LLD: Design a Parking lot

Overview

Real System ⇒ Management System

MVC

Requirement Gathering

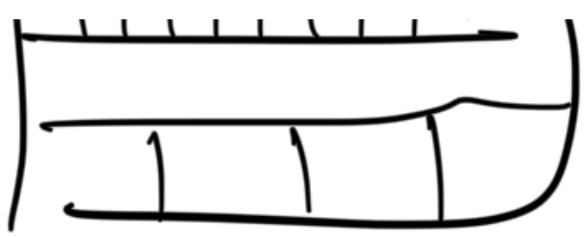
→ Each floor has multiple spots → various sizes

→ Can have multiple floors

→ Slots for diff Type of vehicles. for diff quality

↳ A vehicle can only

park at a slot of its own type



→ Entry Gates have a Display board !!

to show current availability count for each vehicle type

→ At entry gate, a token is issued to the cab

→ the slot at which a vehicle should park is determined by the token → Choose any random available slot

→ there can be multiple exit gates

→ A bill is generated when a car reaches the exit gate

→ Bill can be paid online via UPI / CC / DC
  → or via cash at the exit gate.

→ Fees is a function of
  - Slot
  - Type of ~~vehicle~~
  - Duration of parking

→ For every type of slot there will be diff per hour cost:

time at which it was parked

Time Slot	per hr cost
12AM - 6 AM	100
6AM - 4PM	150
4PM - 12PM	300

↑

+ Amount of electricity used

Duration	multiplier
< 2 hrs	1x
2 - 5	1.5x
5 - 12	2x

12+ | 4X

Slot types :

CAR =

BIKE

HEAVY

CAR-PREMIUM 3

ELECTRIC 2

Ticket
floor → 2
Spot → 24

→ Every floor has mix of vehicles

→ Will store address of every parking lot

getUsage for Duration (,)

REQUIREMENTS

→ Parking lot has multiple floors

→ Each floor has multiple spots

→ Spots are of different types
- CAR
- BIKE
- HEAVY

ELECTRIC ⇒

CAR_PREMIUM)

→ Parking lot has multiple entry gates & exit gates

→ At entry gate a ticket is generated. ⇐

→ Vehicles has to park at the spot mentioned on the ticket

→ When a car reaches exit gate, a bill is generated →

→ Fees is calculated as a f^n of type_of_slot
duration_of_parking
entry_time

→ In future there can be other ways as well.

→ Bill can be paid either via cash or via online

Payment

CC/DC/UPI

→ Entry Gate has a Display Board to show # of available slots for each slot type.

→ for every type of slot there is diff per hour cost

→ for diff time ranges there are different multipliers.

→ Every parking lot has address

→ Every floor can have diff type of spots.

→ for electric car, fee includes amount of electricity used as well.

Floor {

Floor {

⇒ SpotType ⇔

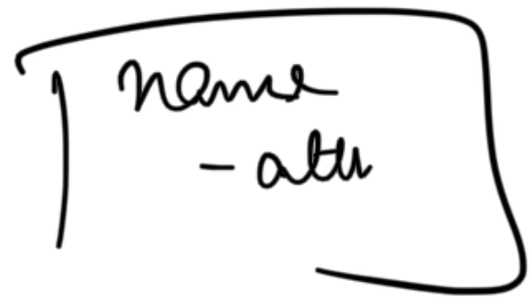
List (Spot)

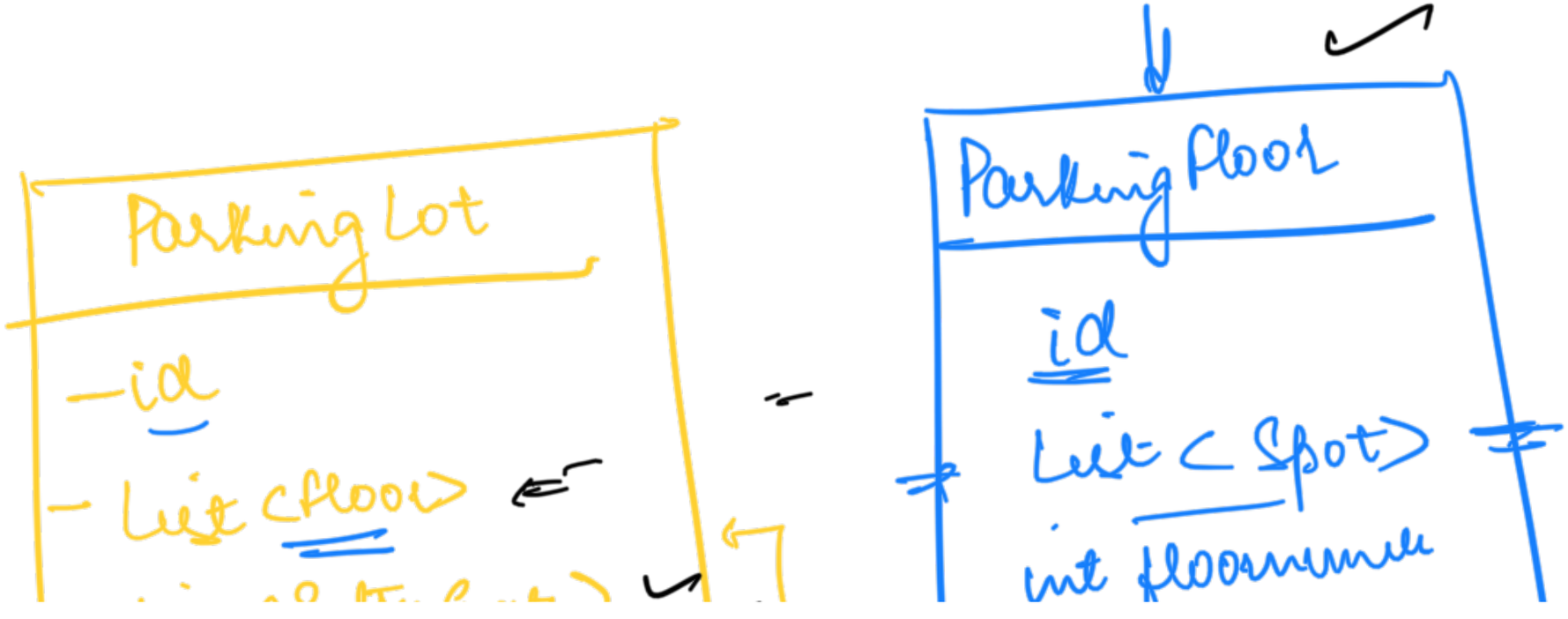
→

Class Diagram

→ Visualization

→ Noun





- address

IRCTC
HLD

Spot

id
floor
number

Spot Type

Status → AVAILABLE
→ BOOKED
→ MAINTE

Spots

id	number	SpotType	vehicle-eg

ElectricParking
Spot

Charger

Gate

number
operator
→ ENTRY

Charger

get Electricity
Used between
st-time, end-ti

Type
Status

→ EXIT

Entry Gate

- Display Board

Exit Gate

Ticket

Invoice

id

Vehicle

Name
Vehicle
Spot
Operator
entryTime
EntryGate
ParkingSlot

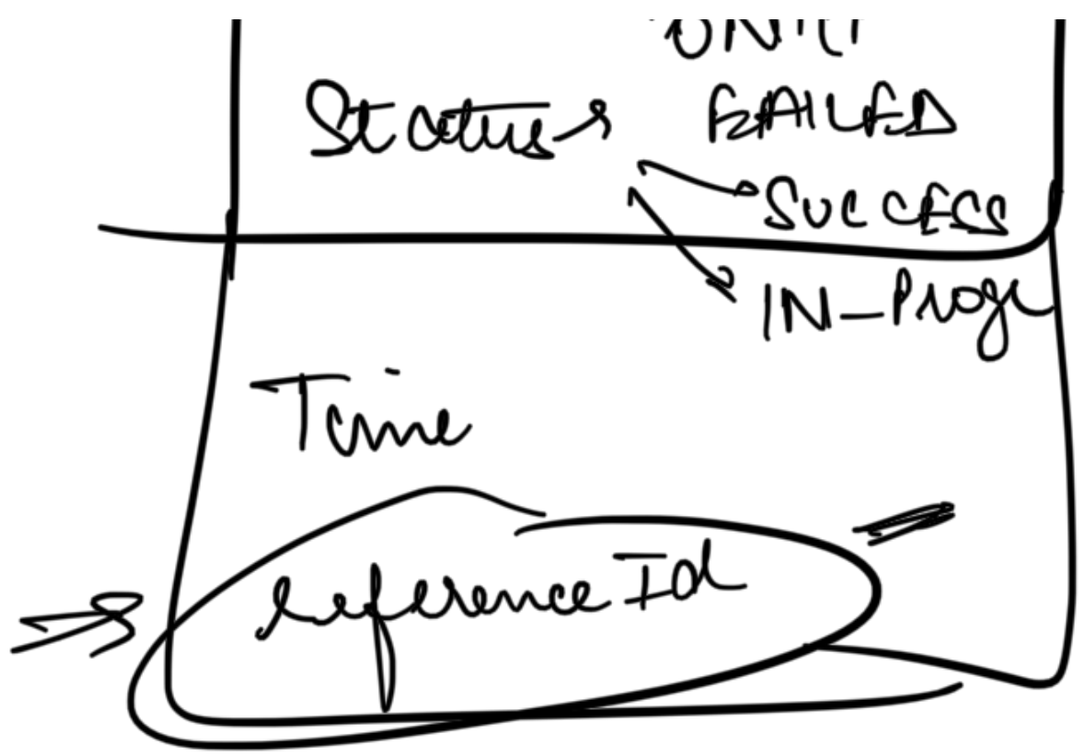
Ticket
exitTime
Amount
Operator
BillPaidStatus → PARTIAL, UNPAID, PAID

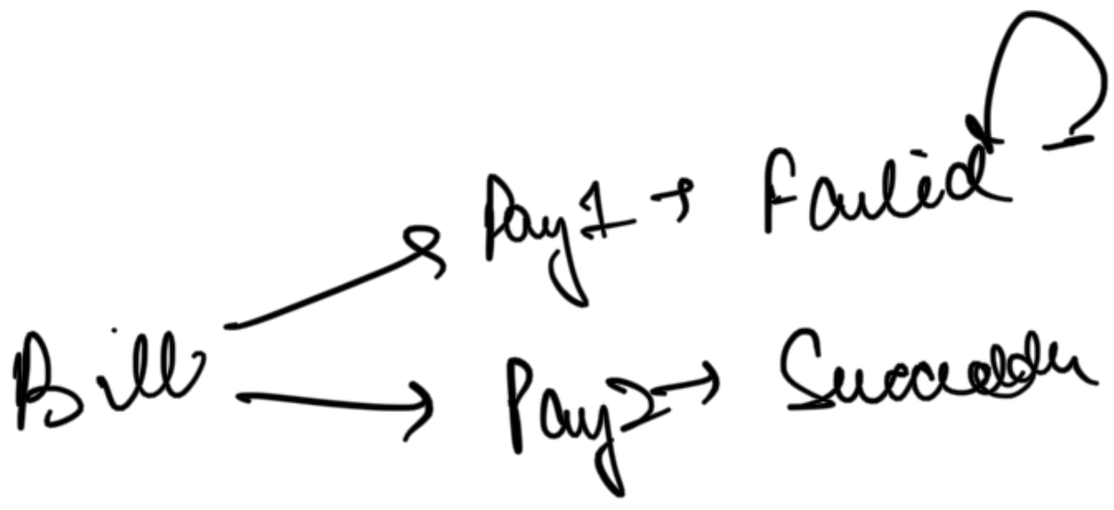
Payment

id

Bill

Mode → CASH, CC, DC


Status
FAILED
Success
IN-Prog
Time
Reference Id


Bill
Pay1
failed
Pay2
Succeeded

Display Board

Map<SpotType, Integer>

Parking Spot PerHour Fee

Map<SpotType, Integer>

Vehicle

Type

reg No

<< fees Calculator Strategy >>

Calculate Fees(___)

<< Spot Assignment Strategy >>

1) See the diagram ⇐

2) Go to the code and read models

15min

2-4PM

dev

gitkraken