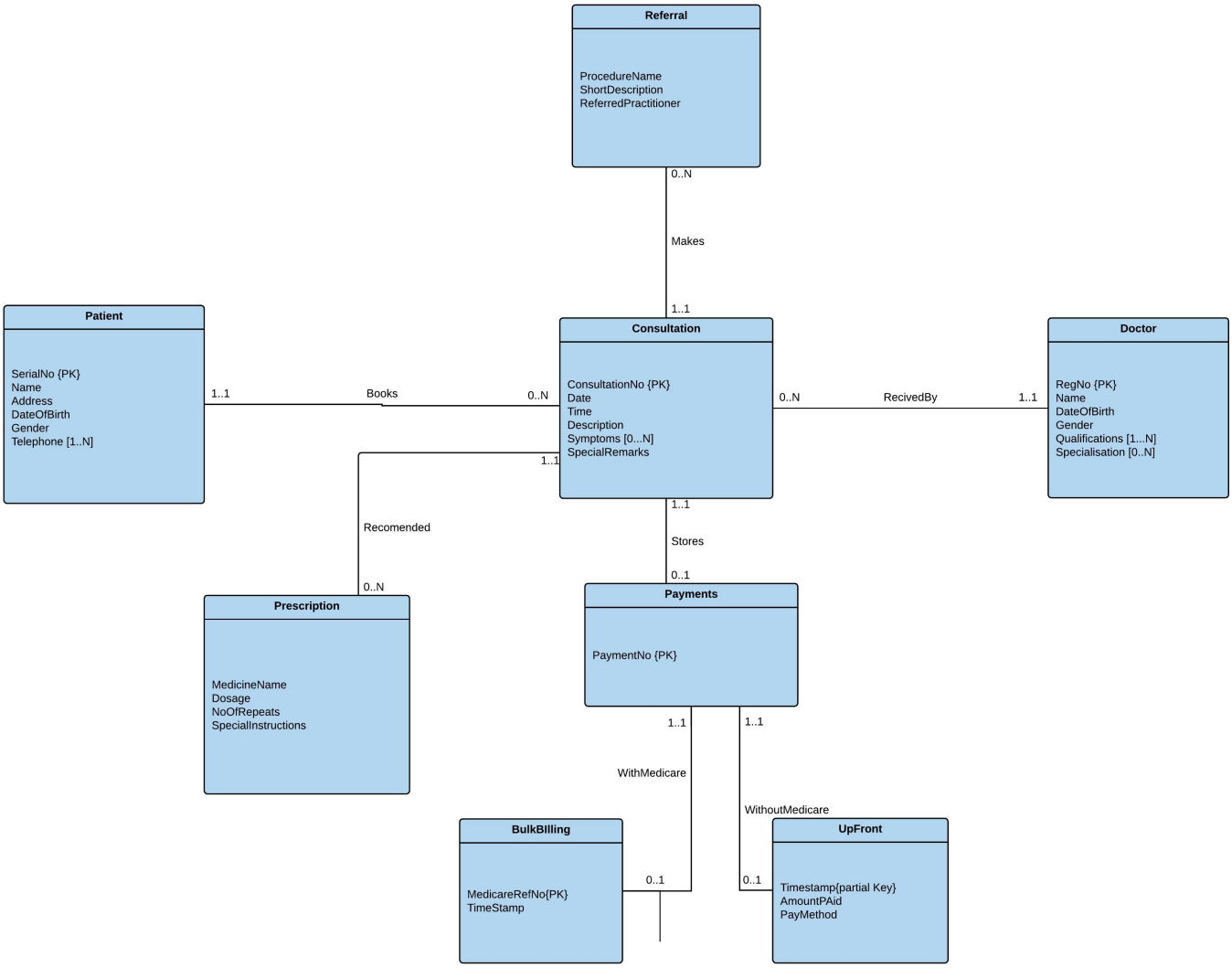
DATABASE CONCEPTS

ASSIGNMENT 1

PART A

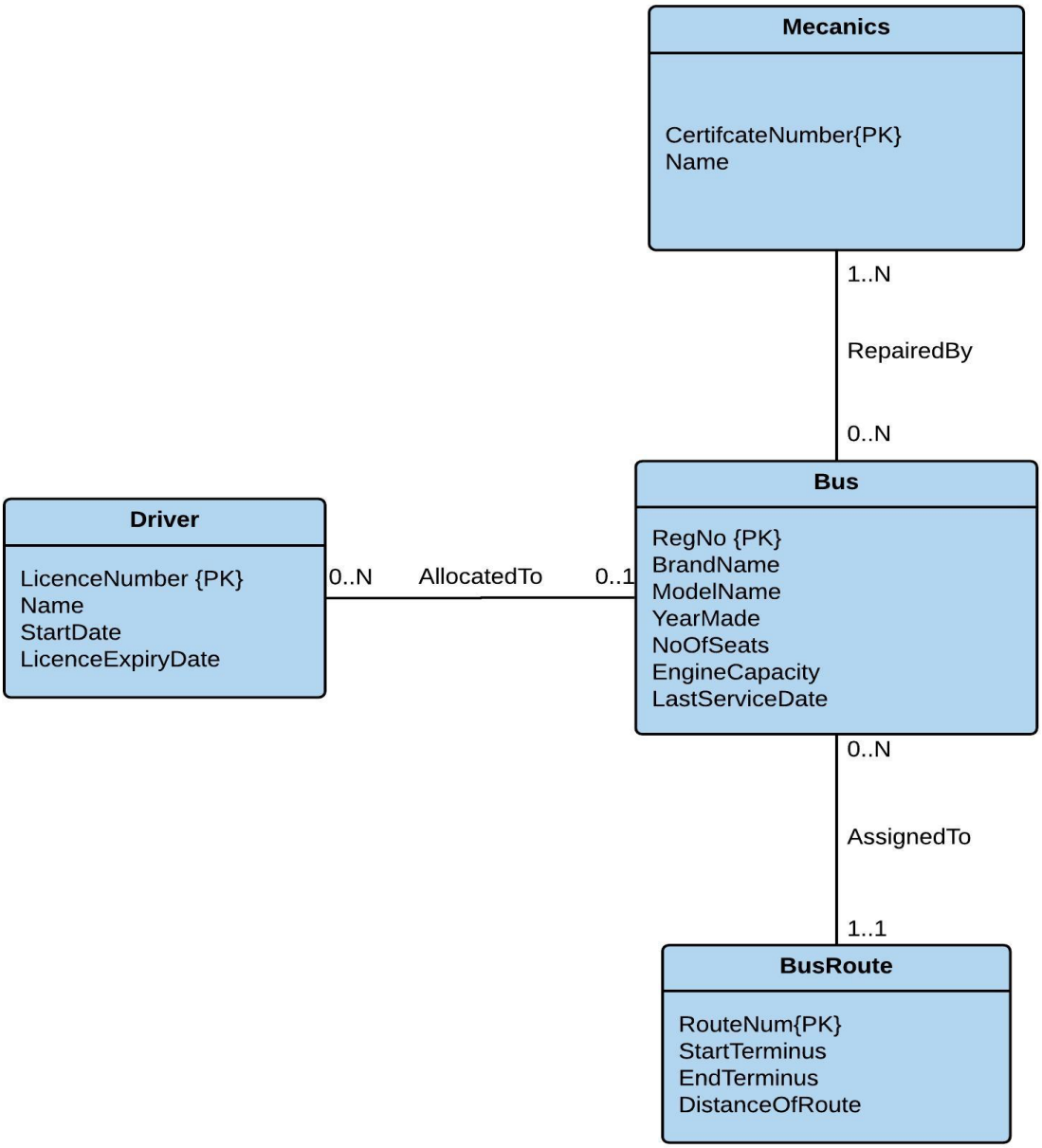
2.1 Designing an Entity Relationship Model for Medical Centre:



Assumptions:

- One patient, after filling the registration form can consult a doctor once per consultation, He can consult the doctor as many times as possible
- A Doctor probably won't prescribe any remedy to some patient or can suggest numerous solutions.
- Moreover, specialist may or may not makes referrals, but rather when influenced it to will originate from one meeting as it were
- After every consultation, Payments are given in view of Medicare reference Number.

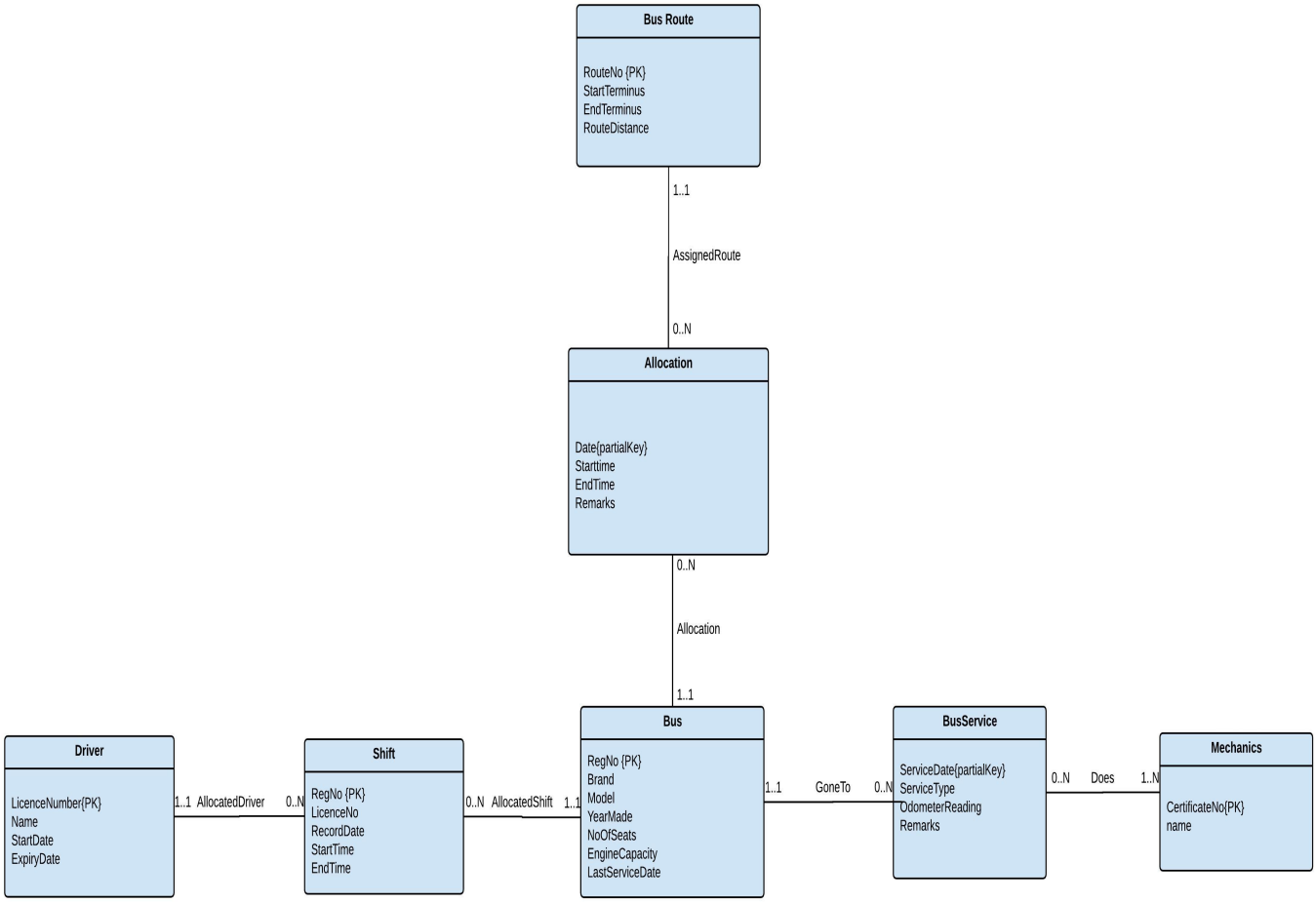
2.2 Designing an Entity Relationship Model for Small Bus Company:



Assumptions:

- A bus is Repaired by at least one or more than one driver.
- A Driver may or may not get allotted to a Bus yet when dispensed, only one driver should drive a transport.
- Route of the Bus is fixed, for a given destination they can be many buses.

The Refined Entity Relationship Model for above Model will be:



This model overcomes the limitations of the first ER diagram

This model can keep track of record date, begin and end times, the transport number and the driver assigned and also the routes of the buses.

Assumptions:

For a driver there may be no shifts or more than one shifts per day.

Bus can be allocated to different directions to get into the destination. Once allocated the bus should follow that route

Different services are provided to a given bus at a time which can be done by at least one Mechanic

2.3 Mapping an ER Model to a Relational Database Schema

In Order to map a ER model into Relational Database Schema, There 7 steps, They are

Step 1: Map Strong Entities
Author (Email, Name, Address, Telephone, ISBN*)
Publisher (Name, Address, URL, ABN)
Book (ISBN, title, edition, Year, ListPrice)
Warehouse (Code, Address)
ShoppingCart (CartID, Timestamp)
Customer (Email, Name, Address)

Step 2: Map Weak Entities
Nothing to do

Step 3: Map One-to-one Relationships
None exists.

Step 4: Map One-to-many Relationships
CustomerShoppingCart is a one-to-many relationship, where "ShoppingCart" sits on many side. So, primary key of the Customer (Email) is imported to ShoppingCart relation as a foreign key.

ShoppingCart (CardID, TimeStamp, Email*)

Step 5: Map Many-to-many relationships
There are 4 many to many relationships in this ER diagram, they are

- AuthorBook (WrittenBy)
- BookShoppingCart (AddedTo)
- BookPublisher (PublishedBy)
- BookWarehouse (StockedAt)

In Order to represent this relationship, we should introduce a new relationship. Primary keys of participating entities together become the new primary key of that relation.
WrittenBy (Email*, ISBN*)
AddedTo (ISBN*, CardID*)
PublishedBy (ISBN*, Name*)
StockedAt (ISBN*, Code*)

Step 6: Map Multivalued attributes.
We can see that Author can have many telephone numbers which make this a Multivalued Attribute, in that case we create a new relation which include corresponding attribute along with the primary key of owner entity.
TelephoneNumber (Email*, Telephone*)

Step 7: Map High degree relationships.
None here.

So, Complete relational database schema is:
Author (Email, Name, Address, ISBN*)
Publisher (Name, Address, URL, ABN)
Book (ISBN, title, edition, Year, ListPrice)
Warehouse (Code, Address)
ShoppingCart (CardID, TimeStamp, Email*)
Customer (Email, Name, Address)
TelephoneNumber (Email*, Telephone)
WrittenBy (Email*, ISBN*)
AddedTo (ISBN*, CardID*, BuyPrice, Qty)
PublishedBy (ISBN*, Name*)
StockedAt (ISBN*, Code*, StockedAt)

3. Part B: Relational Database Model

1. A)
It is known fact that for given relation, Primary key should be unique. But when the given query is executed, System gives an error message stating that "The system cannot change the SSN from '666884444' to '123456789' " , Since that SSN is already preoccupied in that same table.

B)
One of the ways to rectify that error is to replace the value of other attributes for that SSN is not unique.

C)

```
UPDATE employee
SET Fname = 'Ramesh', Minit = 'K', Lname = 'Narayan', Bdate = '1962-09-15',
Address = '975 Fire Oak, Humble, TX', Salary = '38000'
WHERE SSN = '123456789';
UPDATE employee
SET Fname = 'John', Minit = 'B', Lname = 'Smith', Bdate = '1965-01-09',
Address = '731 Fondren, Houston, TX', Salary = '30000'
WHERE SSN = '666884444';
```

2. No integrity Constraints Violated.
3. No integrity Constraints Violated.

4.The given operation violates 2 integrity Constraints

- Entity integrity Constraint:
  Pname, which is the primary key of the relation cannot be NULL.
- Referential Integrity Constraint:
  It can be seen that Dnum is null. Since the attribute Dnum is assigned to Project Relation, which makes it foreign key. That value should be in Department Table.