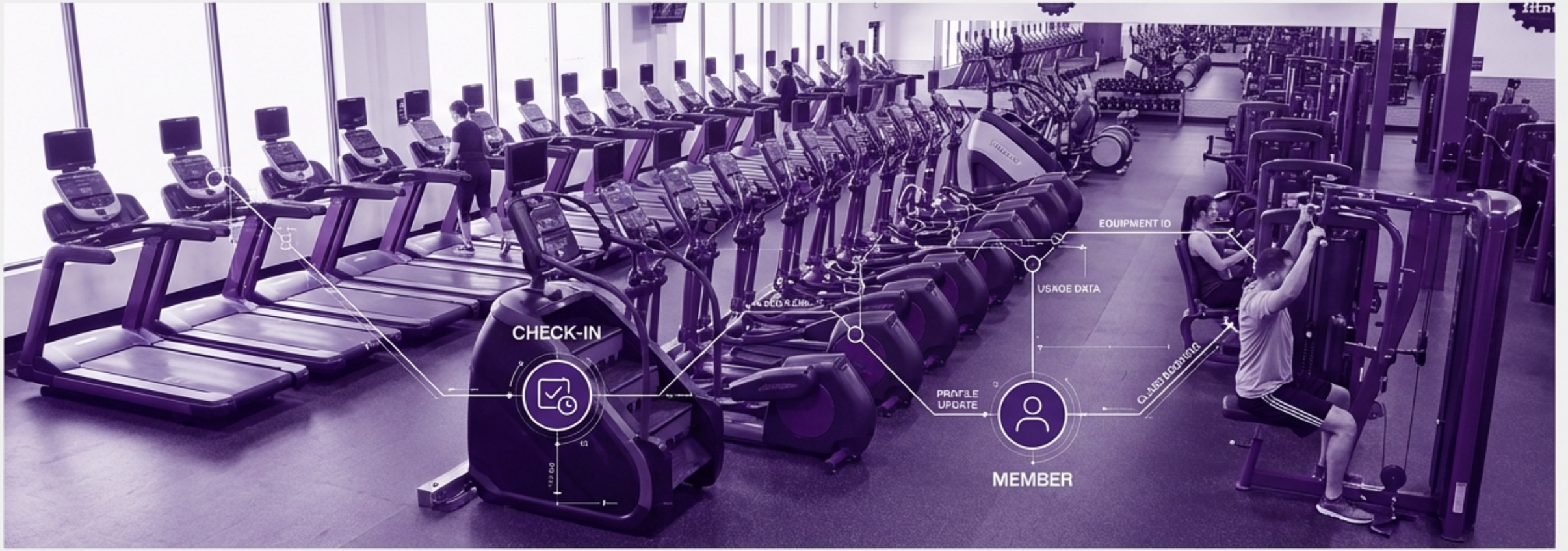

DATABASE DESIGN IN THE REAL WORLD

Architecting the Member Management System for a Planet Fitness Franchise

CASE STUDY: HARRISBURG FRANCHISE | SCENARIO: OPERATIONAL TURNAROUND

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The Crisis at the Harrisburg Franchise

Jen Martino, the new Regional Operations Manager, inherited an operational mess. The current “system” is a fragile mix of disconnected spreadsheets and paper logs.

Ghost Members

Who hasn't visited in 90 days? Impossible to answer. No engagement tracking means revenue leakage.

Guest Abuse

One non-member visited 11 times last month. Staff cannot cross-reference paper logs to enforce the 1-visit limit.

Blind Spots

Classic members ($15/mo) roaming to other gyms against policy. Front desk lacks data to validate "Home Gym" status.

Staffing Guesswork

Scheduling based on “vibes” not volume. No check-in timestamp data to prove overstaffing.

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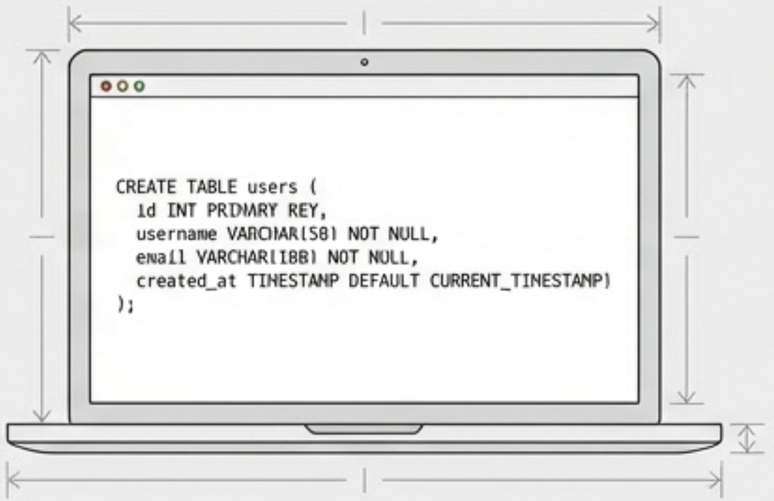
Stop. Don’t Open SQL Yet.

A database designer is a translator. You cannot translate business needs into data structures if you don’t speak the language of the business first.

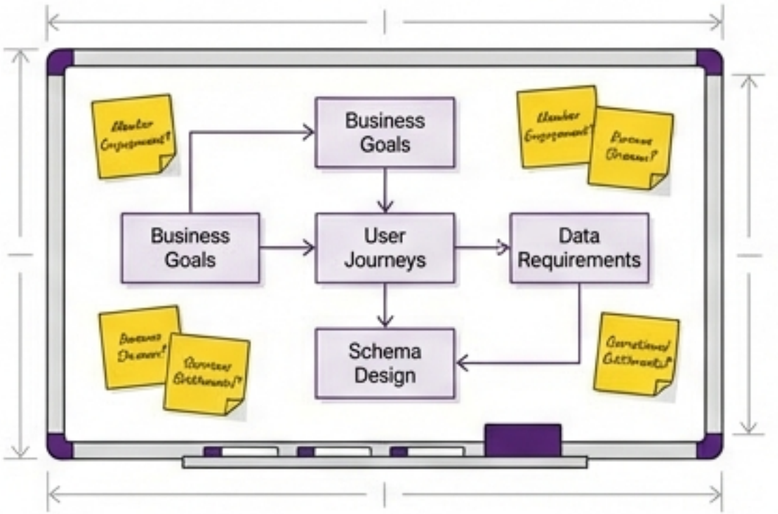
The Rookie Mindset



- Starts with Tables
- Focuses on Data Types

→ Result: Technically functional, Operationally broken.

The Pro Mindset



- Starts with Context
- Focuses on Business Rules

→ Result: Solves the human problem.

Insight: You don’t need to run the business, but you must understand how it operates.

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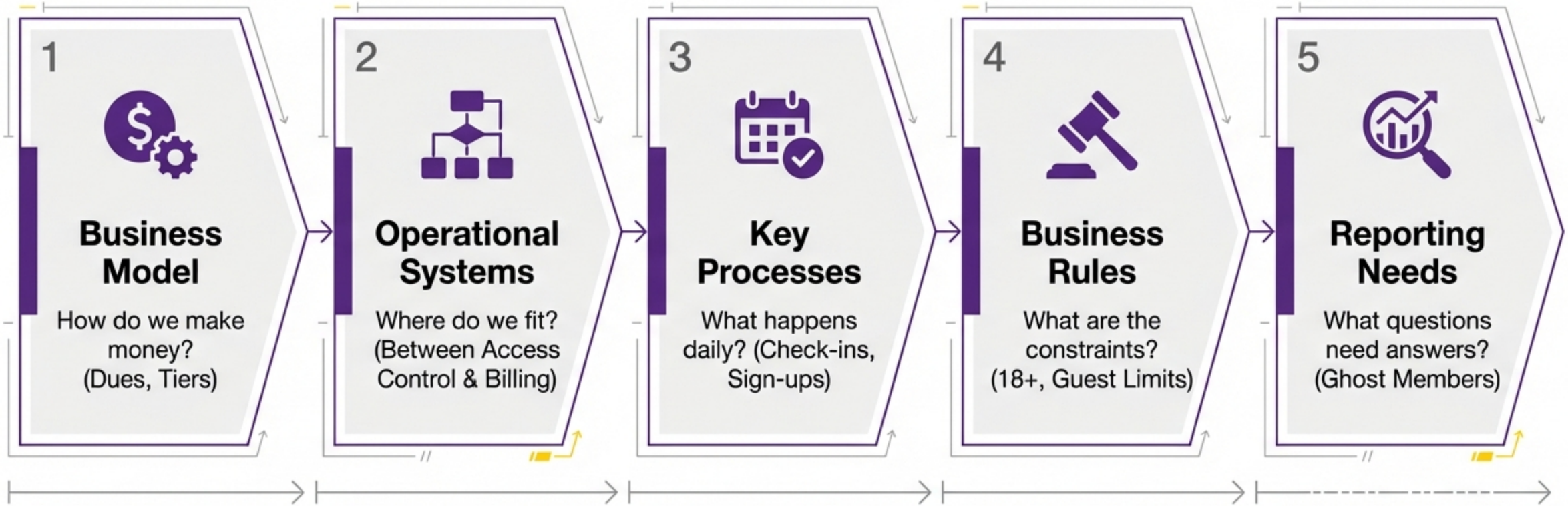
The Framework for Analysis

Before defining entities, we analyze these five areas of the Planet Fitness ecosystem:



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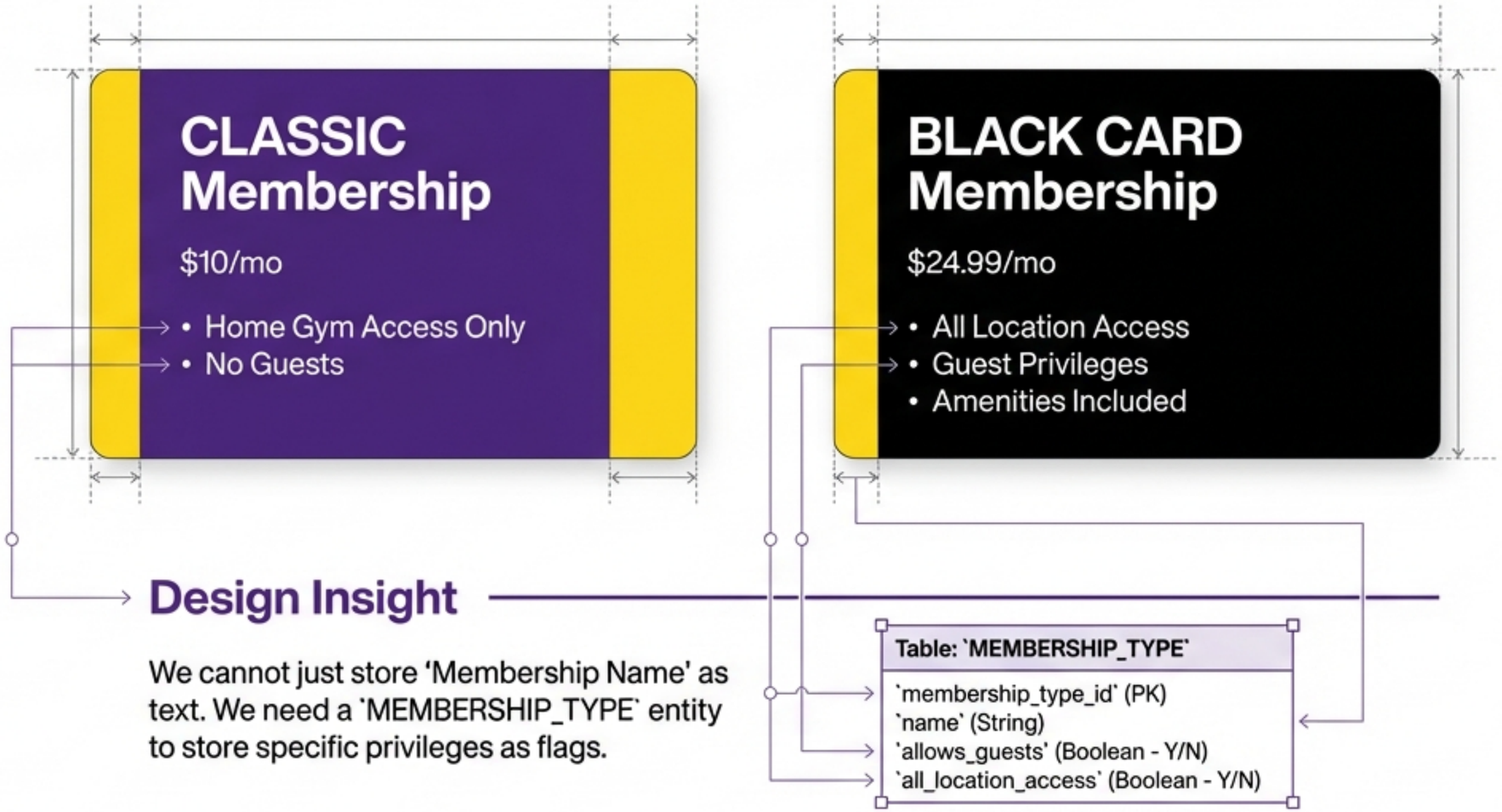
Decoding the Business Model



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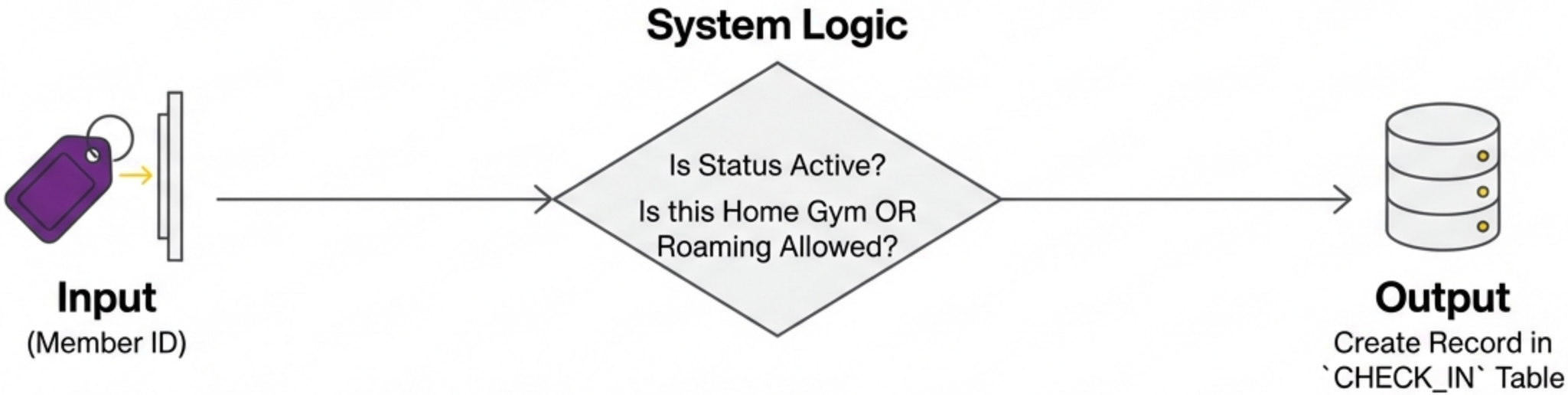
The Heart of the System: The Check-In

The check-in is a transactional event that answers three questions: Who? Where? When?



Data Implication

This requires a transactional table.
It serves as the sole source of truth for ‘Ghost Member’ and ‘Peak Hours’ reports.

CHECK_IN			
🔑	PK	`check_in_id` (PK)	
🔑	FK	`member_id` (FK)	→ Who?
🔑	FK	`location_id` (FK)	→ Where?
		`check_in_timestamp`	→ When?

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Translating Reality into Relational Tables

We identify the core subjects (Entities) based on our analysis.

PEOPLE

Real World

Member Staff Guest

Database Entity

- MEMBER
- STAFF
- GUEST

PLACES

Real World

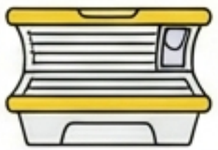
Gym Building

Database Entity

- LOCATION

THINGS

Real World



Tanning Bed

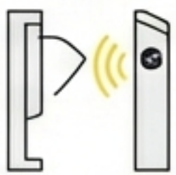
Membership Card

Database Entity

- AMENITY
- MEMBERSHIP_TYPE

EVENTS

Real World



Turnstile Beep

Guest Clipboard

Database Entity

- CHECK_IN
- GUEST_VISIT

Crucial Design Choice: separating Identity (`GUEST`) from Activity (`GUEST_VISIT`).

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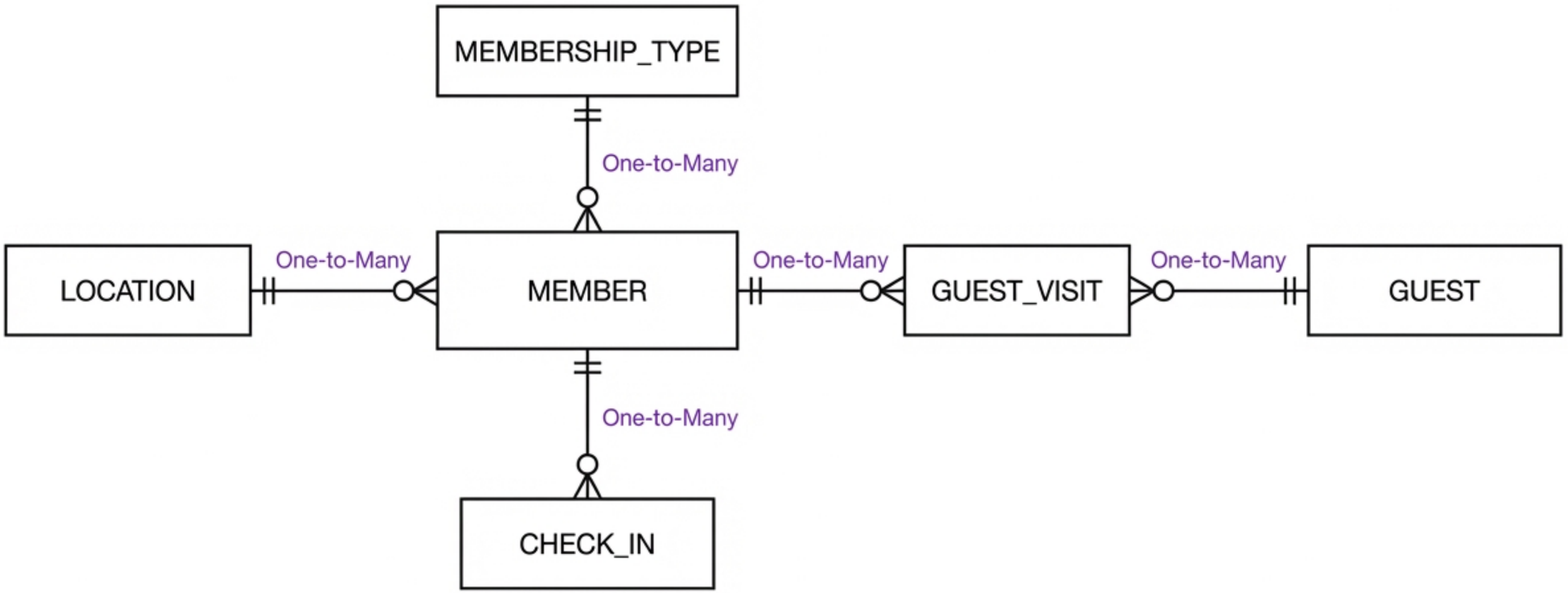
The Blueprint: High-Level Entity Relationship Diagram

A structural overview of the core entities and their relationships using Crow's Foot Notation.



This structure creates a central record for every member while tracking their movement and guest activity independently.

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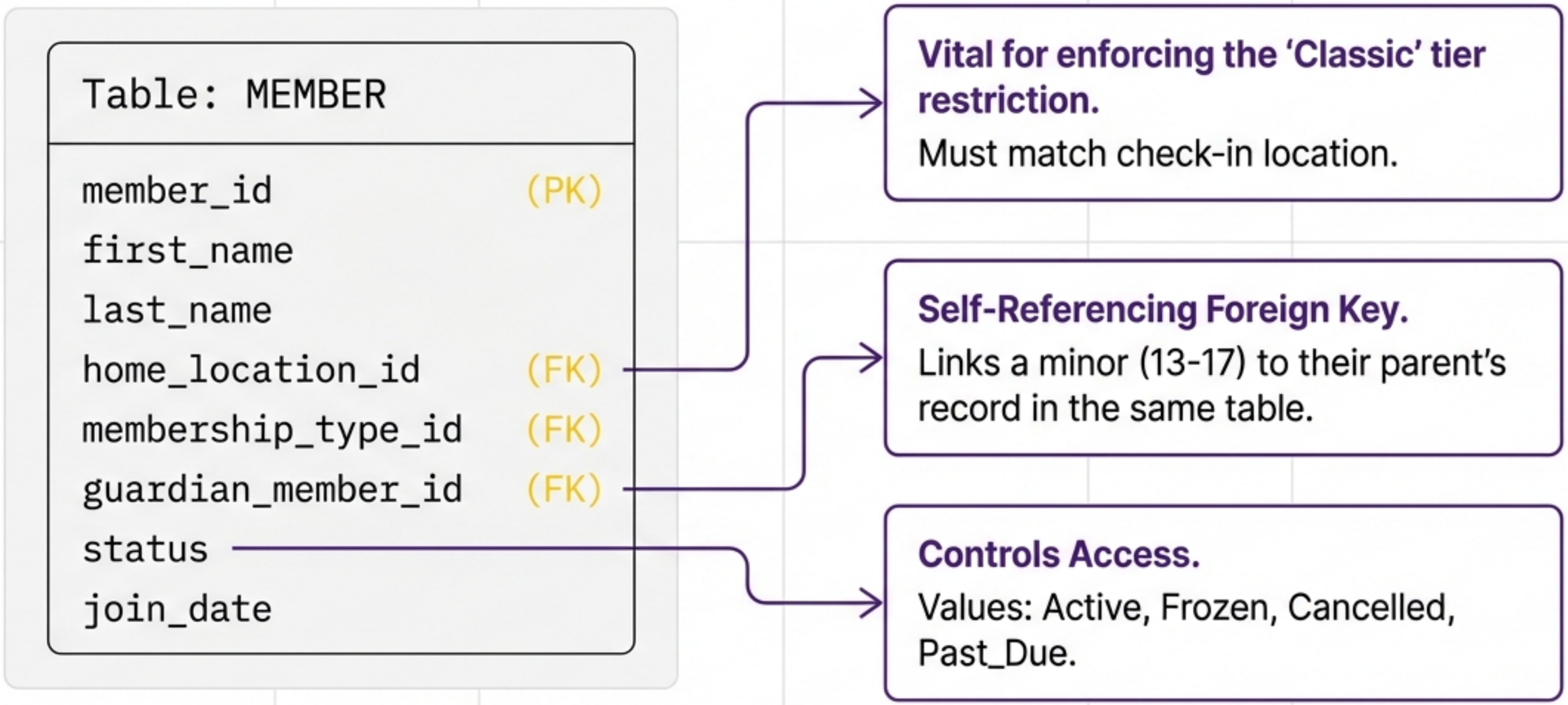
Design Deep Dive: The MEMBER Entity ⚙️

A detailed structural breakdown of the core `MEMBER` table specification and its key constraints.



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Solving the ‘Guest Abuse’ Problem

Business Rule: Guests can visit only once per location per month.

The Data Model

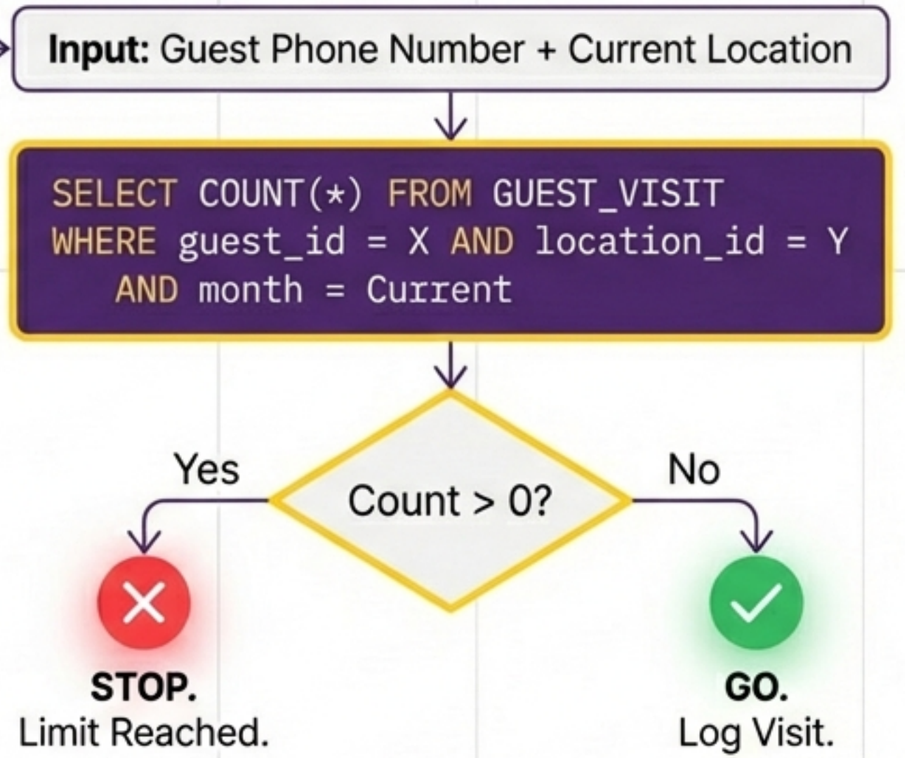
Table: GUEST

guest_id	(PK)
name	
phone_number (Unique ID)	

Table: GUEST_VISIT

visit_id	(PK)
guest_id	(FK)
location_id	(FK)
timestamp	
month_of_visit	

The Logic Gate



By decoupling identity from activity, we create a queryable history that enforces the limit mathematically.

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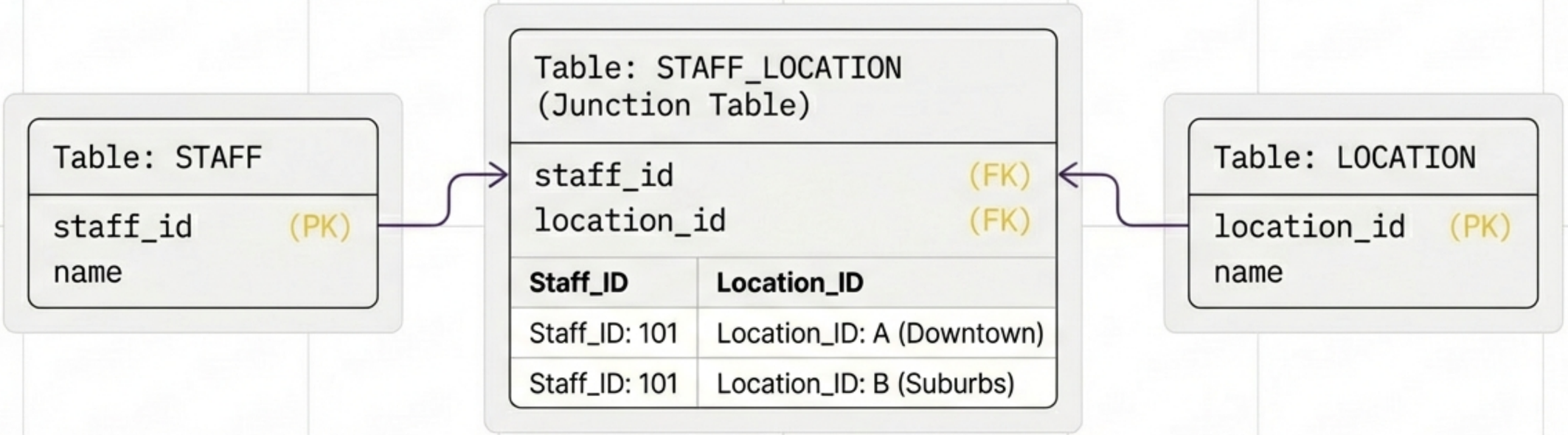
Handling Complexity: Many-to-Many Relationships

Scenario: Staff work at multiple locations. We cannot store a list of locations in the Staff table.



The Junction Table resolves the Many-to-Many relationship by storing pairs of IDs. This allows one staff member to be linked to infinite locations without duplicating staff data.

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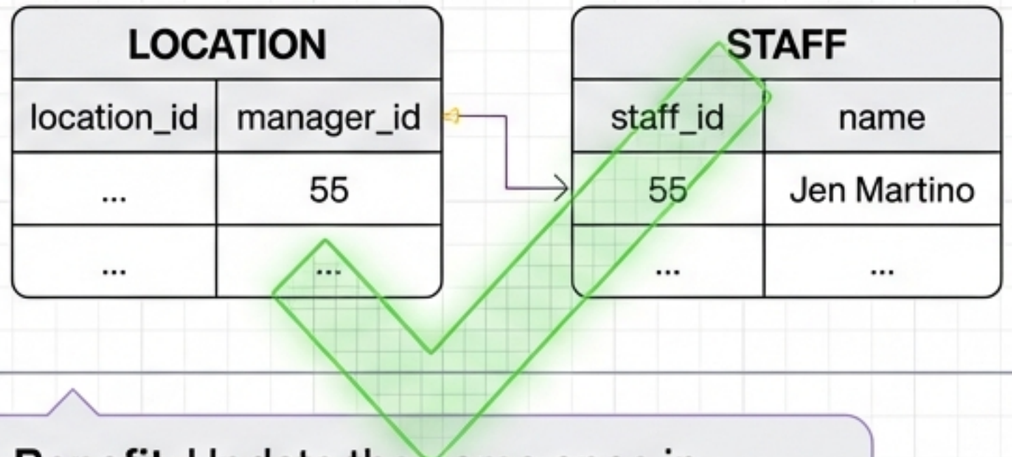
The Principle of Normalization

Single Source of Truth. We design to eliminate redundant data that causes errors.

The Wrong Way

Risk: If Jen gets married or changes her name, we must update this text string in every single table she appears in.

The Right Way



Benefit: Update the name once in the Staff table, and it automatically reflects everywhere.

"Duplicate information is bad; it wastes space and increases errors." — Microsoft Support

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The Return: Answering Jen’s Questions

Mapping the design back to the original operational crisis.

Problem

Who are the Ghost Members?

```
SELECT *
FROM Member
LEFT JOIN Check_In...
WHERE check_in IS NULL
```

Result

List of members with 0 visits in 90 days.

Problem

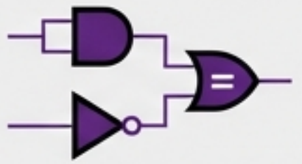
Is the Downtown gym overstaffed?

Result

Hourly check-in volume report generated from timestamp data.

Problem

Who are the Black Card Roamers?



Result

Comparison of `home_location_id` vs `check_in.location_id` reveals usage patterns.

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Designing for Tomorrow

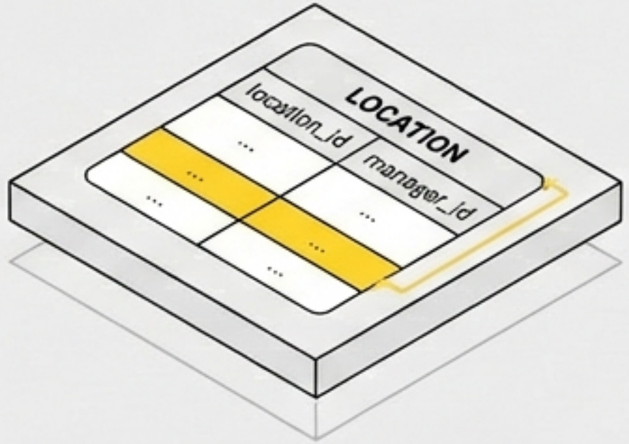
A robust relational design accommodates business changes without breaking the code.

Price Change

Prices increase?
Update `monthly_rate` in `MEMBERSHIP_TYPE`.
No code change needed.

New Tier

Adding 'Platinum' tier?
Insert 1 row into `MEMBERSHIP_TYPE`. System adapts automatically.



Expansion

Opening 4th Location?
Insert 1 row into `LOCATION`.
All logic scales instantly.

Normalization = Scalability.

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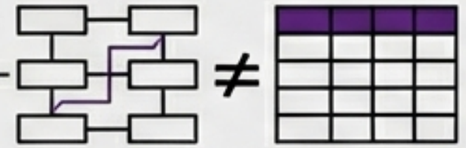
Principles of World-Class Design

Context is King

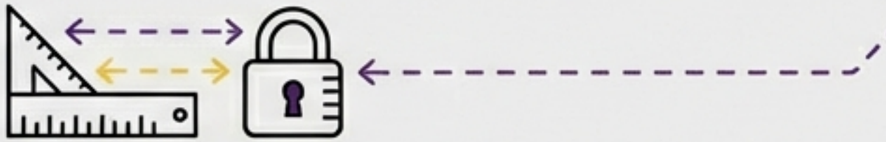
Understand the business model before defining the data structures.

Entities != Spreadsheets



Break data into logical, normalized subjects (People, Places, Events).

Rules become Constraints



Business policies (like Age 18+) dictate table structure (Guardian FK).

Design for Questions

Ensure your structure answers the reporting needs of the user.

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