National University of Computer and Emerging Sciences, Lahore Campus

Course:	**Database Systems**	**Course Code:**	**CS2005**
Program:	**BS (Computer Science)**	**Semester:**	**Spring 2023**
Out Date:	**26-Apr-2023**	**Total Marks:**	**40**
Due Date:	**Wed 3-May-2023 (start of class)**	**Weight:**	
Section	**SOLUTION**	**Page(s):**	**2**
Assignment:	**4 (ER/EER Model)**		

Instructions:

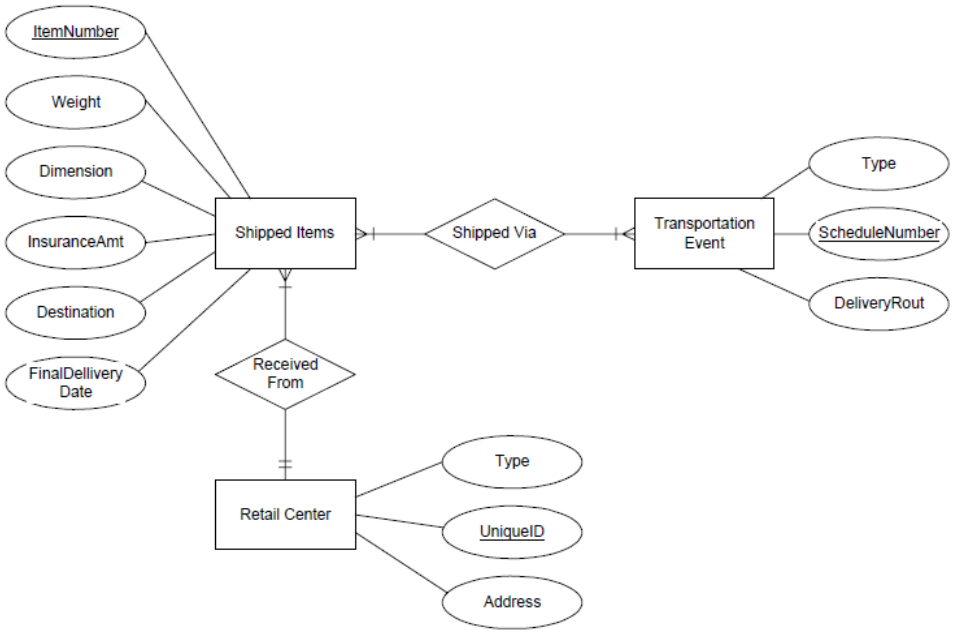
- This assignment is an individual assignment.
- Clearly mention any assumption you have made.
- You are required to submit the hard copy of your assignment at the start of your class.
- For any query, please contact your TA.

TOPIC: Conceptual Data Modeling using ER/EER Data Model

*You are required to draw **ER/EER diagrams** for the following questions. Specify key attributes of each entity type and structural constraints on each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete but clearly state your assumptions along the diagram.*

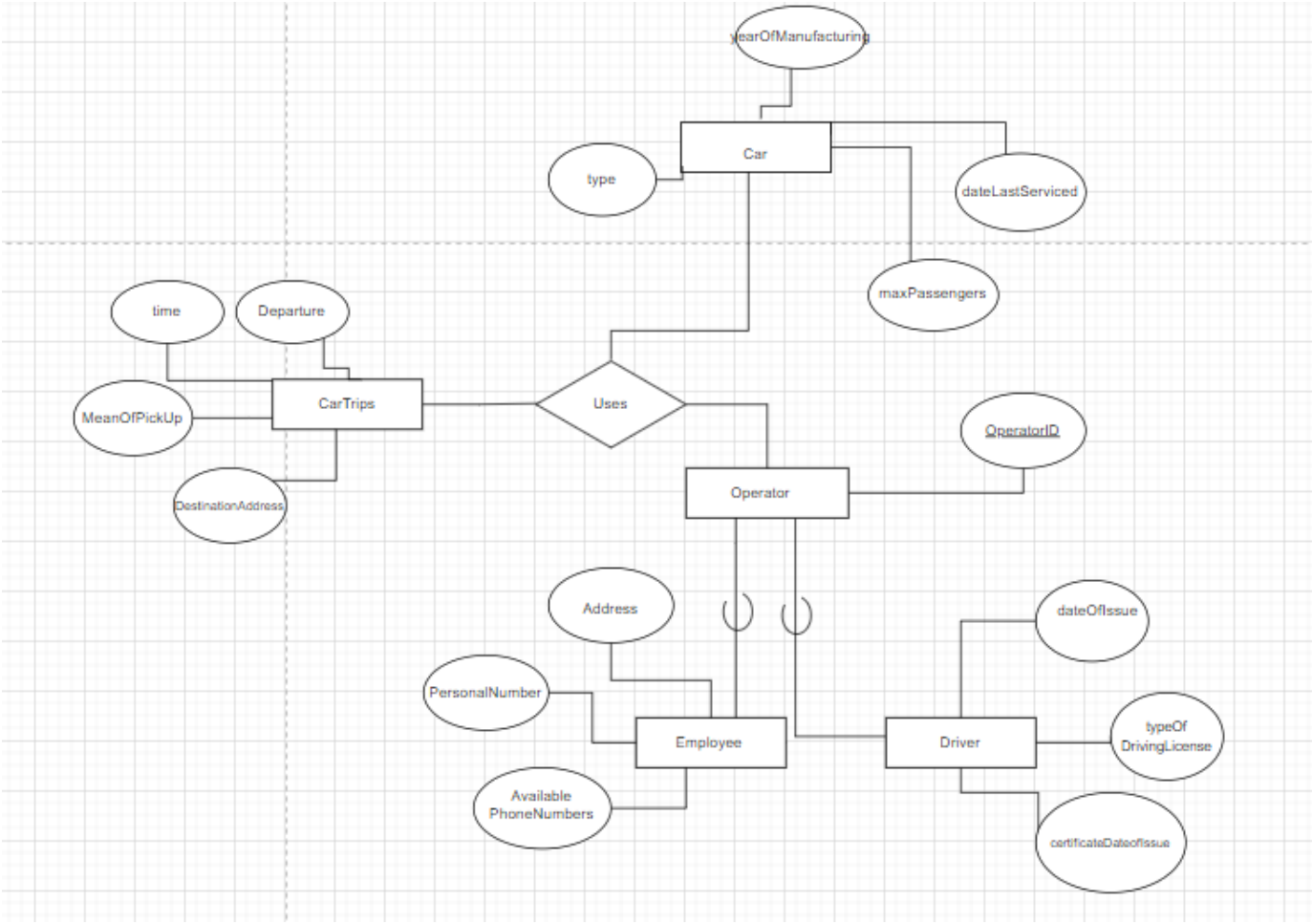
Q1. Suppose you are given the following requirements specification for the database:

Raymond Reddington's famous for having the most up-to-date information on the processing & current location of every single shipped item in his business. He uses a secure company-wide information system called Red-Network to ensure the reliability of the information he gets. Shipped items are very important to the product tracking information system being used. Shipped items may be characterized by a unique item number, dimensions, weight, insurance amount, destination, and final delivery date. These are received from a retail center. Retail centers may be characterized by unique ID, type, and an address. Shipped items are delivered to the destination using one or more means of transportation (transportation events). These are characterized by a unique schedule number, a type, and a delivery route.



Q2. Suppose you are given the following requirements specification for the database:

A taxi company (like Uber) needs to model their activities. There are two types of employees in the company: drivers and operators. For drivers it is interesting to know the date of issue and type of driving license, and the date of issue of the taxi driver's certificate. For all employees it is interesting to know their personal number, address, and the available phone numbers. The company owns several cars. For each car there is a need to know its type, year of manufacturing, maximum number of passengers in the car and date of the last service. The company wants to have a record of car trips. A taxi may be picked on a street or ordered through an operator who assigns the order to a certain driver and a car. Departure and destination address together with times should also be recorded.



Q3. Suppose you are given the following requirements specification for the database:

A company provides security services to clients. The company has two types of employees: security consultants and security guards. Security consultants are responsible for conducting security assessments and developing security plans for clients. Security guards provide on-site security services based on the security plans developed by security consultants. The following information is tracked by the company:

- Security consultant: Employee ID (identifier), Name, Address (Street, City, State, and Zip Code), Telephone, Date of Birth, Age, Years of Experience, Degrees Earned
- Security guard: Employee ID (identifier), Name, Address (Street, City, State, and Zip Code), Telephone, Date of Birth, Age, Post/Role, Years of Experience, and Degrees Earned

The company's clients are businesses that request security services. The following information is tracked for each client:

- Client: Client ID (identifier), Company Name, Address (Street, City, State, and Zip Code), Contact Name, Contact Title, Contact Telephone, Business Type, Number of Employees

Clients can have multiple locations that require security services. The following information is tracked for each location:

- Location: Client ID (identifier), Location ID (unique within each client), Address (Street, City, State, and Zip Code), Telephone, Building Size

When a client requests security services, a security consultant develops a security plan that includes details about the type of security services required at each location. The company provides a cost estimate for the security services requested by the client. The following information is tracked for each estimate:

- Estimate: Estimate ID (identifier), Date, Amount, Security Consultant ID, Client ID, Location ID (optional), Service Type (optional)
- After the client approves the estimate, security guards are assigned to provide security services at the specified location(s). The following information is tracked for each service:
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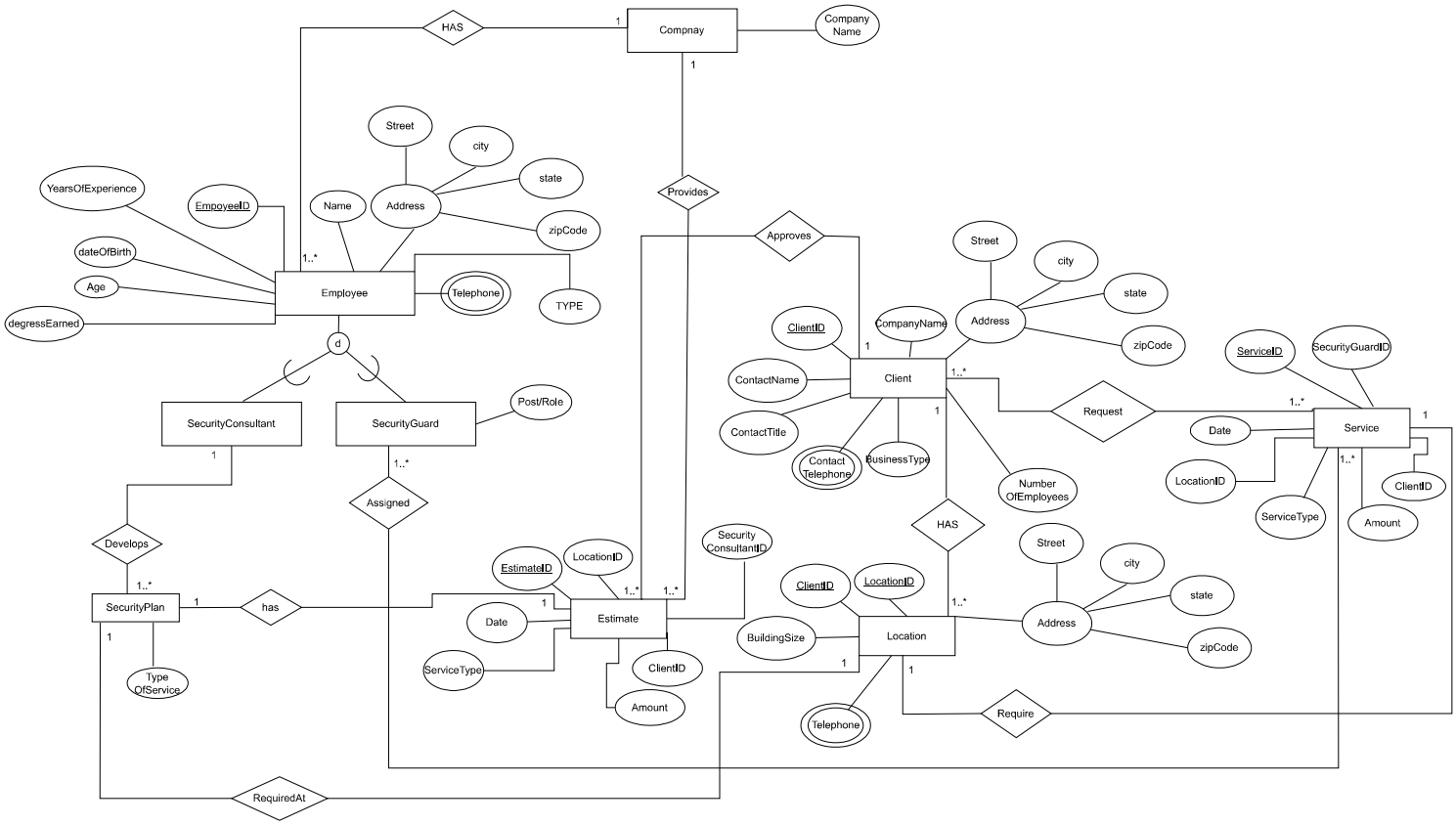
- Service: Service ID (identifier), Date, Amount, Security Guard ID, Client ID, Location ID, Service Type

ANSWER ON NEXT PAGE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