how information enters and leaves the system, what changes the information, and where data is stored.

For the project "Lease Management System", Data Flow Diagrams (DFDs) illustrate how user deletion requests are processed within the system. The DFD shows the interaction between the admin, the system, and the incident database to validate whether a user is assigned to any active matters. If a user is linked to an incident, the system blocks deletion and sends a notification explaining why the user cannot be deleted.

Example Data Flow Diagram

Context Diagram (Level 0 DFD)

The context diagram shows the Lease Management System as a single process with external entities:

External Entities:

- Admin/Manager
- Tenant
- Property Owner
- Payment Gateway

Data Flows:

- Property & Tenant Information → System
- Lease Contracts & Approvals → System
- Payment Records → System
- Notifications & Reports ← System

Level 1 DFD - Lease Management System

Main Processes:

1. **Manage Properties**: Admin creates and updates property records (property details, address, type, sqft)
2. **Manage Tenants**: Admin adds, edits tenant information (name, email, phone, status)
3. **Create Lease Contracts**: Manager initiates lease agreements linking tenants to properties
4. **Process Payments**: System records payment data and validates payment status
5. **Send Notifications**: Automated email alerts for approvals, payments, and lease expiry
6. **Generate Reports**: Dashboard and analytics for occupancy, revenue, and payment tracking

Data Stores:

- Property Database
- Tenant Database
- Lease Database
- Payment Database

Data Flow Example:

- Admin → Property Info → Manage Properties → Property Database
- Tenant → Payment Info → Process Payments → Payment Database → Email Notification → Tenant
- Manager → Lease Request → Create Lease → Lease Database → Approval Notification → Manager

Level 2 DFD - Payment Processing Module

Sub-processes:

1. **Validate Payment Data**: Check tenant ID, property ID, amount, and payment date
2. **Record Payment**: Store payment record in Payment Database
3. **Update Payment Status**: Mark as "Paid" or "Not Paid"
4. **Trigger Notification**: Send confirmation email to tenant if payment successful
5. **Generate Payment Report**: Create payment history for tenant

Data Flows:

- Tenant submits payment → Validate Payment Data → Check Tenant & Property Database
- Valid payment → Record Payment → Payment Database
- Payment successful → Update Status → Trigger Email Notification → Tenant receives confirmation

User Stories

User stories define what different users need from the system in simple, goal-focused language. In this project, they help ensure the system blocks unnecessary operations (like user deletion when a user is assigned to an incident) and fulfills stakeholder needs effectively.

User Stories Table

User Type	Functional Requirement	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Administrator	User Management (Delete Prevention)	USN-1	As an admin, I want to create a user from the system	The system should allow account only if the user is NOT assigned to any incident	High	Sprint-1
Property Manager	Lease Contract Creation	USN-2	As a property manager, I want to create lease contracts by assigning a tenant to a property	The system restricts lease creation if a tenant is already assigned to an active lease for a property	High	Sprint-1
Tenant	Alert Notifications	USN-3	As a tenant, I want to receive an alert when my lease is close to expiry or when payment is due	The system sends email notifications before lease expiry and payment deadlines	Medium	Sprint-2

Detailed User Stories

USN-1: Prevent User Deletion if Assigned to an Incident

As an admin, I want to create a user from the system

Task Description:
An administrator attempts to delete a user account. The system checks if the user is currently assigned to any active property, tenant record, or lease agreement. If the user is linked to any active record, the system prevents deletion and displays an error message: *"User cannot be deleted as they are assigned to active records."*

Acceptance Criteria:

- The system validates user assignment status before deletion
- If assigned, deletion is blocked and an appropriate message is shown
- If not assigned, user is successfully deleted

Priority: High
Sprint: Sprint-1

USN-2: Lease Contract Creation with Validation

As a property manager, I want to create lease contracts by assigning a tenant to a property

Task Description:
A property manager initiates a new lease agreement. The system validates that the property does not already have an active lease assigned. If validation fails, the system blocks lease creation and notifies the manager.

Acceptance Criteria:

- Only one active lease per property is allowed
- Validation occurs before lease is saved
- Error message displayed if property already has active lease

Priority: High
Sprint: Sprint-1

USN-3: Tenant Alert Notifications

As a tenant, I want to receive an alert when my lease is close to expiry or when payment is due

Task Description:
The system automatically sends email notifications to tenants 30 days before lease expiration and on the 1st of every month for payment reminders.

Acceptance Criteria:

- Email sent automatically based on scheduled triggers
- Email contains lease/payment details
- Tenant receives notification at registered email address

Priority: Medium
Sprint: Sprint-2

Benefits of DFD and User Stories

Data Flow Diagrams:

- Provide a clear visual representation of system processes
- Identify data inputs, outputs, and storage requirements
- Help stakeholders understand system workflows

User Stories:

- Focus on user needs and business value
- Written in plain language for easy understanding
- Serve as basis for development and testing

References

- https://www.visual-paradigm.com/tutorials/data-flow-diagram-example-video-rental-system.jsp
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- https://www.cs.uct.ac.za/mit_notes/software/pdfs/Chp06.pdf
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