Assignment 7 and 8

EER Model

Database Systems Spring 2021

Due Date: Before the start of the class (21st June 2021)

Assignment 7

Draw an EER diagram for the problems given below. Make sure that you indicate all cardinality constraints and your diagram should not contain redundant entity sets, relationships, or attributes. If you need to make any assumptions, include them in your answer.

Question 1: An institute facilitates its students to participate in three types of sports events: Long Jump, Discus Throw and 100-Meter race. The following attributes are recorded for each event:

Long Jump: Student Roll Number, Name, House, Age, Recorded Jump
Discus Throw: Student Roll Number, Name, House, Age, Distance covered
100 m. Race: Student Roll Number, Name, House, Age, Time taken

Apply rule of generalization and develop an EER model segment to represent this situation using traditional Chen EER notation. Assume that each of this sport event can be a part of exactly one of these subtypes.

Question 2: An electronics goods store has electronic devices, such as mobile phones, laptops, televisions, and refrigerators for sale.

- **a.** Is it possible to apply supertype/subtype hierarchy to the above situation?How?
- **b.** Construct an EER diagram. Which specialization rule (completeness constraint) does it satisfy?
- **c.** Can you think of any possible scenario in which the diagram satisfies the other specialization rule?
- **d.** Consider that the owner has decided to sell both new and old products for resale. How will you incorporate this into the diagram?

Question 3: Draw the EER model using Chen Notation for cardinality and participation constraint. The basic information is as follows:
The Xeroz organization depends on a different type of persons for its successful operation. The organization is interested in the following attributes for all of these persons: SSN, Name, Address, City/ State/Zip, and Telephone. Three types of persons are of greatest interest: employees, volunteers, and donors. Employees have only a Date Hired attribute, and volunteers have only a Skill attribute. Donors have only a relationship (named Donates) with an Item entity type. A donor must have donated one or more items, and an item may have no donors, or one or more donors. There are persons other than employees, volunteers, and donors who are of interest to the organization so that a person need not belong to any of these three groups. On the other hand, at a given time a person may belong to two or more of these groups (e.g., employee and donor)

Question 4: Draw the EER model using Chen Notation for cardinality and participation constraint. The basic information is as follows:

We have developed a new firm for providing security services to companies. We consults with companies to determine their security needs. The information for our firm working is as follows:

There are two types of consultants: business consultants and technical consultants. Business consultants are contacted by a business in order to first determine security needs and provide an estimate for the actual services to be performed. Technical consultants perform services according to the specifications developed by the business consultants. Attributes of business consultant includes Employee ID (identifier), Name, Address (which is composed of Street, City, State, and Zip Code), Telephone, Date Of Birth, Age, Business Experience (which is composed of Number of Years, Type of Business [or businesses], and Degrees Received). Attributes of technical consultant are: Employee ID (identifier), Name, Address (which is composed of Street, City, State, and Zip Code), Telephone, Date Of Birth, Age, Technical Skills, and Degrees Received.

Customers are businesses that have asked for consulting services. Attributes of customer are Customer ID identifier), Company Name, Address (which is composed of Street, City, State, and Zip Code), Contact Name, Contact Title, Contact Telephone, Business Type, and Number Of Employees. Customers can have multiple locations. Attributes of location are Customer ID (identifier), Location ID (which is unique only for each Customer ID), Address (which is composed of Street, City, State, and Zip Code), Telephone, and Building Size.

A security service is performed for a customer at one or more locations. Before services are performed, an estimate is prepared. Attributes of service are Service ID (identifier), Description, Cost, Coverage, and Clearance Required.

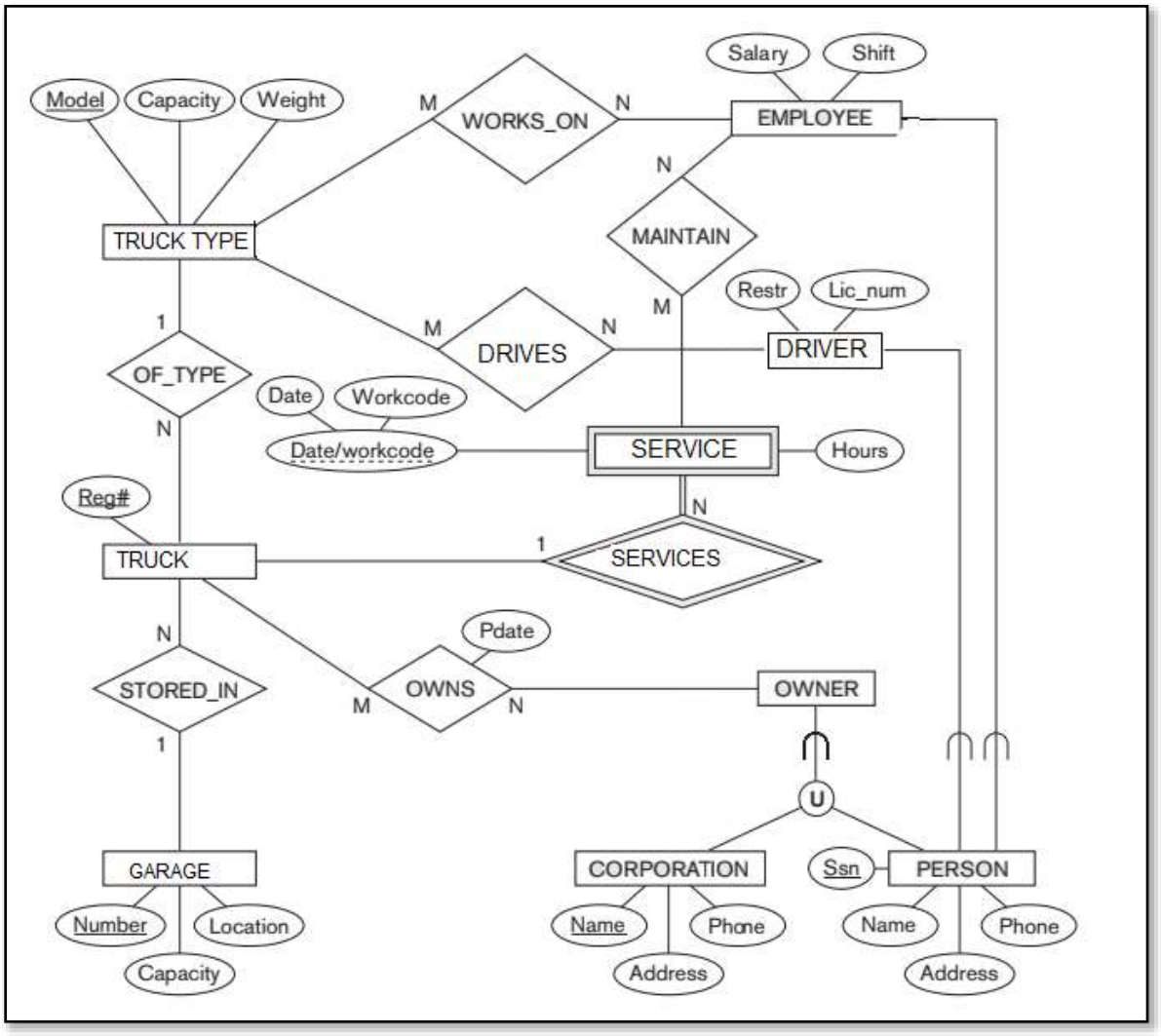
In addition to the entities outlined previously, the following information will need to be stored and should be shown in the model. These may be entities, but they also reflect a relationship between more than one entity:

- Estimates, which have characteristics of Date, Amount, Business Consultant, Services, and Customer
- Services Performed, which have characteristics of Date, Amount, Technical Consultant, Services, and Customer

In order to construct the EER diagram, you may assume the following:
A customer can have many consultants providing many services. You wish to track both actual services performed as well as services offered. Therefore, there should be two relationships between customer, service, and consultant, one to show services performed and one to show services offered as part of the estimate.

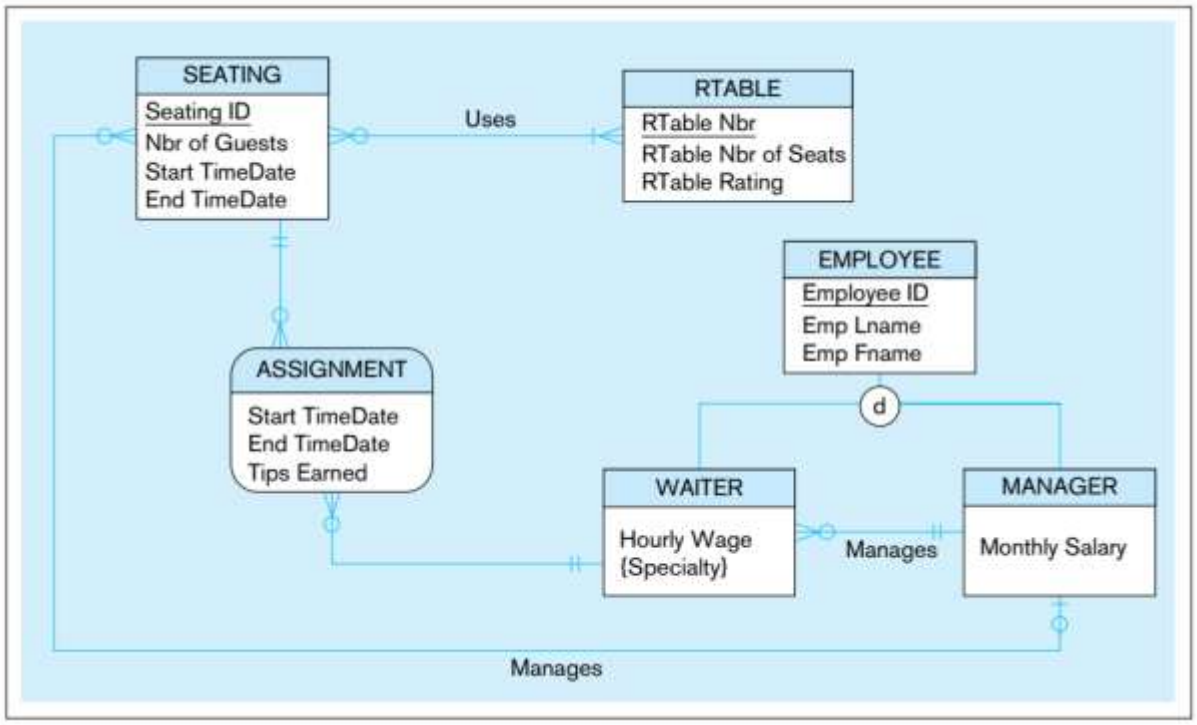
Assignment 8

Question 1: Transform the diagram into a relational schema that shows referential integrity constraints.



Question 2: Figure given below shows an EER diagram for a restaurant, its tables, and the waiters and waiting staff managers who work at the restaurant. Your assignment is to:

a. Develop a relational schema.
b. Show the functional dependencies.
c. Develop a set of 3NF relations.



Question 3: Online MovieBox

In Assignment 1, we have asked you to design an online platform called "MovieBox" that has movies, documentaries, dramas, cartoons of different regions around the world. The user can subscribe to "MovieBox" to watch the videos of their choice. Our website would be an online platform like Netflix and HBO.

We want to you to design and develop a database system that keep track of all the videos, subscribers and the video watched by each subscriber. Your system should allow user to rate videos and watch a list of videos they have watched or desire to view. Work on the details that the platform needs to maintain for smooth operations AND Design an **ER\EER model** for MOVIEBOX:

a) What do you think are the main objects (entities) that need to be represented in the database?
b) What relationships do you think exist between these main objects (entities)?
c) **For each of the objects, what details do you think need to be held in the database (attributes)? Also identify keys and candidate keys.**