

**Smt. Chandaben Mohanbhai Patel Institute of Computer Applications  
(CMPICA)**

**Faculty of Computer Science and Applications**

**Case Study**

**B.Sc. IT – Semester II**

**CA408: Database Fundamentals**

**Title of Case Study**

**Parking management System**

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# Introduction

The topic of my case study project is parking management system. This parking management system is made by keeping a small area in mind where light motor vehicle and motor cycle with gear and non-gear can be parked (you can extend this model according to your need). The entities of the parking management system are customer, vehicle, bill, and parking slot (these entities may vary based on your needs).

## Identifying cardinality and relationship

One customer can only drive one car or vehicle at a time and one vehicle can be derived by one customer. Hence the cardinality between car and customer is one-to-one. The relationship between customer and vehicle is that customer parks the vehicle.

At most one vehicle can be parked at one parking slot and one parking slot can contain at most one vehicle. Hence the cardinality between vehicle and parking slot is one-to-one. The relationship between vehicle and parking slot is that vehicle is assigned to given parking slot.

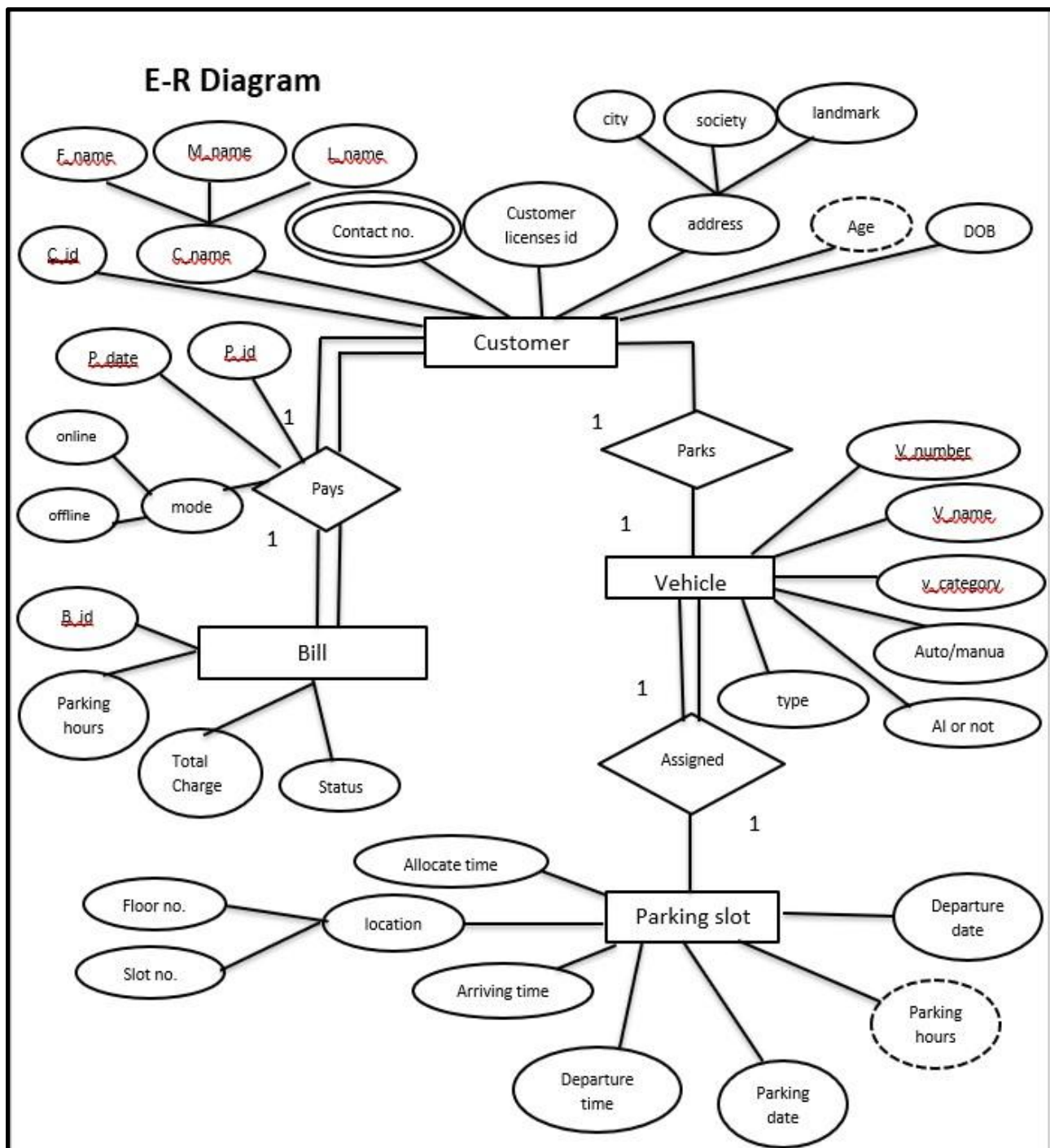
One customer needs to pay for one parking slot. The single parking slot fee will be charged to one customer. Here if one customer has two or more vehicles obviously there will be two or more driver and will treat this driver as a customer and data or information will be entered on their name. So, cardinality between customer and bill one to one (in our case we have made cardinality one to one but the cardinality for this relation can be one to many also). The relationship between customer and bill is that customer pays bill.

## Identifying the attribute

- For customer entity the attributes are customer name, customer id, address, DOB, Age, contact number, customer licence id.
- For vehicle entity attributes are vehicle number, vehicle category, customer id, AI or not, vehicle type, vehicle or car name, auto/manual.
- For parking slot attributes are location, customer id, allocated time, arriving time, departure time, parking date, parking hours, vehicle number.
- For bill entity attributes are bill id, customer id, parking hours, total charge, status.

## Identifying Primary Key

- The customer id can identify customer uniquely. Hence customer id is the primary key attribute for customer entity.
- The car number or vehicle number can uniquely identify each vehicle. Hence vehicle number is the primary key for vehicle.
- In parking slot attribute there does not exist any single attribute which can identify tuple uniquely. So, in parking slot entity we will use parking date, Arriving time and location (floor no. and slot no.) together as primary key.
- The bill id can identify customer uniquely. Hence bill id is primary key attribute for Bill.



# Relational Model

## Customer

<u>c_id</u>
f_name
m_name
l_name
dob
age
Address
customer_licence_id
contact_number

## Pays

<u>p_id</u>
c_id
b_id
p_date
mode

## Bill

<u>B_id</u>
C_id
Total charge
Parking hours
Status

## Vehicle

<u>v_number</u>
c_id
v_name
v_Category
ai_or_not
auto/manual
type

## Parking slot

arriving_time
parking_date
floor_no.
slot_no.
<u>c_id</u>
v_number
allocated_time
parking_hours
departure_time
departure_date



## Relation Schema

- ✓ customer (c\_id, f\_name, m\_name, l\_name, dob, age, address, customer\_licence\_id, contact\_no)
- ✓ vehicle (v\_number, c\_id, v\_name, v\_category, ai\_or\_not, auto\_manual, type)
- ✓ parking\_slot (arriving\_time, parking\_date, floor\_no, slot\_no, c\_id, v\_number, allocated\_time, parking\_hours, departure\_time, departure\_date)
- ✓ pays (p\_id, c\_id, b\_id, p\_date, mode)
- ✓ bill (b\_id, c\_id, total\_charge, parking\_hours, status)