1814ict/2814ict/7003ict/1011ICT: Data Management/ Database Design/ Applied Computing

Topic 3.2: Normalisation & Database Schema

(Chapters 6 & 7)

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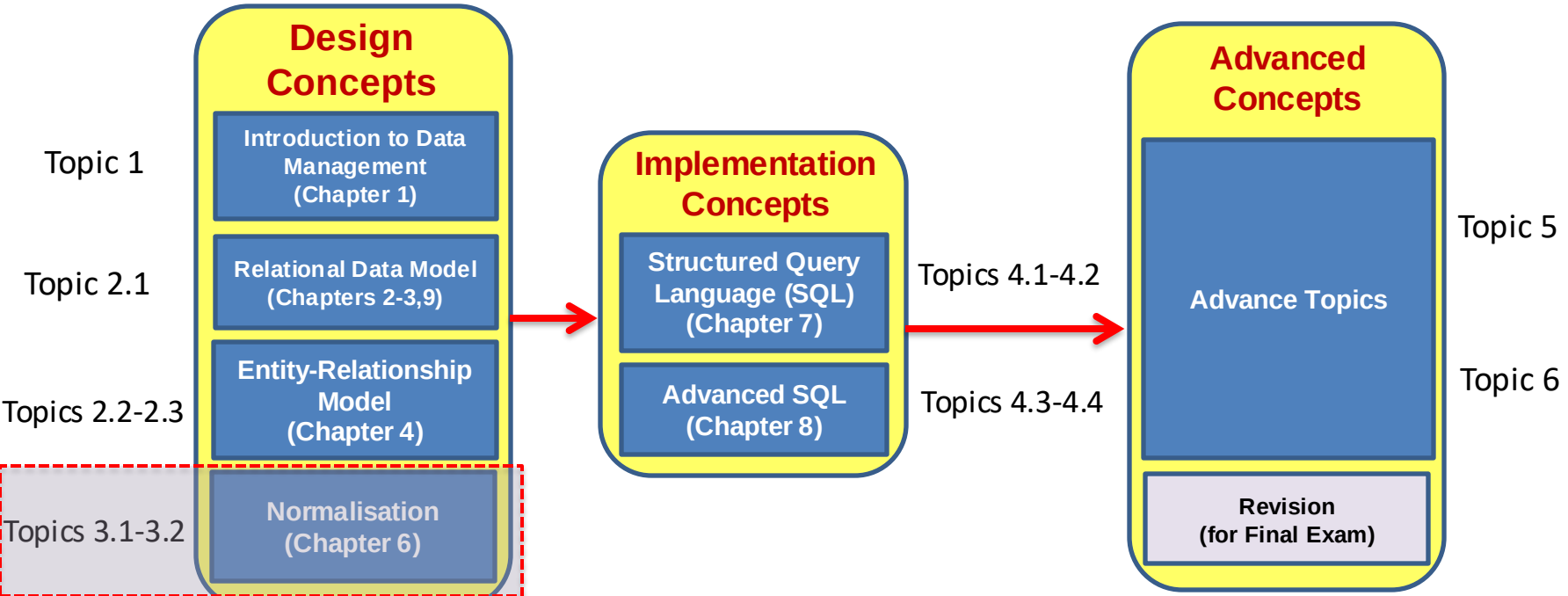
Course bigger picture

- Chapter references are to textbook *Database Systems: Design, Implementation, & Management - By Carlos Coronel and Steven Morris*



Learning Outcomes

At the end of this lecture students will be able to know:

- More examples on normalisation
- Relational database schema

Content

- Examples on normalisation
- Relation not in 3NF

Outcome 1

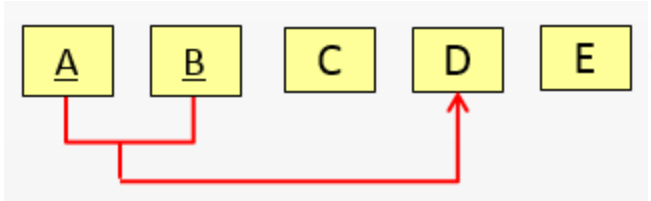
- Data type
- Relational database schema

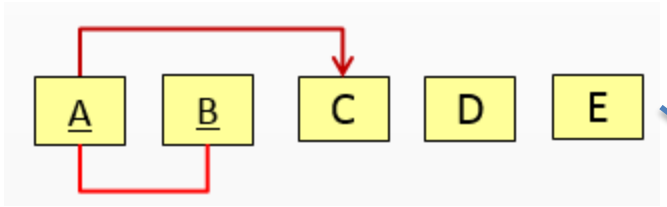
Outcome 2

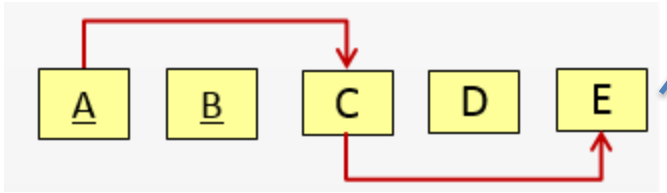
Recap from Topic 3.1

Normalisation

- Identify & match different types of dependencies:







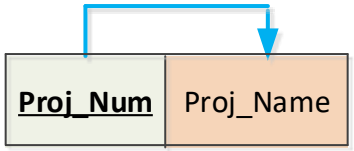
Emp_Num → Job_Class → Chg_Hour

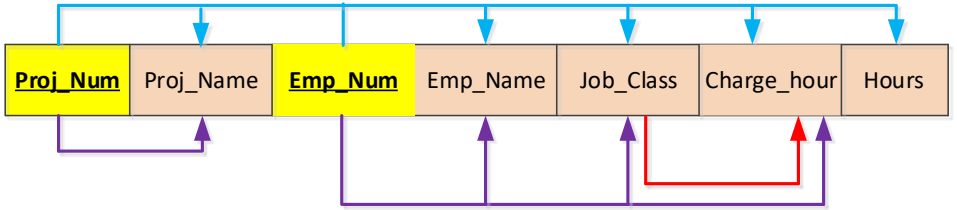
{*Proj_Num*, *Emp_Num*} → Hours

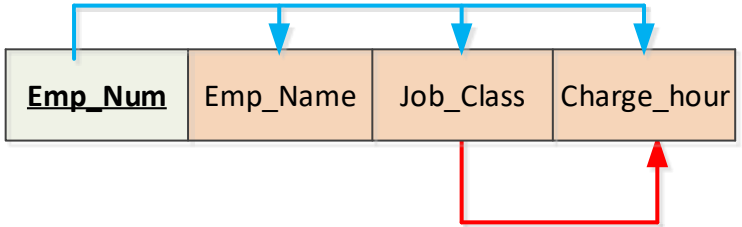
{*Proj_Num*, *Emp_Num*} → Emp_Name

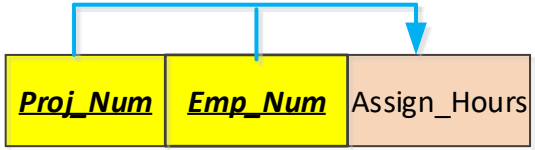
Normalisation

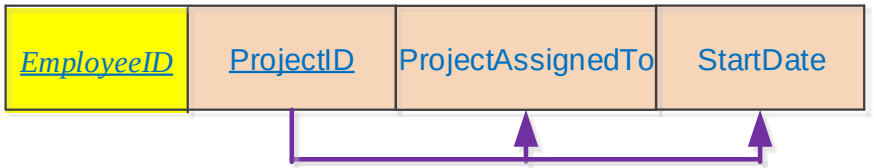
- For dependency diagram below identify
  - Functional dependencies
  - Normal forms
  - How many new tables to create to convert to 2NF and/or 3NF











Normalisation: Example 3 (Case 1)

Example 3: Normalisation

A traditional data file – sales data

Date	*Product*	*Price*	*Client*	*Phone*	*Address*
11 Jan	Widget	100	Nurk Inc.	666-999	11 Bush Ave
12 Jan	Gizmo	120	Klutz & Co	131-313	13 Luck Rd
12 Jan	Widget	100	Bloggs Ltd	123-456	12 High St
13 Jan	Widget	100	Klutz Coy.	131-323	13 Luck Rd
14 Jan	Gizmo	120	F. Nurk Inc.	666-999	11 Bushy Ave

Case 1

With given the following business rules:

- *Each client makes no more than one order per day*
- *No two clients have the same name*
- *Each order consists of a single product*

Example 3: Normalisation

UNF

Sale

Date	Product	Price	Client	Phone	Address

Example 3: Normalisation

- **Convert to 1NF**
- Step 1: No null entries in the table now, so nothing to do!
- Step 2: Identify the primary key

Date	*Product*	*Price*	*Client*	*Phone*	*Address*
11 Jan	Widget	100	Nurk Inc.	666-999	11 Bush Ave
12 Jan	Gizmo	120	Klutz & Co	131-313	13 Luck Rd
12 Jan	Widget	100	Bloggs Ltd	123-456	12 High St
13 Jan	Widget	100	Klutz Coy.	131-323	13 Luck Rd
14 Jan	Gizmo	120	F. Nurk Inc.	666-999	11 Bushy Ave

Example 3: Normalisation

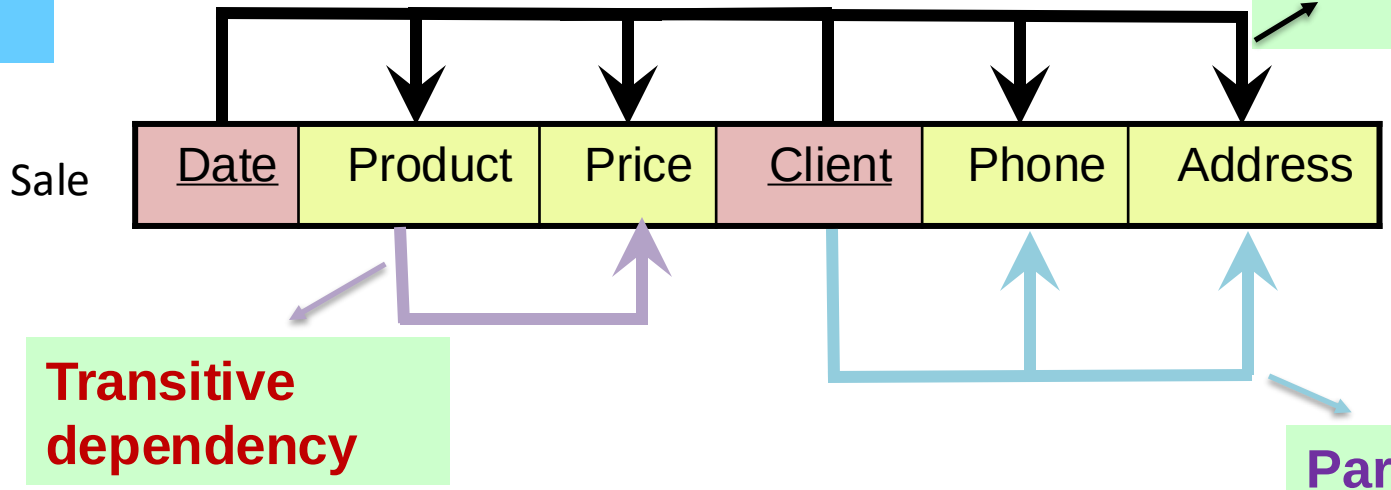
1NF

Sale

Date	Product	Price	Client	Phone	Address

- Step 3: Draw the dependency diagram

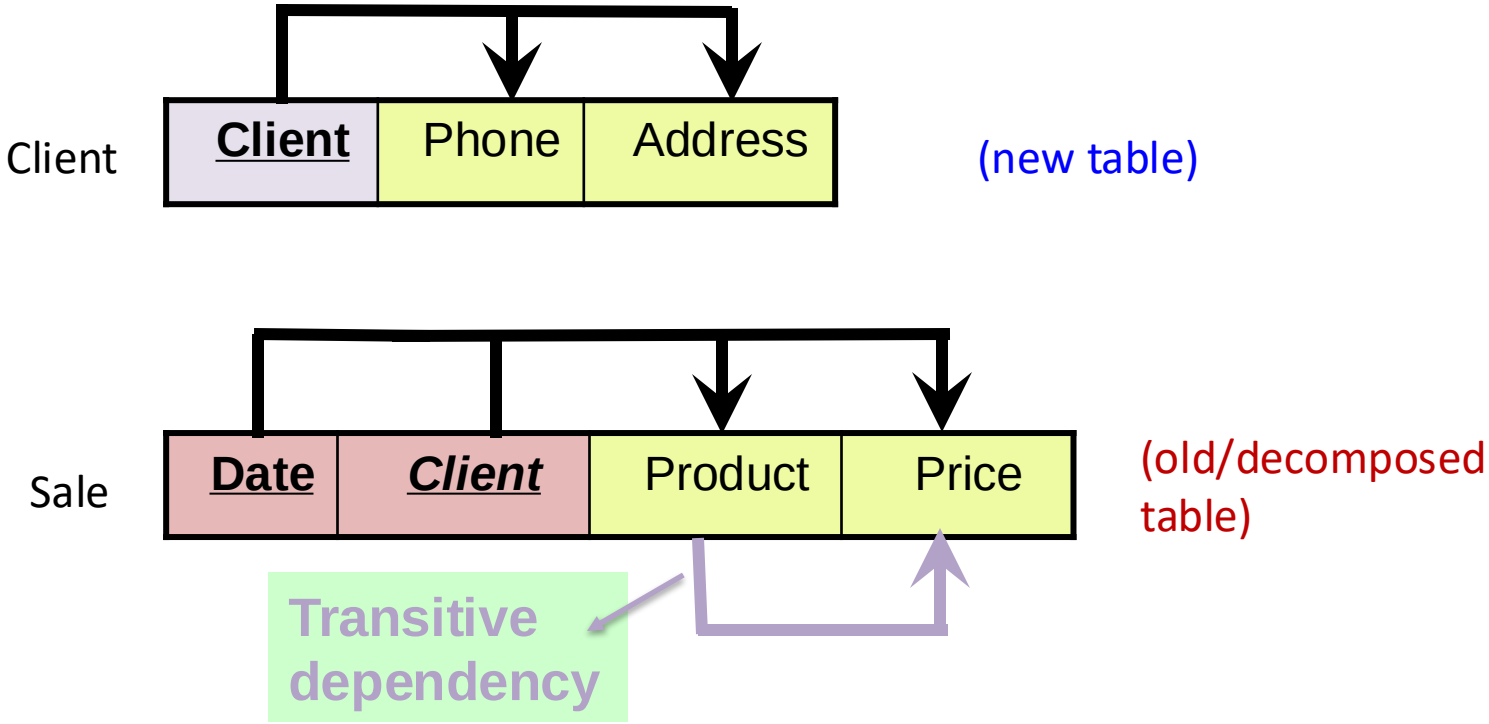
1NF



Example 3: Normalisation

- **Convert to 2NF**
  - Step 4: Remove partial dependency

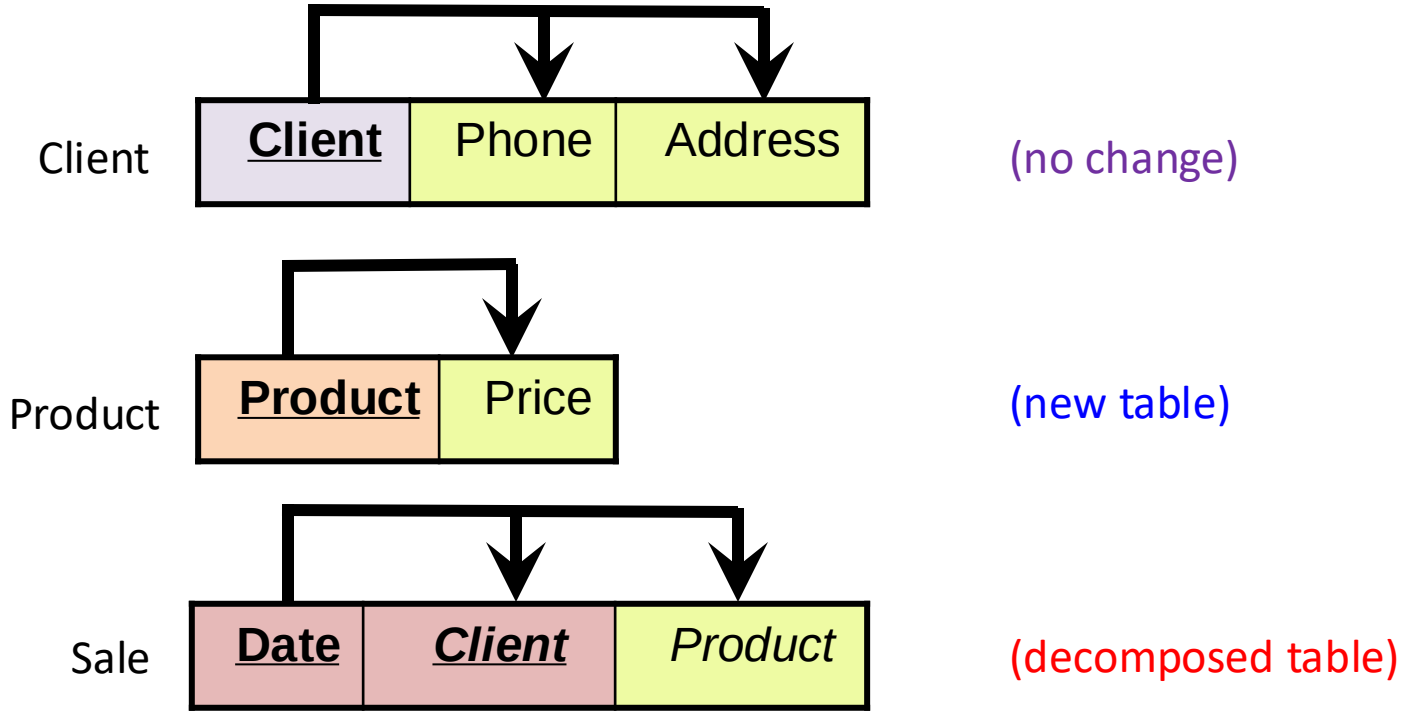
2NF



Example 3: Normalisation

- **Convert to 3NF**
  - Step 5: Remove transitive dependency

3NF



Example 3: Relation schema

UNF

Sale (date, product, price, client, phone, address)

1NF

Sale (**date**, product, price, **client**, phone, address)

2NF

Customer (**client**, phone, address)
Sale (**date**, product, price, ***client***)

3NF

Product(**product**, price)
Customer (**client**, phone, address)
Sale (**date**, *product*, ***client***)

Thank you