Perancangan Basis Data(IFWP1007)
3 sks

Major: Informatics

Topic: Third Normal Form

Dosen Pengampu

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Skills

Objectives

This lesson covers the following objectives:

- Identify transitive dependencies in a data model
- Define the rule of Third 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 Third Normal Form to resolve a violation in the model

Purpose

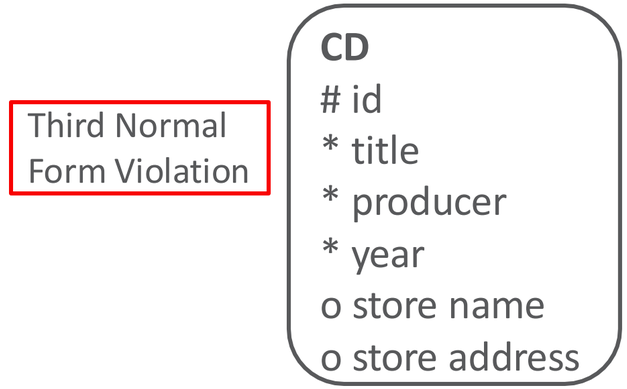
- Your goal as a database designer is to "store information in one place only and in the best possible place."
- Following the rules of normalization helps you achieve this goal.
- You may want to enter different kinds of information for a friend in your personal address book: phone number, address, name of school or place of work.

Purpose

- If you have several friends who go to the same school, and you enter the school's street address along with each of them, you would not only be duplicating data but causing potential problems - for instance, if the school moved and changed its address, you would have to go back and change it everywhere!
- Normalization is a process to eliminate these kinds of problems.

Third Normal Form Rule

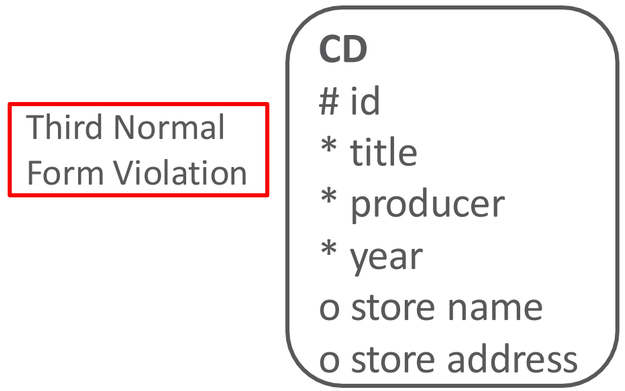
- The rule of Third Normal Form (3NF) states that no non-UID attribute can be dependent on another non-UID attribute.
- Third Normal Form prohibits transitive dependencies.
- A transitive dependency exists when any attribute in an entity is dependent on any other non-UID attribute in that entity.



Apa itu *"transitive dependency"*? Transitive dependency biasanya terjadi pada tabel hasil relasi, atau kondisi dimana terdapat tiga atribut A, B, C. Kondisinya adalah A ⇒ B dan B ⇒ C. Maka C dikatakan sebagai transitive dependency terhadap A melalui B.

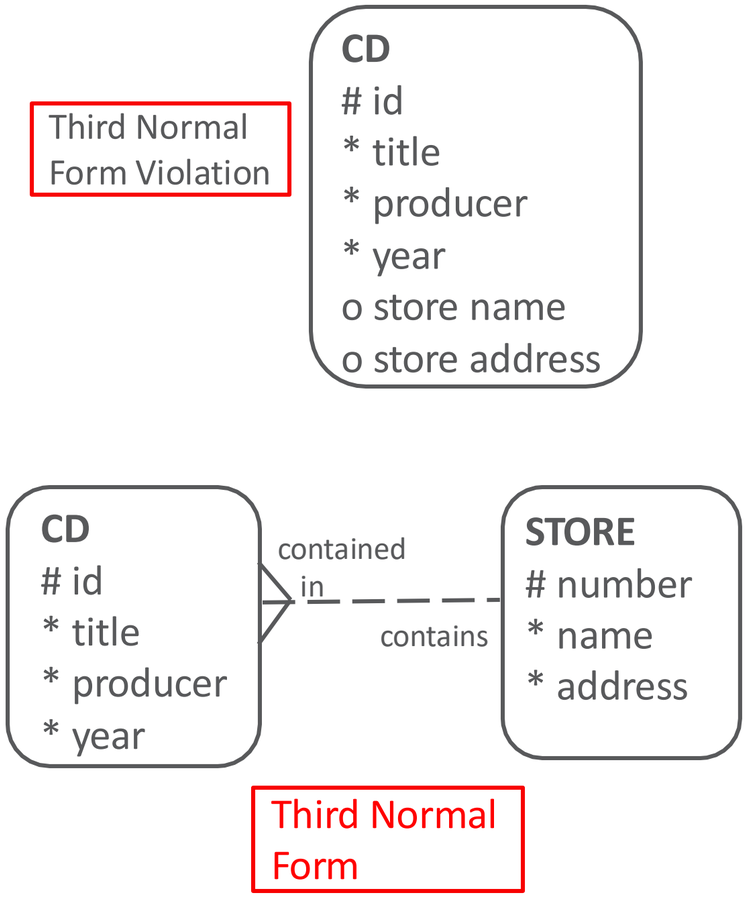
Third Normal Form Rule

- Think of the kind of information you'd like to store about your CD collection.
- Does information about the store where you bought the CD belong in the same entity?
- If the store address changed, you would have to change the information on all the CDs that were bought at that store.



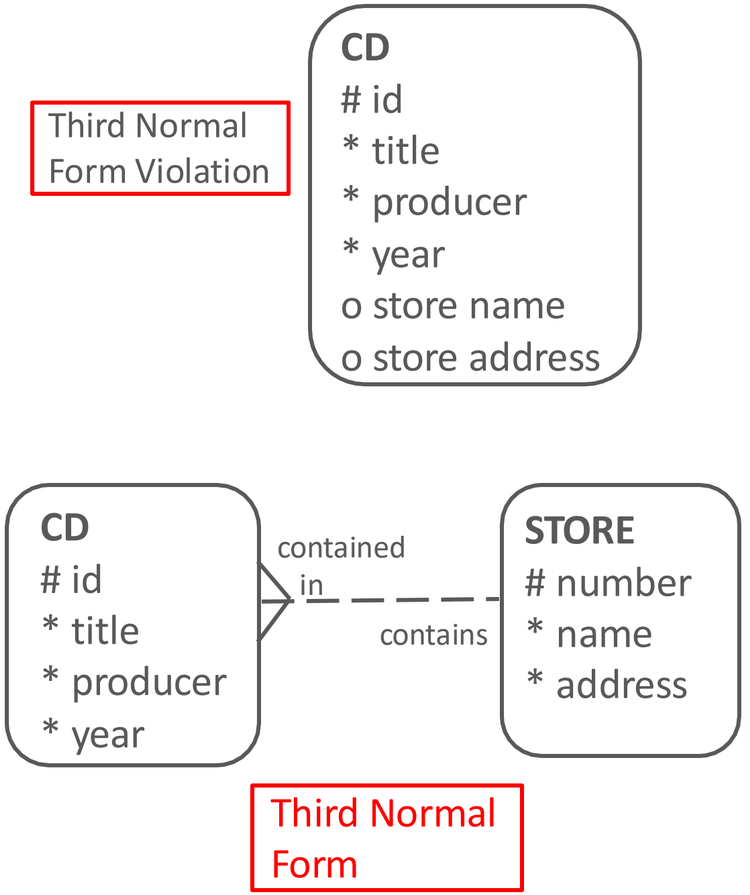
Third Normal Form Transitive Dependency

- The store address is dependent on the CD number, which is the UID of the CD entity. So this entity is in 1NF and 2NF.
- But store address is also dependent on store name, which is a non-UID attribute.
- This is an example of a transitive dependency and a violation of Third Normal Form.



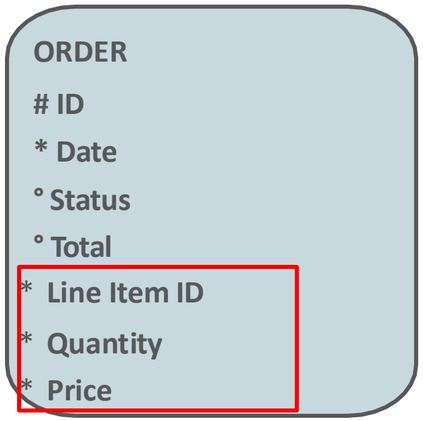
Third Normal Form Transitive Dependency

- The correctly normalized model is shown here: create a second entity STORE, with a relationship to CD.



Third Normal Form (3NF)

- Each attribute depends only on the UID of its entity.
- Move any non-UID attribute that is dependent on another non-UID attribute into a new entity.



The Quantity and Price attributes are dependent on the ORDER table ID (UID) and Line Item ID (non-UID). Therefore, this is not 3NF

Create a new `ORDER ITEM` entity. Move the Line Item ID, Quantity, and Price attributes to the new entity, and then create an identifying relationship.

2NF

Tabel Barang

kode_barang	nama_barang	harga
BRG_001	Indomie Goreng	2500
BRG_002	Indomie Goreng Jumbo	3000
BRG_003	Mie Sedaap Goreng	2500
BRG_004	Mie Sedaap Soto	2300
BRG_005	Intermie Goreng	1500
BRG_006	Intermie Soto	1500
BRG_007	Pop Mie Ayam	4500

Tabel Transaksi

kode_faktur	tanggal	kode_barang	qty
KD_001	13/07/2020	BRG_001	5
KD_001	13/07/2020	BRG_002	8
KD_001	13/07/2020	BRG_003	9
KD_001	13/07/2020	BRG_004	3
KD_002	13/07/2020	BRG_005	6
KD_002	13/07/2020	BRG_006	6
KD_003	14/07/2020	BRG_007	3

3NF

Tabel Barang

kode_barang	nama_barang	harga
BRG_001	Indomie Goreng	2500
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Tabel Transaksi

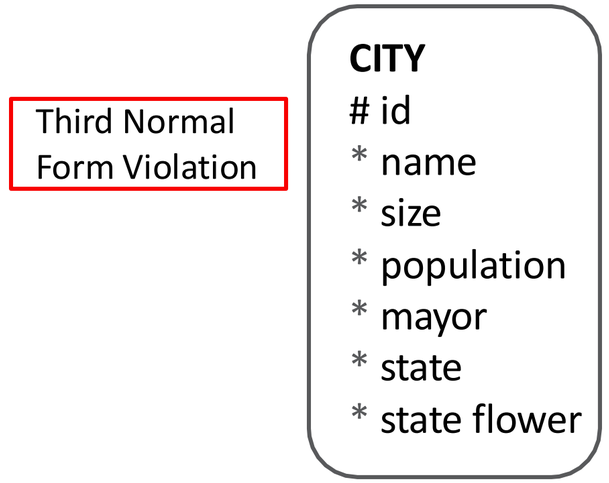
kode_faktur	tanggal
KD_001	13/07/2020
KD_002	13/07/2020
KD_003	14/07/2020

Tabel Detail Barang

kode_faktur	kode_barang	qty
KD_001	BRG_001	5
KD_001	BRG_002	8
KD_001	BRG_003	9
KD_001	BRG_004	3
KD_002	BRG_005	6
KD_002	BRG_006	6
KD_003	BRG_007	3

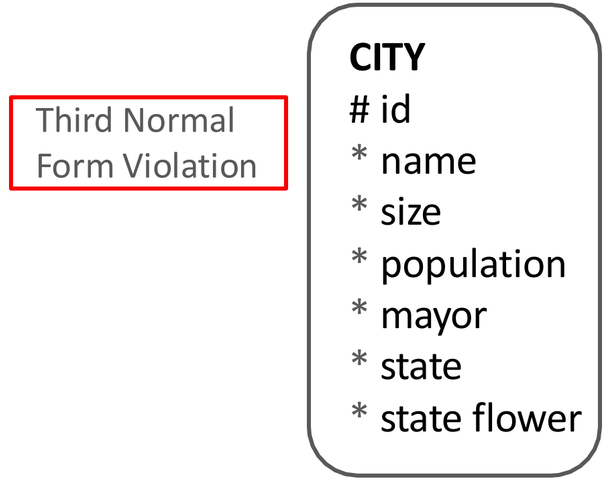
Third Normal Form Example

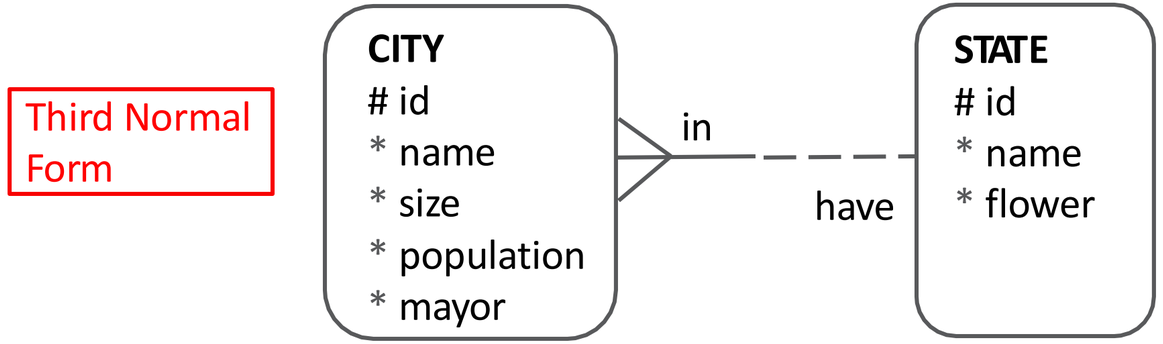
- Consider a system that tracks information about cities - size, population, mayor, and so on.
- The first model shows an entity that includes state information.
- Although state is an attribute of city, state flower is really an attribute of state.



Third Normal Form Example

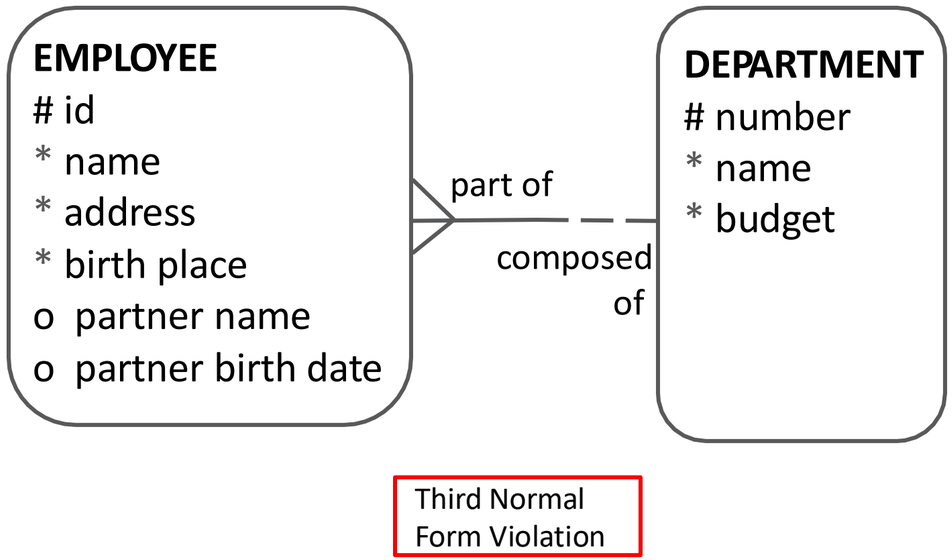
- The second model, with a new entity STATE, is in Third Normal Form.





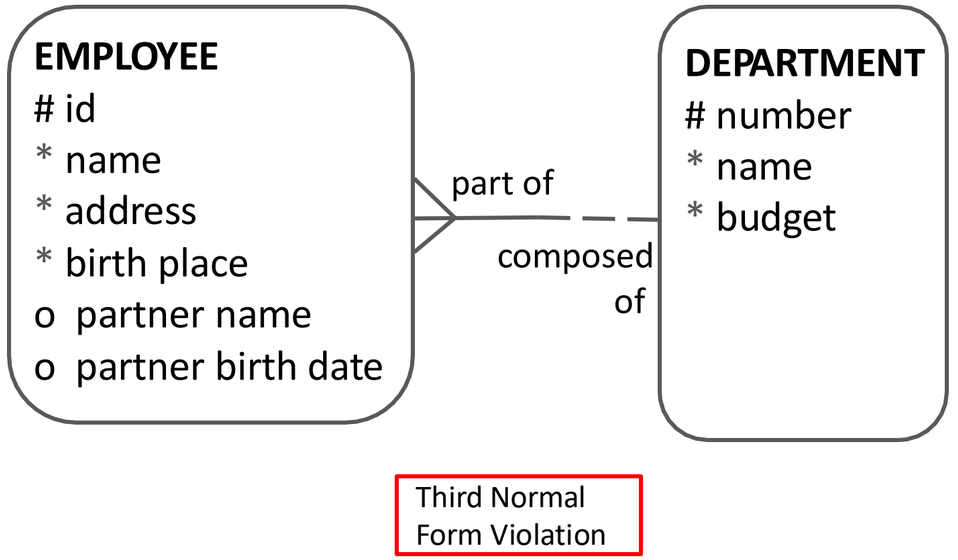
Third Normal Form Second Example

- In this example, assume the following business rule: each employee can have one partner.
- This model violates Third Normal Form because partner birth date is an attribute of partner, not of EMPLOYEE.



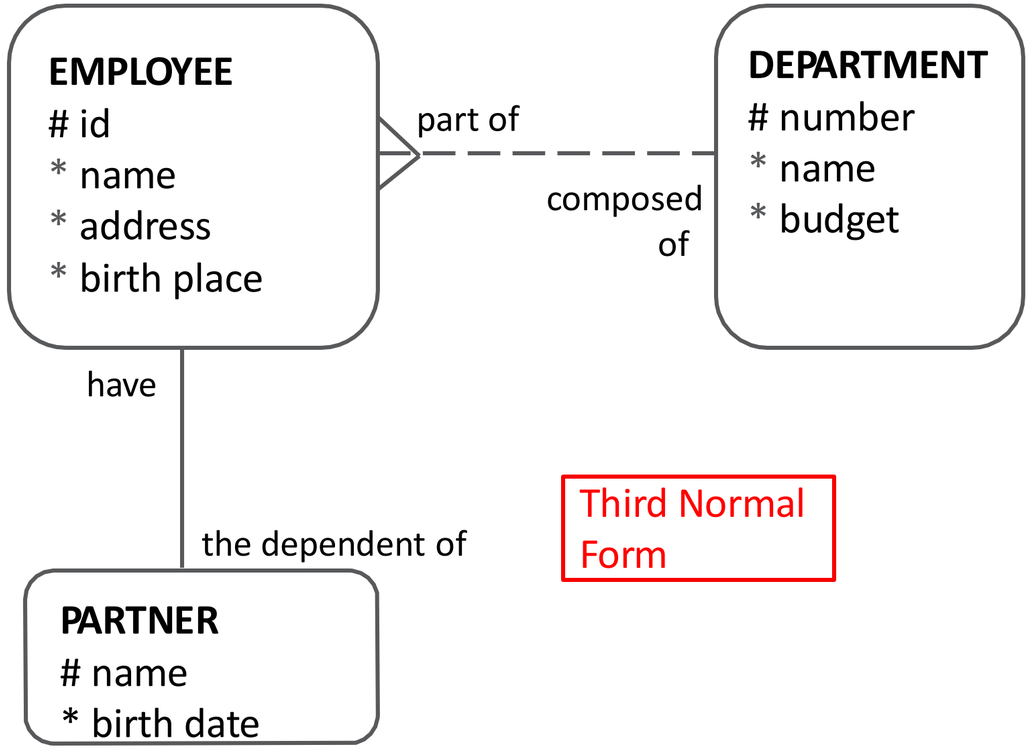
Third Normal Form Second Example

- Another way of stating Third Normal Form: non-UID attributes can't have attributes of their own.



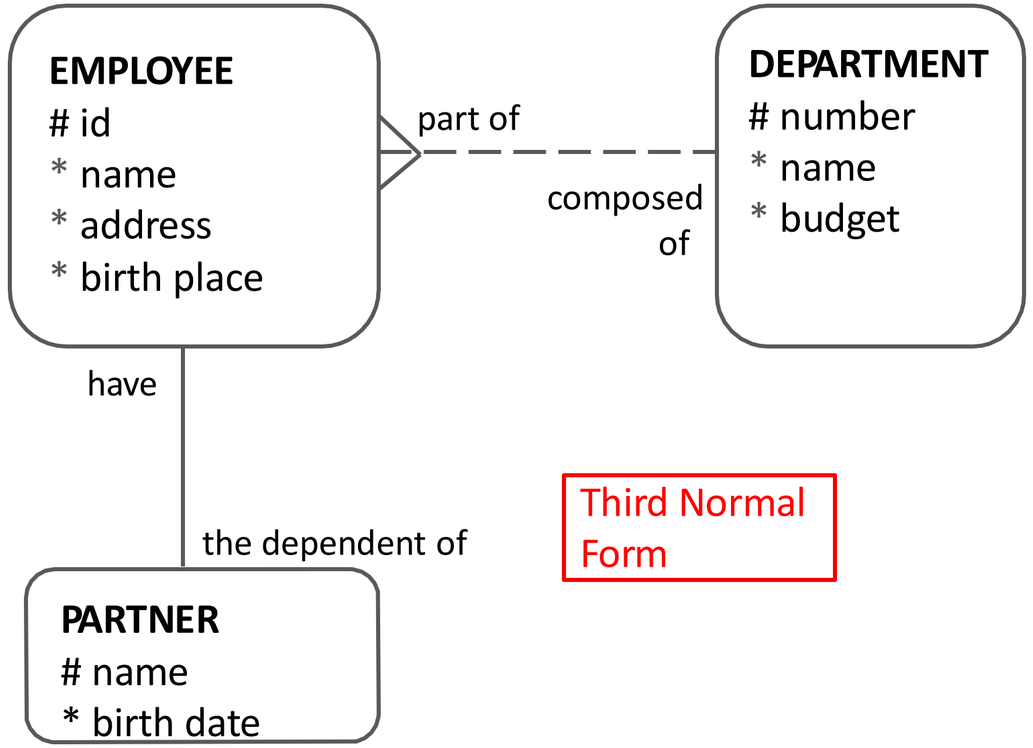
3NF Second Example Solution

- This model supports Third Normal Form because partner birth date is an attribute of partner, not of EMPLOYEE.



3NF Second Example Solution

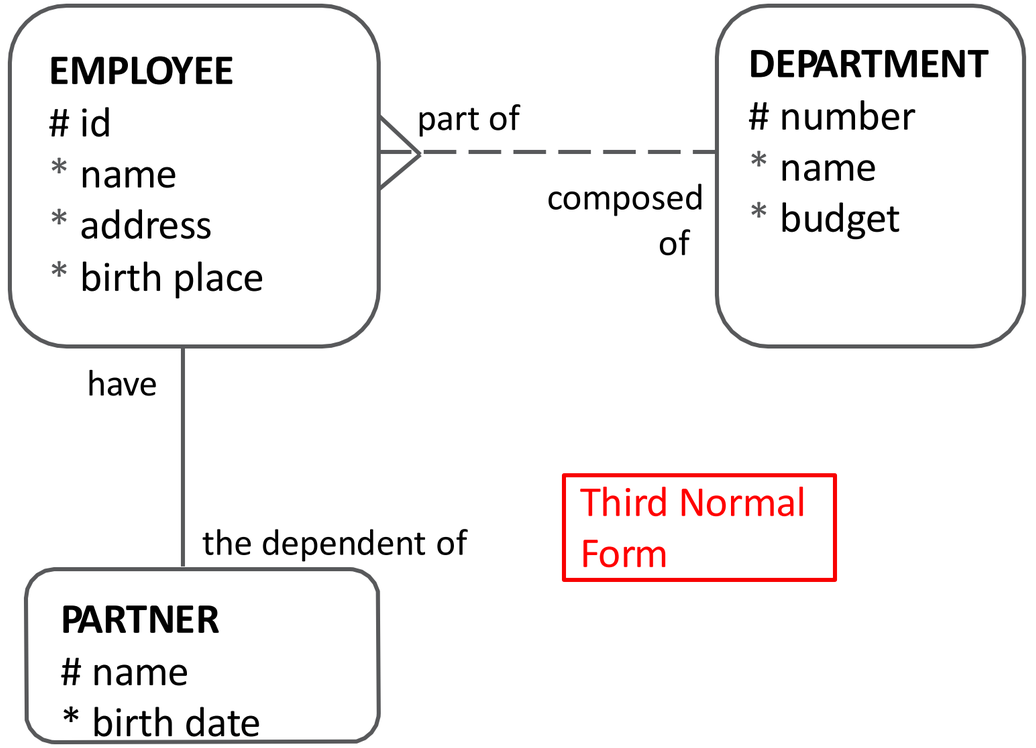
- The 1:1 relationship is optional on the EMPLOYEE end because some employees will not have partners.



Third Normal Form

3NF Second Example Solution

- It is mandatory on the PARTNER end because information about a partner is tracked only if that person is a partner of one and only one EMPLOYEE.



Tabel tidak memenuhi Third Normal Form

- Book ID merupakan primary key dan menentukan Category ID, dimana Category ID menentukan Category desc. Dengan kata lain Category Desc bergantung pada Category ID.
- Oleh karena itu, Book ID juga menentukan Category Desc melalui Category ID.

Book ID	Category ID	Category Desc	Price
1	1	Cooking	$27.99
2	2	Travel	$17.99
3	1	Cooking	$20.99
4	3	Computers	$40.99
5	2	Travel	$19.99

Book ID	Category ID	Category Desc	Price
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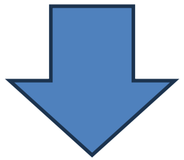

TABLE: BOOK_PRICE_DETAILS

Book ID	Category ID	Price
1	1	$27.99
2	2	$17.99
3	1	$20.99

TABLE: BOOK_PRICE_DETAILS

Book ID	Category ID	Price
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3	1	$20.99
4	3	$40.99
5	2	$19.99

Setiap atribut harus bergantung langsung pada primary key, dan menghapus semua atribut yang tidak bergantung pada primary key.

TABLE2: CATEGORY_DETAILS

Category ID	Category Desc
1	Cooking
3	Computers
2	Travel

Terminology

Key terms used in this lesson included:

- Third Normal Form (3NF)
- Transitive dependency

Summary

In this lesson, you should have learned how to:

- Identify transitive dependencies in a data model
- Define the rule of Third 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 Third Normal Form to resolve a violation in the model

Thank You

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