

CPSC 304: Introduction to Relational Databases

Tutorial #1: Entity-Relation Diagrams – Vehicle Rental Application (“SuperRent”)

You will be creating an entity-relationship diagram (ERD). Don’t convert anything to tables using SQL Data Definition Language, in this tutorial. Use the same ERD convention as in the textbook and in class.

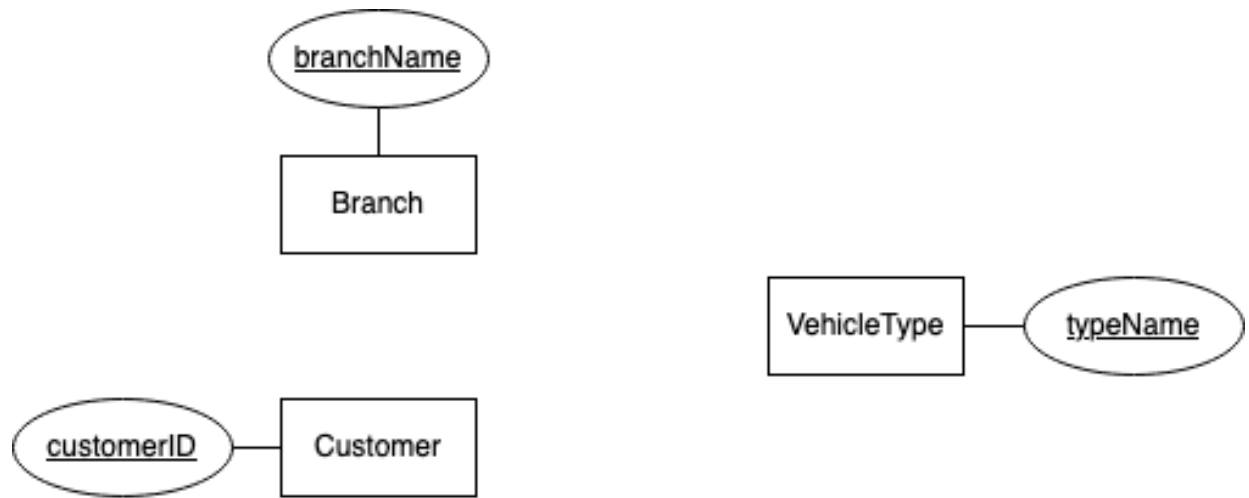
For the tutorial’s specifications and description of the vehicle rental business, refer to the **vehicle_rental_specifications.pdf** document that was uploaded to Canvas for Tutorial 1. We will be using that document extensively for this tutorial and the next one. We will be dealing with a subset of the entities and attributes described in that document.

Before You Start ... Some Comments to Remember:

1. You can draw an ER diagram using any tool you wish, or even by hand, but for consistency, you must use the conventions we have discussed in class—e.g., no Crow’s Foot notation or other textbook’s notation allowed. Many students in previous semesters have downloaded and used the free tool called draw.io, and in fact we used that tool to create the quiz and tutorial questions, but we are not endorsing any particular tool or website for this task.
2. Tutorial answers are generally released at the start of when the next tutorial is released.

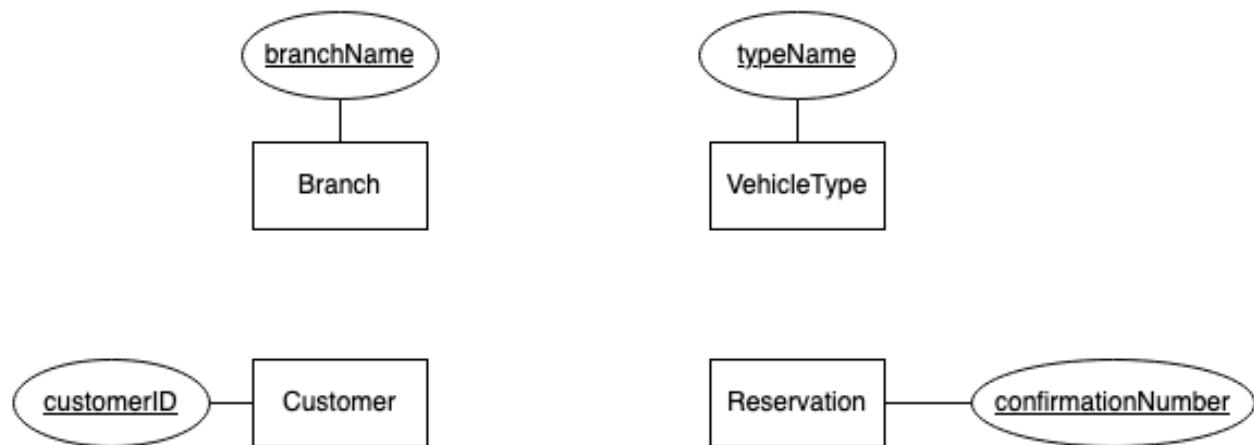
Task #1: Reserving a Vehicle

Below, we have a simple ERD capturing the entities of **Branch**, **VehicleType**, and **Customer**. We have provided each entity's primary key for you. First, carefully read the parts of the Vehicle Rental Specifications that deal with these 3 entities. Then, based on that, create a **ternary relationship** below to represent reserving a vehicle, and add any missing and necessary attributes to the entities. Do not add any more entities.



Task #2: Reserving a Vehicle

Next, we present a different ERD for capturing the entities of **Branch**, **VehicleType**, **Customer**, and **Reservation**. Again, we have provided the primary key for each entity. After carefully reading the descriptions of these entities and their attributes in the Vehicle Rental Specifications, create binary relationships between all 4 entities and add any missing necessary attributes to each entity. Do not add any more entities, and this time **do not use a ternary relationship**.



Task #3: Comparison between the ERD Designs for Task #1 and Task #2

Compare and contrast Task #1 and Task #2 as it pertains to the ternary relationship or lack thereof. Explain in **3-5 sentences** the limitations and advantages of each design (so far). Some things (but not necessarily all) to think about include: Are you able to capture the same information from both designs? Will you lose any information? Is one of the designs going to lead to more work for the database designer? For the user (or the one asking queries), is it going to be more work? Are there some kinds of queries that you can answer using one design, but not in the other?

Task #4: ISA Hierarchy

We now want to add an ISA hierarchy for the vehicle types. Specifically, we want to model the fact that there are two different vehicle types, namely cars and trucks. Extend the diagram from Task #1 to include this ISA hierarchy on the VehicleType. Do not forget to include the ISA constraints/declarations (but do not write any SQL DDL).

Task #5: Overall ERD

Draw an ER diagram that incorporates all entities and relations in vehicle_rental_specifications.pdf document.

To Hand In

Nothing. But make sure that you make a serious effort at this tutorial. 😊