Question 1: consider the following scenario which describe the operations of a store . Read it carefully then draw the EER that represent the database.   **8 points**

A store that sells several product want to develop a database for its operations. The store sells several product for each product the following information is stored product_id, product_name, product_price and supplier. The store also keep information about its customers for each customer the database should store customer_id, name, address and phone. The store have employees work for it the following information is stored about each employee (employee_id, name, address, phone, salary and job) the employee in the store may be a sales person, supervisor or accountant. The database should store information about its suppliers which contain supplier_id, name, address, phone and the name of contact person. A supplier may supply several product for store but a product can only be supplied by one supplier. The database should store information about the bills from the suppliers which contain supplier, products, quantity, value ,date, and due_date. The customer may buy several products with one or more quantities. The store issue a bill to customer which contains the customer, products, quantity for each product, total value, date, due_date and the seals person who make the sale.
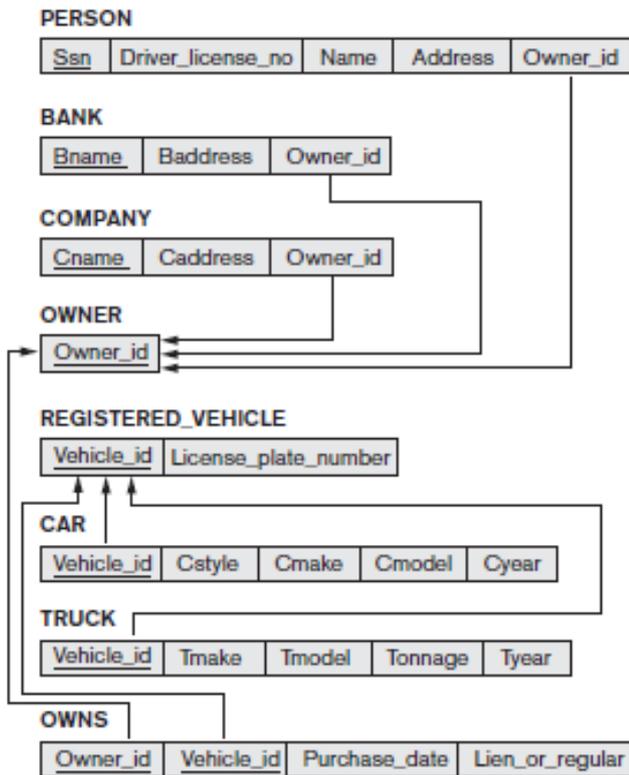
Question 2: Given the following ER diagram for insurance company map it to relational schema. **4 points**
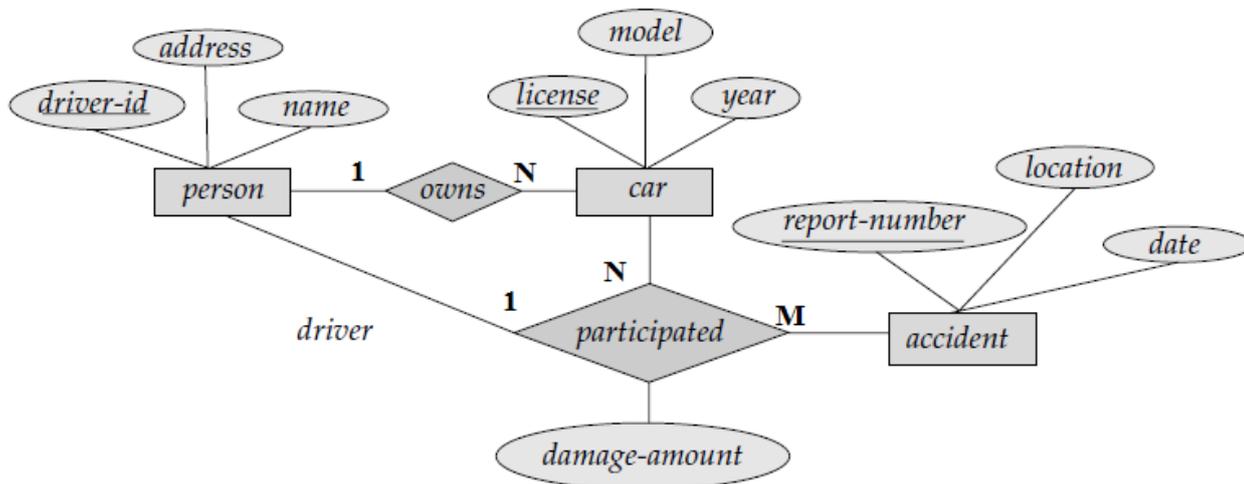
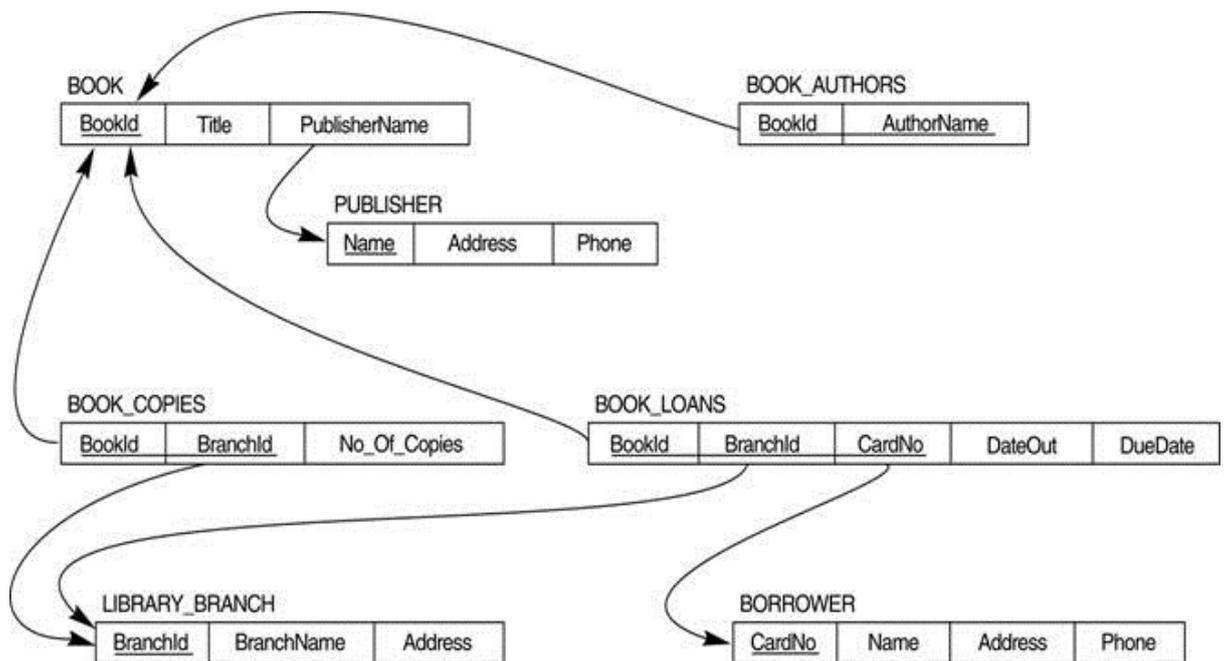E-R diagram for a Car-insurance company.

Question 3: given the following relational schema which represent a simple vehicle registration system. Perform the following tasks.   **6 points**

PERSON

Ssn	Driver_license_no	Name	Address	Owner_id

BANK

Bname	Baddress	Owner_id

COMPANY

Cname	Caddress	Owner_id

OWNER

Owner_id

REGISTERED_VEHICLE

Vehicle_id	License_plate_number

CAR

Vehicle_id	Cstyle	Cmake	Cmodel	Cyear

TRUCK

Vehicle_id	Tmake	Tmodel	Tonnage	Tyear

OWNS

Owner_id	Vehicle_id	Purchase_date	Lien_or_regular

A) Write relational algebra expression that represent the following operation.
   1- Display truck model (Tmodel) that are owned by 'national' company.
   2- Display License_plate_number and car style (Cstyle) for car of year 2016.
   3- Display the Driver_license_no of drivers that own a 'sedan' style car.
B) Write a relational calculus expression that represents the following operations.
   1- Select the bank name (Bname) and car make (Cmake) for banks that own a car of year 2010.
   2- Select purchase_date and truck model (Tmodel) for trucks that their License_plate_number between 19000 and 20300.
   3- Select the name of persons that own a truck of Tmake 'toyota' and Tyear '2013'.

Question 4: Given the following relational schema which represent a public library database, write SQL statement that perform the following operations.   **16 points**

BOOK

BookId	Title	PublisherName

BOOK_AUTHORS

BookId	AuthorName

PUBLISHER

Name	Address	Phone

BOOK_COPIES

BookId	BranchId	No_Of_Copies

BOOK_LOANS

BookId	BranchId	CardNo	DateOut	DueDate

LIBRARY_BRANCH

BranchId	BranchName	Address

BORROWER

CardNo	Name	Address	Phone

1- Create table BOOK_LOANS using appropriate data types
2- For the book 'Fundamentals of Databse' Select the brachId for branches that have the book and No_Of_Copies for each branch.
3- Select the publisher name and address for publishers that publish a book for Author names contains 'Sami'
4- Select the BookId and Title that had been borrowed by persons whose addresses is 'Amman'
5- Find the CardNo and the number of books that have been borrowed by every person who lives in 'Irbid'
6- Ahmad is a person who lives in Aqaba and his phone number is 0701234567 and his CardNo id 201601200 want to join the library borrowers, insert his information in table BORROWER.
7- The 'National Publishers' have changed their Address to 'Irbid' and their phone number to '061234567' update their information in the database.
8- Select the branchName and number of books in each branch for branches that have more than 500 books.

Question 5: Given the universal relation R={A,B,C,D,E,F,G,I,J} And a decomposition D={R1,R2} such that R1={A,B,C,D,E,I,J} and R2={A,B,F,G}, and a set of Function dependency
F={{A,B}→{C,D,E},B→D ,A→{B,F,G},G→F,C→{I,J} }.   **6 points**

A) Normalize the decomposition above to 3rd normal form.
B) After normalization in section a test your decomposition for lossless join property.

Good Luck

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