ERD Example: E-Commerce

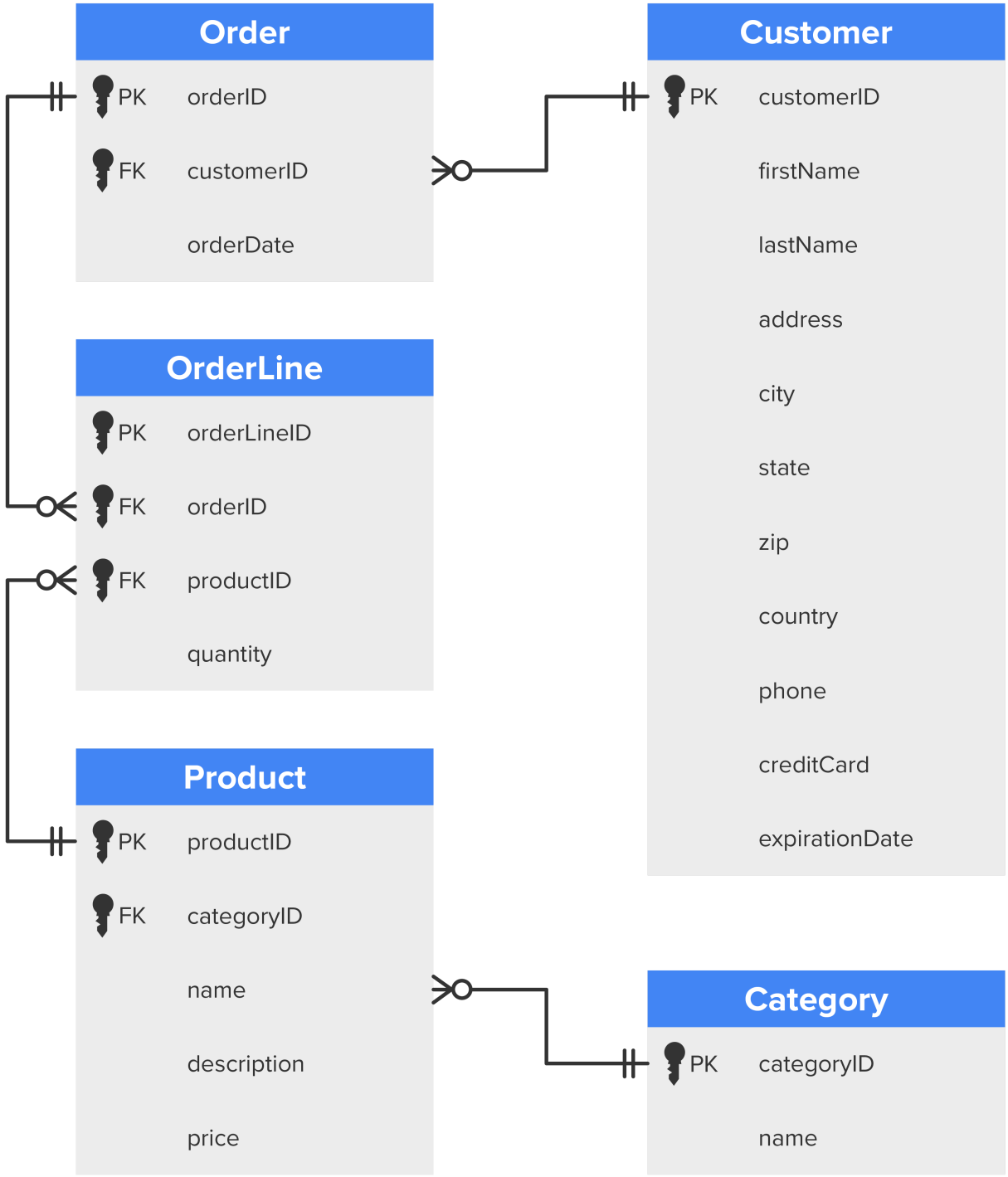
by Sophia

WHAT'S COVERED

In this lesson, you will explore a completed entity-relationship diagram (ERD) for an e-commerce database structure, in two parts. Specifically, this lesson covers:

1. Introduction

When a database designer receives an ERD, they will start working through the diagram to see if there are any issues with how the database was constructed. In this lesson, we will explore the ER diagram below and see if we can spot any potential issues.



For an experienced designer, some items become apparent quickly in the above diagram. These include:

EXAMPLE

- Currently, the user can only have a single address for shipping and billing and cannot store multiple addresses.
- The user would only have a single phone number, and the type of phone cannot be specified, whether it is an office, cell phone, landline, or even a fax number.
- The user can only have a single credit card.
- From an order perspective, if the product's price changes at any given point, there is no way to indicate the price the customer had purchased a product for at that given time.
- A product could also belong to multiple categories, but with this setup, a product could only belong to a single category.

Because the ER diagram enables us to see how the database would be built, we have an opportunity to review it before being built and identify issues that need to be addressed. We could work in a team or brainstorming session to develop this initial database. The important thing here is to make the database as correct as possible, using the ER diagram to spot issues early. This saves time, money, and effort when working on database design.

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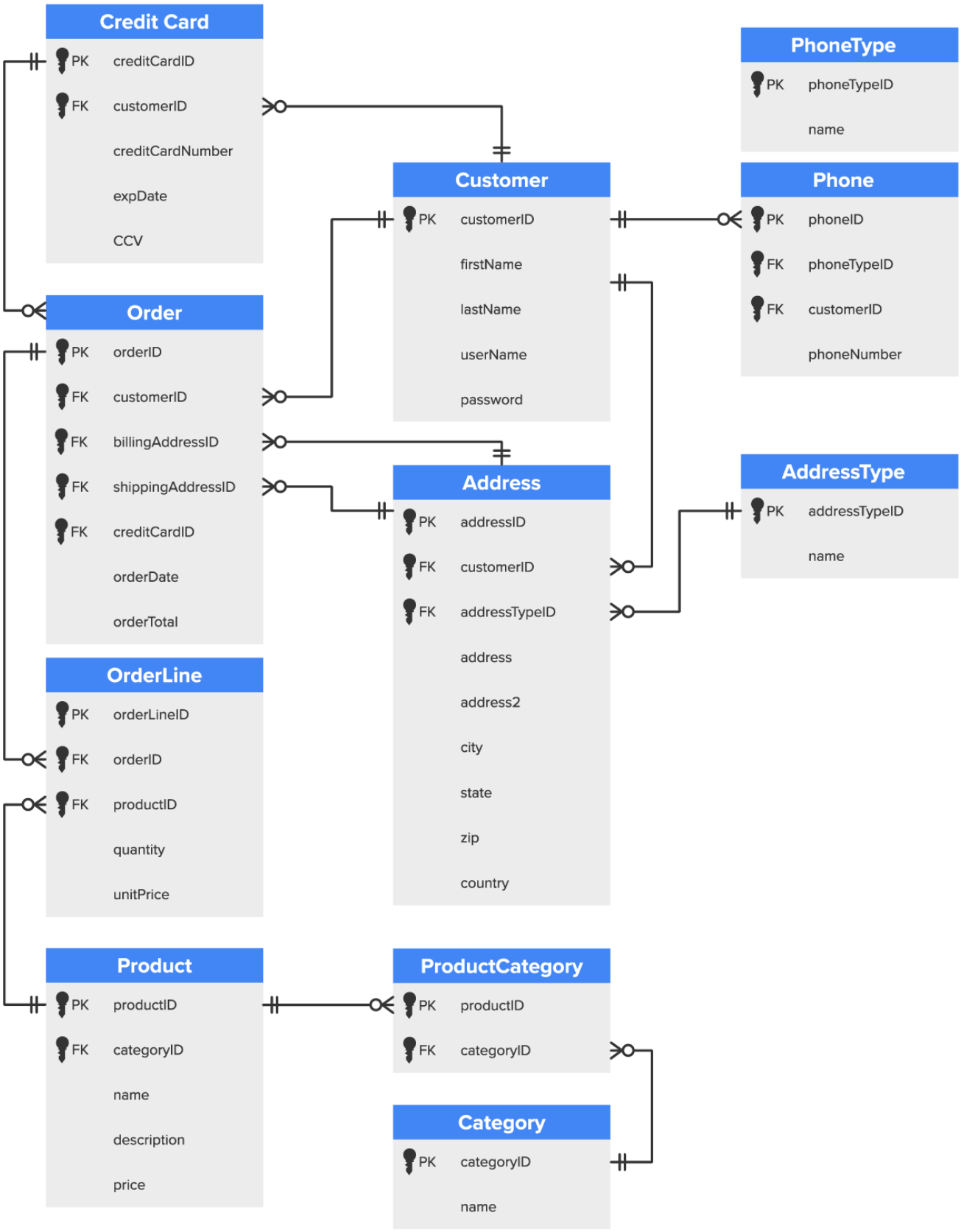
2. Adding Details

The next step is to resolve the identified issues within the initial ERD. Our data model becomes more complex as we attempt to solve all four problems.



The following are potential solutions. Remember that all designs are interactive, and we have yet to even normalize the database at this point. We're just working out what the relationships will be among the fact tables.

Here are the changes made in the above diagram to resolve the issues:

1. The AddressType and PhoneType are set up as lookup tables. For example, the PhoneType will have values in the name like Work, Mobile, Home, and Fax. The AddressType will have values in the name like Billing and Shipping. In the Order table, Billing and Shipping each have their own unique ID: billingAddressID and shippingAddressID. Each of them is connected to the Address table directly to avoid the chasm trap. With those values in place, if the customer has multiple billing or shipping addresses, you will know which address is being used for each.
2. In the OrderLine table, there is a unitPrice field that will contain the price used for the order.
3. The database now stores the orderTotal in the Order table as a discount that could be used later on (which you have not identified but will be a feature of the shopping site, coupon codes, discounts, and other customer-centric savings plans).
4. To resolve the many-to-many relationship between the product and category, there is now a ProductCategory table that maps the relationship as two one-to-many relationships.

This complete ERD describes a more complete structure for the e-commerce database, but you still need to consider any business rules and criteria. This is a good start in learning how to read an ERD and thinking about improving it. Often you will be working in a team, either brainstorming or working out initial designs, at this stage of an ERD.

SUMMARY

In this lesson, you learned in the **introduction** that you begin by identifying issues that exist in the initial ERD design of an e-commerce database. Next, you learned how to strategically **add details** to the ERD, like lookup tables and additional values, to get a more complete structure. You learned that at this ERD level, you often work in a team, brainstorming what the final database would look like. You also learned that this design is still being optimized; you will need to address additional information like normalization and performance as you build out more of this database design.

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