



# Database Design

6-3

Second Normal Form



# Objectives

This lesson covers the following objectives:

- Define the rule of Second Normal Form in the normalization process
- Examine a non-normalized entity and determine which rule, or rules of normalization are being violated
- Apply the rule of Second Normal Form to resolve a violation in the model

# Purpose

- Your goal as a database designer is to “store information in one place only and in the best possible place.”
- Consistently applying the rules of normalization helps you achieve this goal.
- When organizing information such as your friends’ phone numbers and addresses, you want to make sure that you store that information in the appropriate place -- such as a personal address book.

# Purpose

- If you store a friend's address in your recipe box, for instance, you may not find it until the next time you look up that recipe.
- Normalization is a process that helps eliminate these kinds of problems.



# Second Normal Form Example

- Examine the entity PRODUCT SUPPLIER.
- The UID is a composite UID consisting of the supplier number and the product number.
- If one supplier supplies 5 different products, then 5 different instances are created.
- What happens if the supplier name changes?

## PRODUCT SUPPLIER

# supplier number  
# product number  
\* purchase price  
\* supplier name

# Second Normal Form Example

- The supplier name would then need to be changed in 5 different instances.
- What if some of them were changed, but not others?
- How would users know which name is the correct name?

## PRODUCT SUPPLIER

# supplier number  
# product number  
\* purchase price  
\* supplier name

# Second Normal Form Description

- Second Normal Form (2NF) requires that any non-UID attribute be dependent on (be a property of, or a characteristic of) the entire UID.
- Is purchase price a property of supplier number, product number, or both?

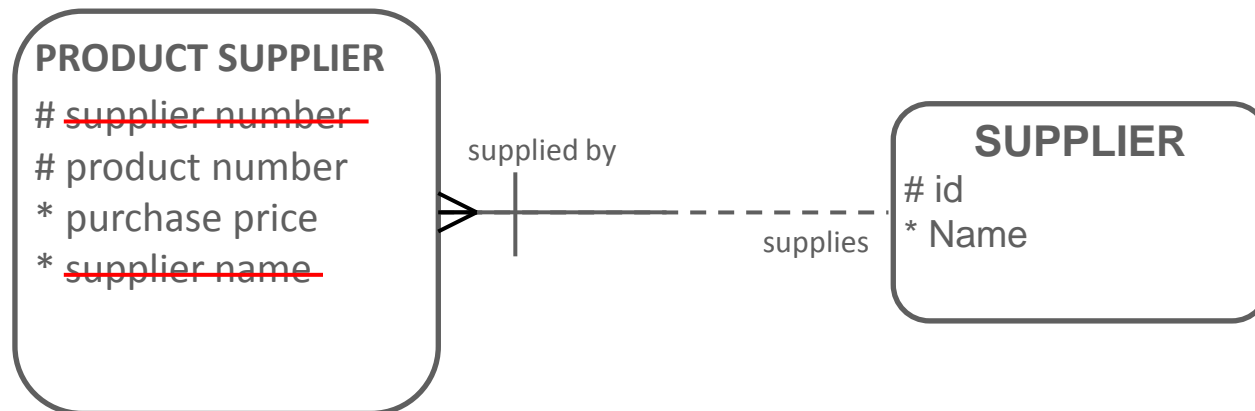
## PRODUCT SUPPLIER

# supplier number  
# product number  
\* purchase price  
\* supplier name



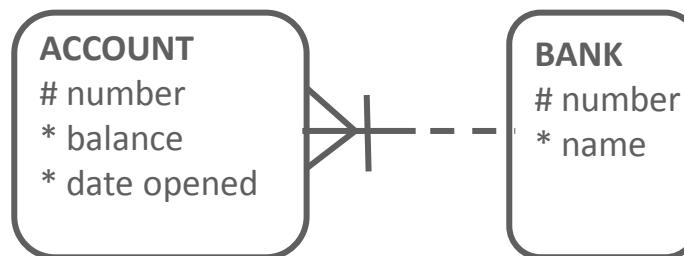
# Second Normal Form Description

- Is supplier name a property of supplier number, product number, or both?
- 2NF requires a “both” answer to each question.



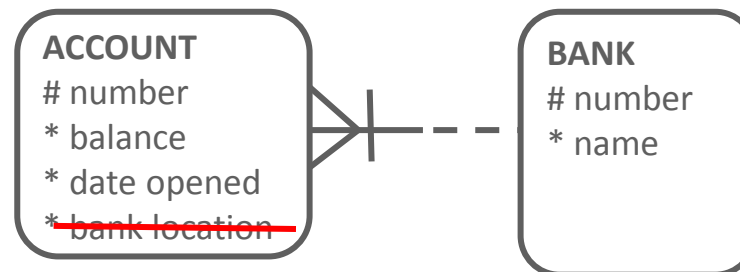
# Second Normal Form Bar Relationship

- The UID for ACCOUNT is a composite UID from a barred relationship consisting of ACCOUNT number and BANK number.
- Is balance a property of ACCOUNT number, BANK number, or both?
- Is date opened a property of ACCOUNT number, BANK number, or both?



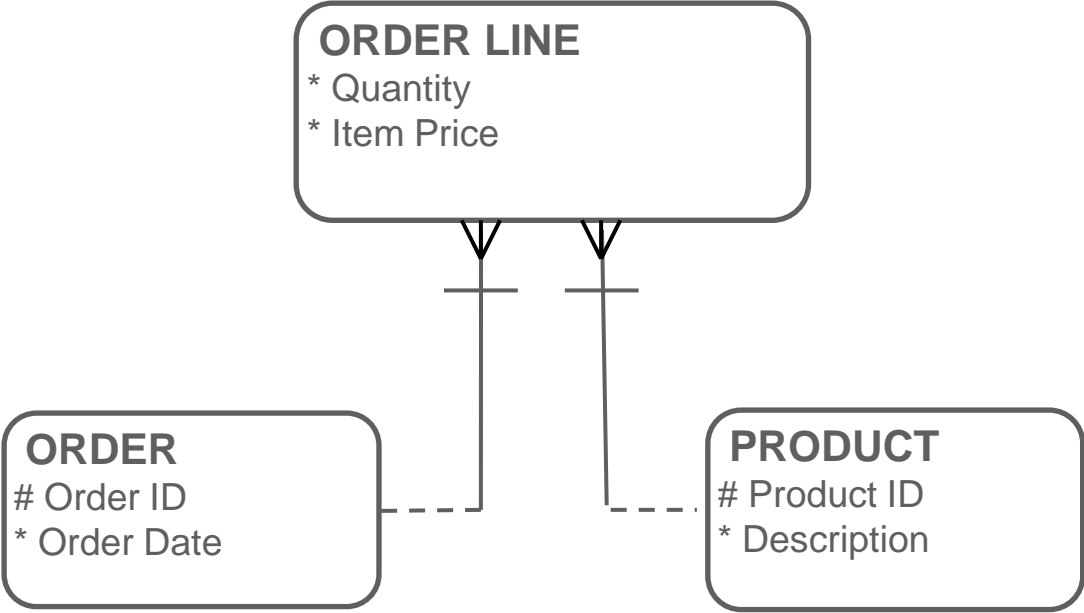
# Second Normal Form Violation

- In this ERD, the attribute bank location has been added. Is bank location a property of ACCOUNT number, BANK number, or both?
- It is a property of BANK number only and is thus misplaced. This is a violation of Second Normal Form.
- What would happen if a bank's location changed?
- Every account at that bank would need to be updated.



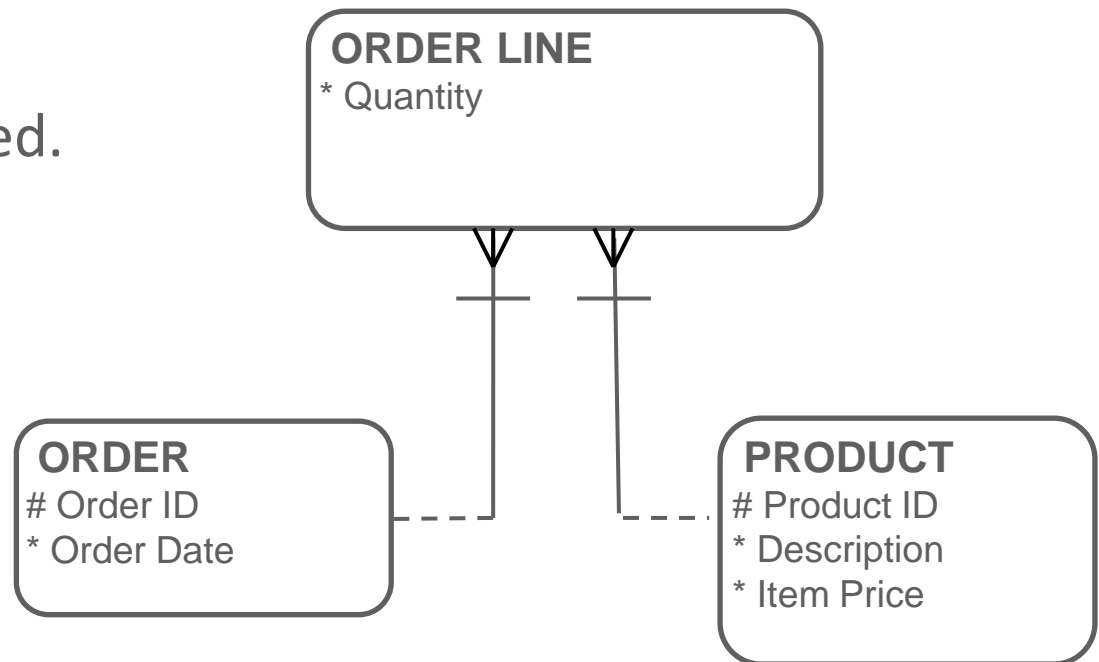
# Order ERD

- What is wrong with this diagram?



# Order ERD

- The ERD is now in 2NF
- Answer: The price attribute is misplaced.
- Item Price depends solely on PRODUCT.
- This is a violation of Second Normal Form.



# Terminology

Key terms used in this lesson included:

- Second Normal Form (2NF)

# Summary

In this lesson, you should have learned how to:

- Define the rule of Second Normal Form in the normalization process
- Examine a non-normalized entity and determine which rule, or rules of normalization are being violated
- Apply the rule of Second Normal Form to resolve a violation in the model

