

DataBase Foundations

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Workshop No. 1- Data Base Desing

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1. Introduction

Welcome to the Database Design Document for the Apartment Complex. This document outlines the comprehensive design and structure of the database system that will support the management and operational needs of the apartment complex. The purpose of this design is to provide a robust, scalable, and efficient database solution that ensures seamless operations, accurate data management, and enhanced decision-making capabilities.

2. Project Overview

2.1. Objective

The objective of this project is to design a database system that will handle various aspects of apartment complex management, including tenant information, lease agreements, maintenance requests, billing, and property management. This system aims to streamline operations, improve data accessibility, and facilitate efficient management of the apartment complex.

2.2 questions and user stories

2.2.1 interviews with Students

To gain a clear understanding of what students want in an apartment complex app, I will ask key questions such as:

What features do you consider most important for an apartment management application?

What aspects would enhance your experience as a resident in an apartment complex?

How would you like to interact with the management of the complex through the app?

What type of information would you like to have easily accessible?

Are there any additional features you would like to see that are not included in the basic functionalities?

2.2.2

1) As a resident, I want to receive notifications about events and scheduled maintenance so that I can stay informed about activities and maintenance that may affect my daily life.

2) As a resident, I want to report maintenance issues or request repairs so that I can ensure any problems are resolved quickly.

3) As a resident, I want to view and update my personal and contact information so that I can keep my information current and receive important communications without issues.

4) As a resident, I want to view the history of my payments and reservations so that I can keep track of my expenses and use of facilities.

5) As a resident, I want to have access to a neighbor directory so that I can connect with my neighbors if I wish.

6) As a resident, I want to have a chat or messaging feature with the administration so that I can communicate directly with the complex's staff to resolve any concerns.

7) As a resident, I want to view a calendar of complex events so that I can participate in community activities and stay informed about what's happening in the complex.

8) As a resident, I want to receive personalized recommendations for events and services so that I can discover new opportunities and services that match my interests and needs.

9) As a resident, I want to access a Frequently Asked Questions (FAQ) section and guides so that I can resolve common questions and obtain useful information without needing to contact the administration.

10) As a resident, I want to participate in surveys or provide feedback on services and events so that I can contribute to improving the quality of life in the complex and express my opinions.

2.3 functionalities

2.3.1) Minimum Required Functionalities

1. List of Blocks and Apartments
2. Payment Processing
3. Common Space Reservations

2.3.2) Additional Functionalities Based on User Stories

1. As a resident, I want to receive notifications about events and scheduled maintenance so that I can stay informed about activities and maintenance that may affect my daily life.
2. As a resident, I want to report maintenance issues or request repairs so that I can ensure any problems are resolved quickly.
3. As a resident, I want to view and update my personal and contact information so that I can keep my information current and receive important communications without issues.
4. As a resident, I want to view the history of my payments and reservations so that I can keep track of my expenses and use of facilities.
5. As a resident, I want to have access to a neighbor directory (if possible and with privacy permissions) so that I can connect with my neighbors if I wish.
6. As a resident, I want to have a chat or messaging feature with the administration so that I can communicate directly with the complex's staff to resolve any concerns.
7. As a resident, I want to view a calendar of complex events so that I can participate in community activities and stay informed about what's happening in the complex.
8. As a resident, I want to receive personalized recommendations for events and services so that I can discover new opportunities and services that match my interests and needs.
9. As a resident, I want to access a Frequently Asked Questions (FAQ) section and guides so that I can resolve common questions and obtain useful information without needing to contact the administration.
10. As a resident, I want to participate in surveys or provide feedback on services and events so that I can contribute to improving the quality of life in the complex and express my opinions.

2.4) Technical Decisions:

2.4.1 Database Design:

Use a relational database to manage entities such as blocks, apartments, residents, payments, reservations, maintenance requests, notifications, and events. Ensure normalization to reduce redundancy and improve data integrity.

2.4.2 Security:

Implement encryption for sensitive data, secure authentication mechanisms, and comply with data protection regulations such as GDPR or CCPA.

2.4.3 Scalability:

Design the system architecture to handle increasing loads efficiently. Consider using cloud services for scalable storage and computing resources.

2.4.4 User Interface:

Design a user-friendly interface that is intuitive and accessible. Use responsive design principles to ensure compatibility with various devices.

2.4.5 Integration:

Integrate with external services such as payment gateways, email systems, and calendar services to provide a seamless user experience.

2.4.6

Optimize application performance by implementing efficient query processing, caching mechanisms, and load balancing.

2.5) Design Decisions:

2.5.1 Data Privacy:

Incorporate features that allow users to manage their privacy settings and consent to share personal information.

2.5.2 User Experience:

Focus on creating a clean and intuitive user interface that simplifies interactions and minimizes the learning curve for residents.

2.5.3 Notifications Management:

2.5.4 Allow users to customize their notification preferences and ensure notifications are relevant and timely.

Support and Help:

2.5.5 Provide accessible support options, including FAQs, user guides, and contact forms for further assistance.

3) 10 steps of ontological design

1,2,3)

A) Building Management System

1)Block

BlockID

BlockName

Location

Description

2)Apartment

ApartmentID

UnitNumber

Size

Features

AvailabilityStatus

A) Financial Management System

3)Payment

PaymentID

Amount

PaymentDate

PaymentMethod

Description

4)Billing

Bill_ID

AmountDue

DueDate

Status

B) Notifications Management System

5)Notification

Notification

Type (e.g., Event, Maintenance, Update)

Message

Date

Status

6)NotificationSettings

SettingID

NotificationType

PreferredChannel (e.g., Email, SMS, In-App)

Frequency

C) Maintenance Request System

7)MaintenanceRequest

RequestID

IssueDescription

RequestDate

Status

ResolutionDate

Priority

8)MaintenanceLog

RequestID

IssueDescription

RequestDate

Status

ResolutionDate

Priority

D) Resident Profile Management System

9)Resident

ResidentID

Name

Address

PhoneNumber

Email

EmergencyContact

10)ProfileUpdateLog

UpdateID

UpdateType

OldValue

NewValue

UpdateDate

E) History Management System

11)PaymentHistory

PaymentID

Amount

PaymentDate

Description

F) Neighbor Directory System

12)NeighborDirectory

Name

ApartmentNumber

ContactInformation

VisibilitySettings (e.g., Public, Private)

G) Communication System

13)ChatSession

ChatID

StartDate

14) ChatMessage

MessageID

MessageContent

Timestamp

H) Event Management System

15) Event

EventID

EventName

EventDate

StartTime

EndTime

Location

Description

I) Recommendations Engine

16) Recommendation

RecommendationID

RecommendationScore

RecommendationDate

J) FAQ and Guides

17) FAQ

FAQID

Question

Answer

Category

18) Guide

GuideID

Title

Content

Category

K) Feedback Management System

19)Survey

SurveyID

SurveyTitle

SurveyDescription

CreationDate

20)SurveyResponse

ResponseID

ResponseContent

ResponseDate

21)Feedback

FeedbackID

FeedbackType






























FeedbackContent

FeedbackDate

4)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1		y	x																		
2	y		y																		
3	x	y																			
4	x	y	y																		
5	x	y	y	y																	
6	x	y	x	x	y																
7	y	y	x	x	x	x															
8	y	y	y	y	y	x	y														
9	y	y	y	y	y	x	y	x													
10	x	x	x	x	x	x	x	x	y												
11	x	y	y	x	x	x	x	x	y	x											
12	y	y	x	x	x	x	x	x	y	x	x										
13	y	y	x	x	x	x	x	x	x	x	x	y									
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15	y	y	x	x	y	x	x	x	x	x	x	y	x	x							
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20	x	y	x	x	x	x	x	x	y	x	x	x	x	x	x	x	y	x	y		
21	y	y	x	x	x	x	x	x	y	x	x	x	y	x	y	y	x	x	x	x	

5)

e1		e2	e2		e3	e3		e4	e7	e9	e13	e21
e1		e7	e2		e4	e3		e5	e9	e10	e15	e16
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			e2		e21	e7		e8	e13	e19		

In process....