RELATIONAL DATABASES

BSc IoT

Objectives

- Define the rule of Second Normal Form in the normalisation process

- Examine a non normalised entity and determine which rule or rules of normalisation are being violated

- Apply the rule of second normal form to resolve a violation in the model

Purpose

- Storing data in the correct or most appropriate place is very important in the design of relational databases.

- If you store a friend's email address in your college notes you may not find it until the next time you look up those notes.

- Normalisation helps to eliminate these kinds of problems

Second Normal Form (2NF)

- Examine the entity PRODUCT SUPPLIER

- The UID is a composite UID 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?

- The supplier name would need changing in 5 places, what would be the effect if some were changed but not all? How would users know which was the correct name?

- This occurs when an attribute is dependent on only part of a composite key.

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

Second Normal Form (2NF)

- 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 or product number? Or both. Is supplier name a property of supplier number or product number?

- 2NF allows us to validate that every attribute is in the correct entity.

- An entity is in 2NF if it has a simple UID

Second Normal Form (2NF)

- Is supplier name a property of supplier number, product number, or both?

- 2NF requires a "both" answer to the question.

- To convert the example shown to 2NF, we need to create a SUPPLIER entity (it is does not already exist), and move supplier name attribute to the SUPPLIER entity.

- In this case we can also remove the supplier number from the entity and bar the relationship so that supplier number is used with product number for the composite UID
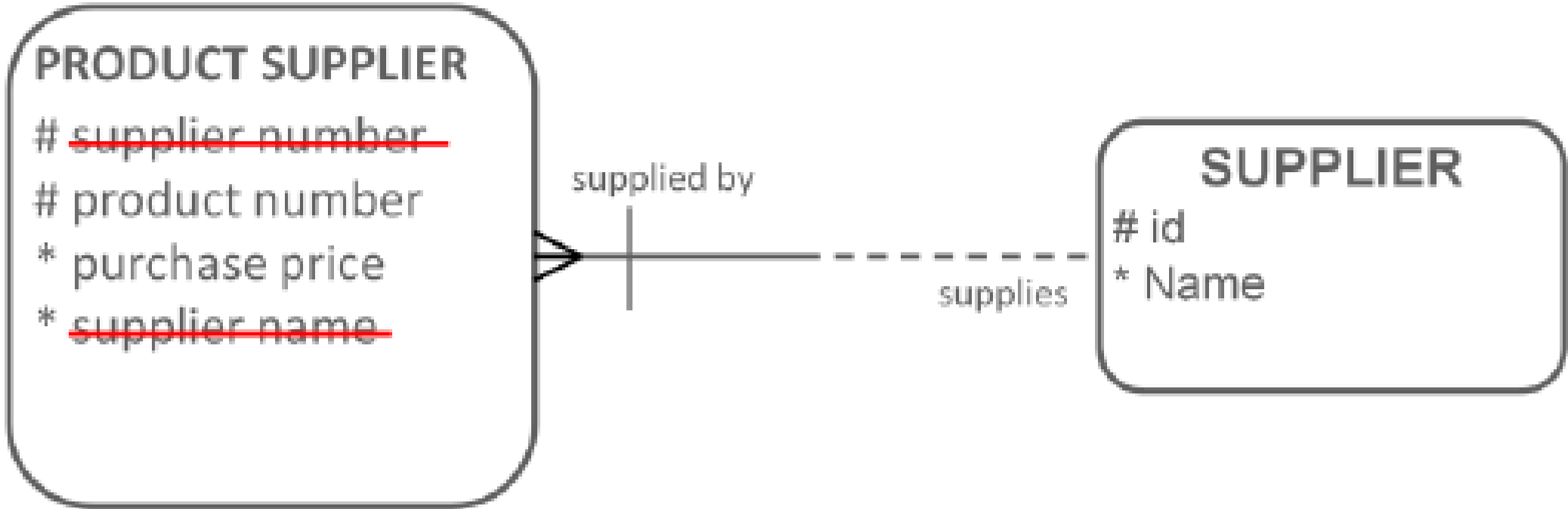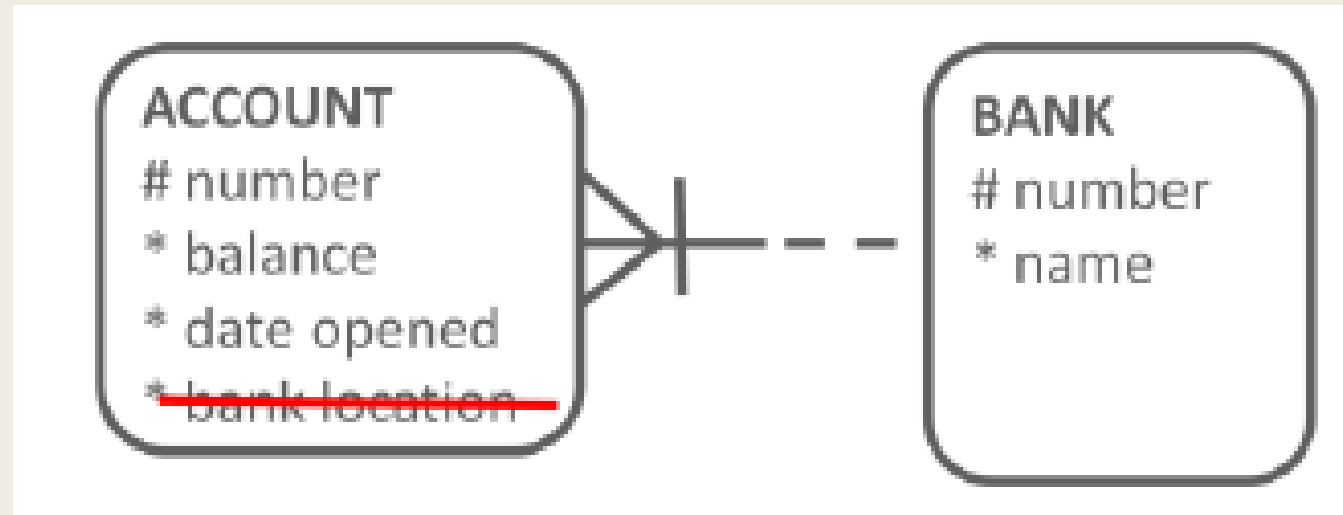
Second Normal Form Bar Relationship

- 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?
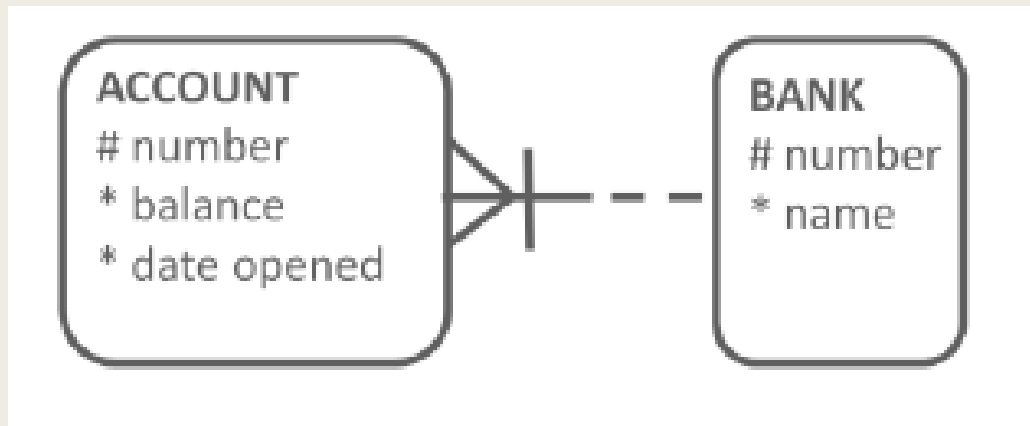
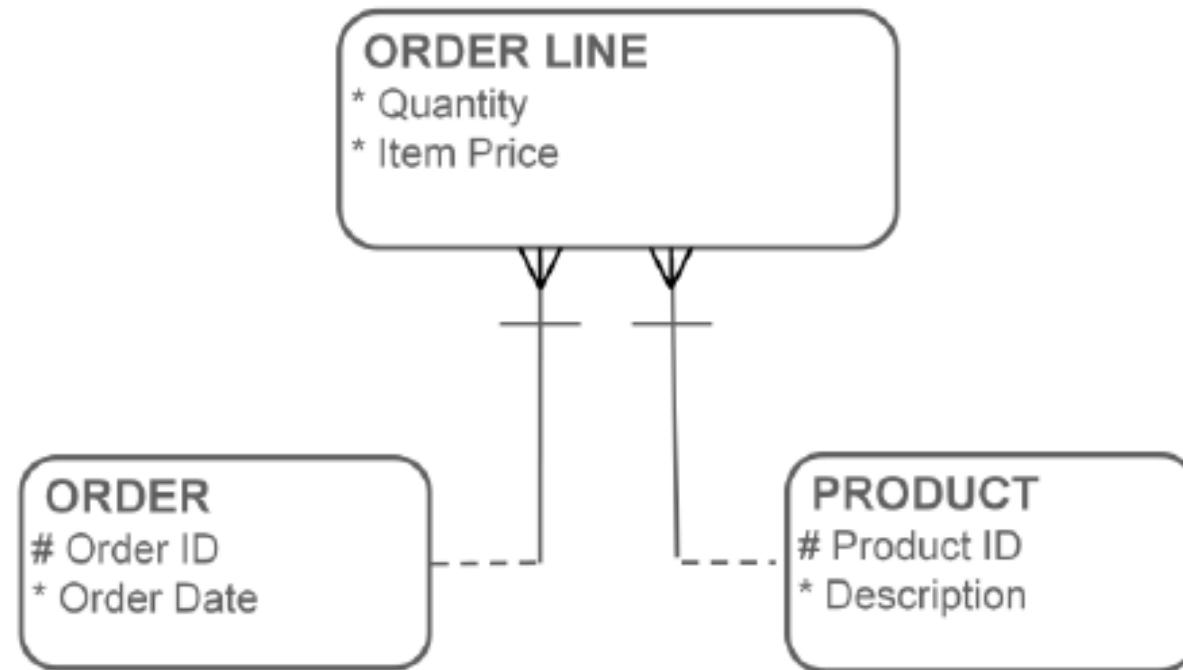# Second Normal Form Violation

- If we adjusted the ERD and the attribute bank location had been added. Is bank location a property of ACCOUNT number, BANK number, or both?

- It is a property of BANK number but not ACCOUNT number.

- If the bank location changed it would have to be changed for every account at the bank.

- It is thus removed from ACCOUNT and placed in BANK which is the correct and most appropriate place for the attribute.

2NF solution

Example

Solution