

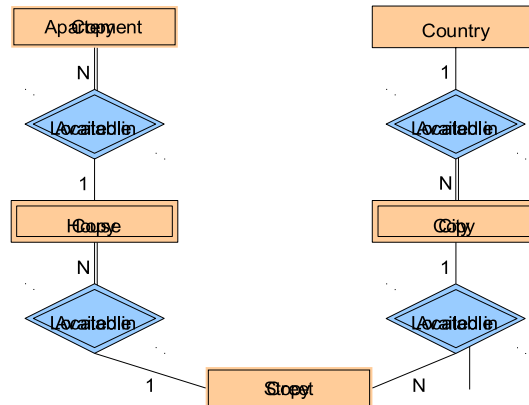
Exercise 1: Entity-Relationship Model

Exercises and Solution

Model the following relationships in ER.

1. An apartment is located in a house in a street in a city in a country.

Solution:



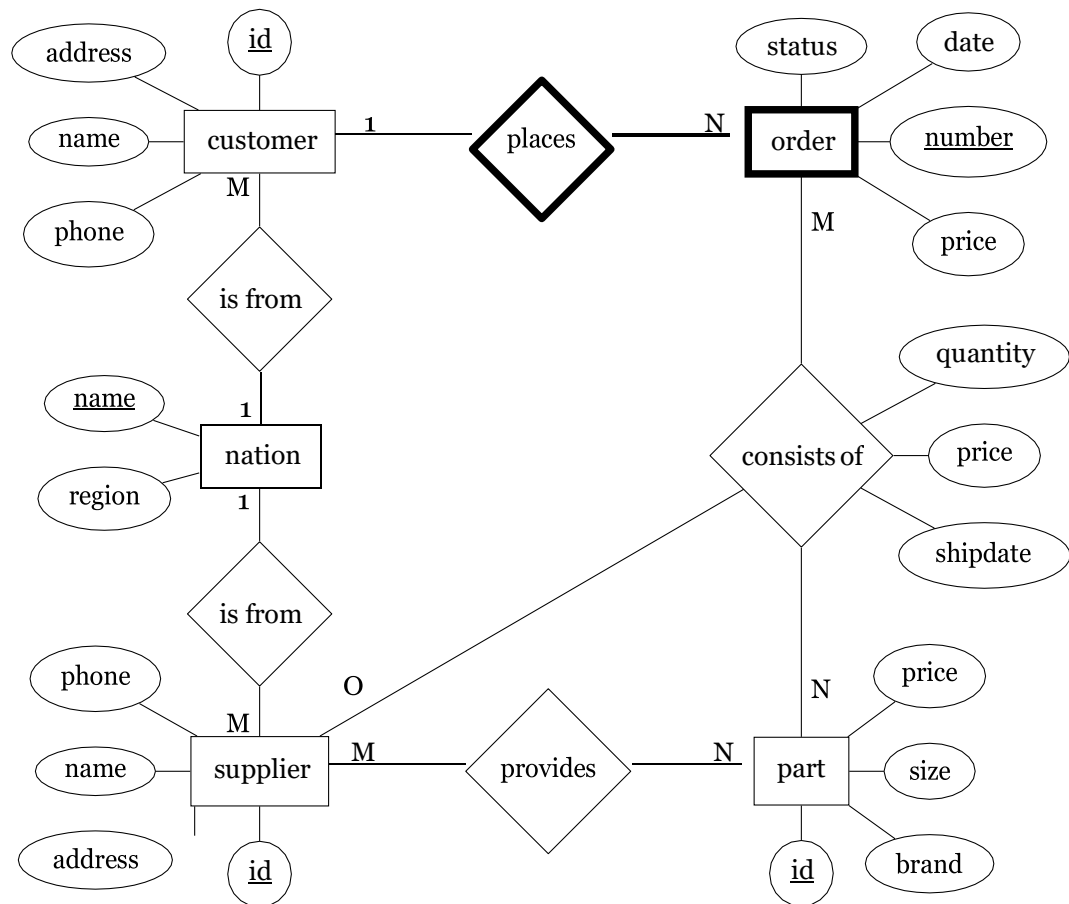
2 International Wholesale Supplier*

Model the following an international wholesale supplier in ER. Identify the keys and give the functionalities of all relationships (e.g. 1:1, N:1, N:M)

The wholesale supplier has customers that place orders, which are placed on a particular date and have a total price, current status, and an order number (starting from 1 for each customer). In each order, a customer can order several parts (products), each in a different quantity and at a (possibly discounted) price. We also want to model the date on which each of the parts has been sent. The parts are provided by suppliers. Each part may be provided by several suppliers

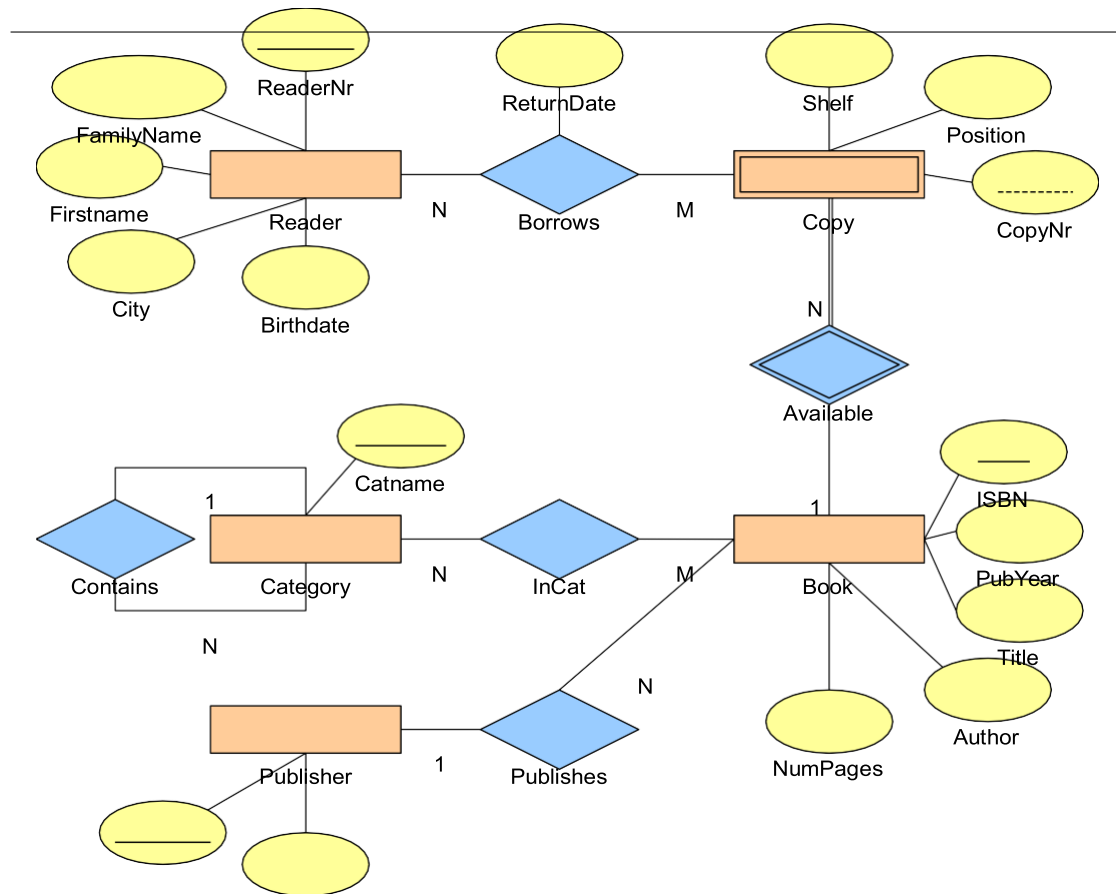
and customers may order the same part of different suppliers in the same order, but in this case, they may have different (retail) prices. Customers and suppliers have a name, an address, a phone number, and a customer/supplier number and they come from a certain nation, which in turn is from a particular region (of the world). Parts have a brand, a size, and a retail price.

Solution:



Library System

Assume there is a library system with the following properties. The library contains one or several copies of the same book. Every copy of a book has a copy number and is located at a specific location in a shelf. A copy is identified by the copy number and the ISBN number of the book. Every book has a unique ISBN, a publication year, a title, an author, and a number of pages. Books are published by publishers. A publisher has a name as well as a location. Within the library system, books are assigned to one or several categories. A category can be a subcategory of exactly one other category. A category has a name and no further properties. Each reader needs to provide his/her family name, his/her first name, his/her city, and his/her date of birth to register at the library. Each reader gets a unique reader number. Readers borrow copies of books. Upon borrowing the return date is stored. Create an ER diagram of this library system.



Crowfoot Notation

Manufacturer – Exercise 01

A manufacturing company produces products. The following product information is stored: product name, product ID and quantity on hand. These products are made up of many components. Each component can be supplied by one or more suppliers. The following component information is kept: component ID, name, description, suppliers who supply them, and products in which they are used. Use Figure B.1 for this exercise.

Create an ERD to show how you would track this information.

Show entity names, primary keys, attributes for each entity, relationships between the entities and cardinality.

Assumptions

- A supplier can exist without providing components.
- A component does not have to be associated with a supplier.
- A component does not have to be associated with a product. Not all components are used in products.
- A product cannot exist without components.

ERD Answer

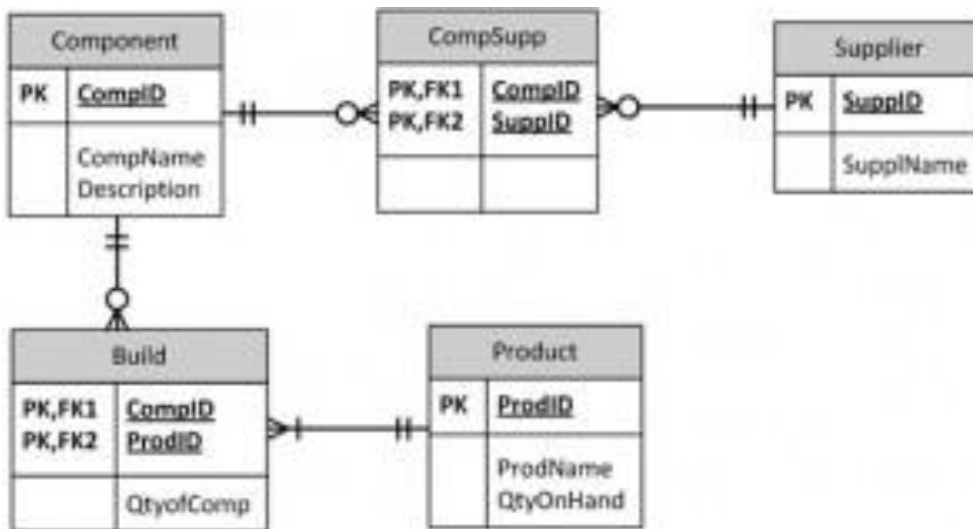
Component(CompID, CompName, Description) PK=CompID

Product(ProdID, ProdName, QtyOnHand) PK=ProdID

Supplier(SuppID, SuppName) PK = SuppID

CompSupp(CompID, SuppID) PK = CompID, SuppID

Build(CompID, ProdID, QtyOfComp) PK= CompID, ProdID



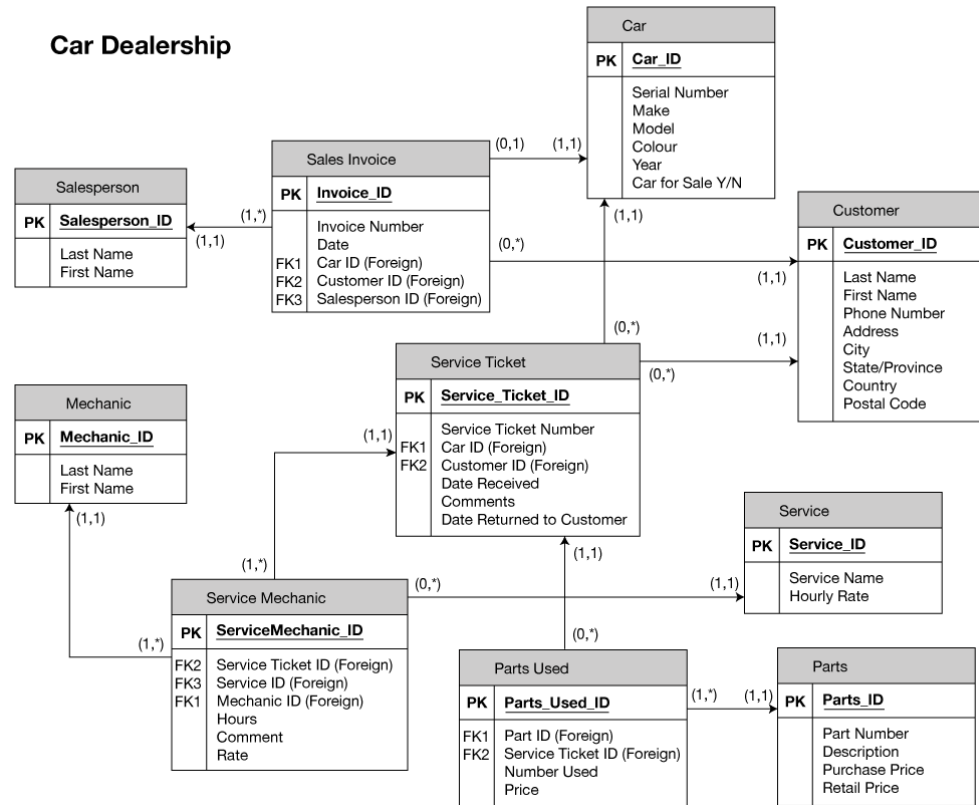
Exercise 2

Car Dealership

Create an ERD for a car dealership. The dealership sells both new and used cars, and it operates a service facility (see Figure B.2). Base your design on the following business rules:

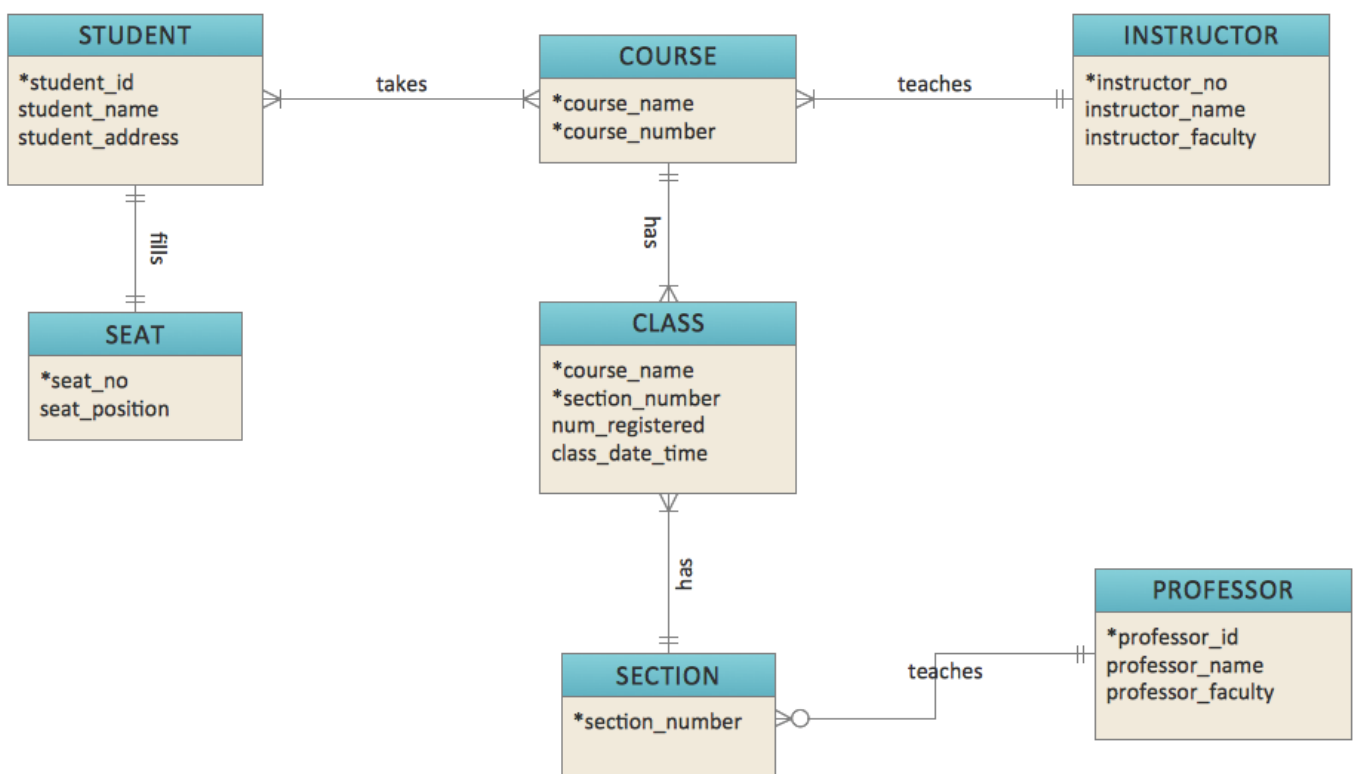
- A salesperson may sell many cars, but each car is sold by only one salesperson.
- A customer may buy many cars, but each car is bought by only one customer.
- A salesperson writes a single invoice for each car he or she sells.
- A customer gets an invoice for each car he or she buys.
- A customer may come in just to have his or her car serviced; that is, a customer need not buy a car to be classified as a customer.
- When a customer takes one or more cars in for repair or service, one service ticket is written for each car.
- The car dealership maintains a service history for each of the cars serviced. The service records are referenced by the car's serial number.
- A car brought in for service can be worked on by many mechanics, and each mechanic may work on many cars.
- A car that is serviced may or may not need parts (e.g., adjusting a carburetor or cleaning a fuel injector nozzle does not require providing new parts).

ERD Answer



An Exercise

Here's a sample crowfoot diagram.



Reference

www.systems.ethz.ch

<https://opentextbc.ca/dbdesign01/back-matter/appendix-b-erd-exercises/>