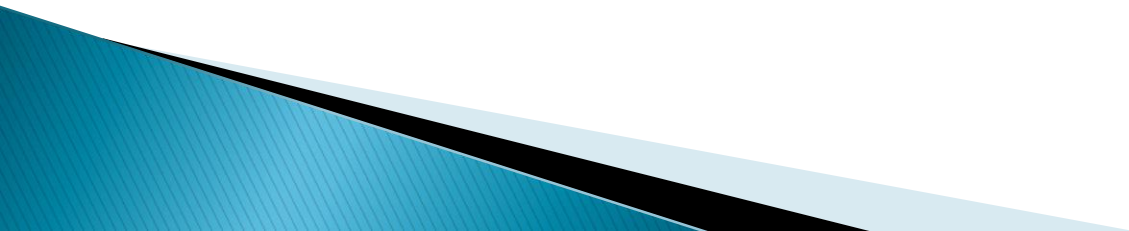


Normalization, Chapter 14



Normal Forms (page 379)

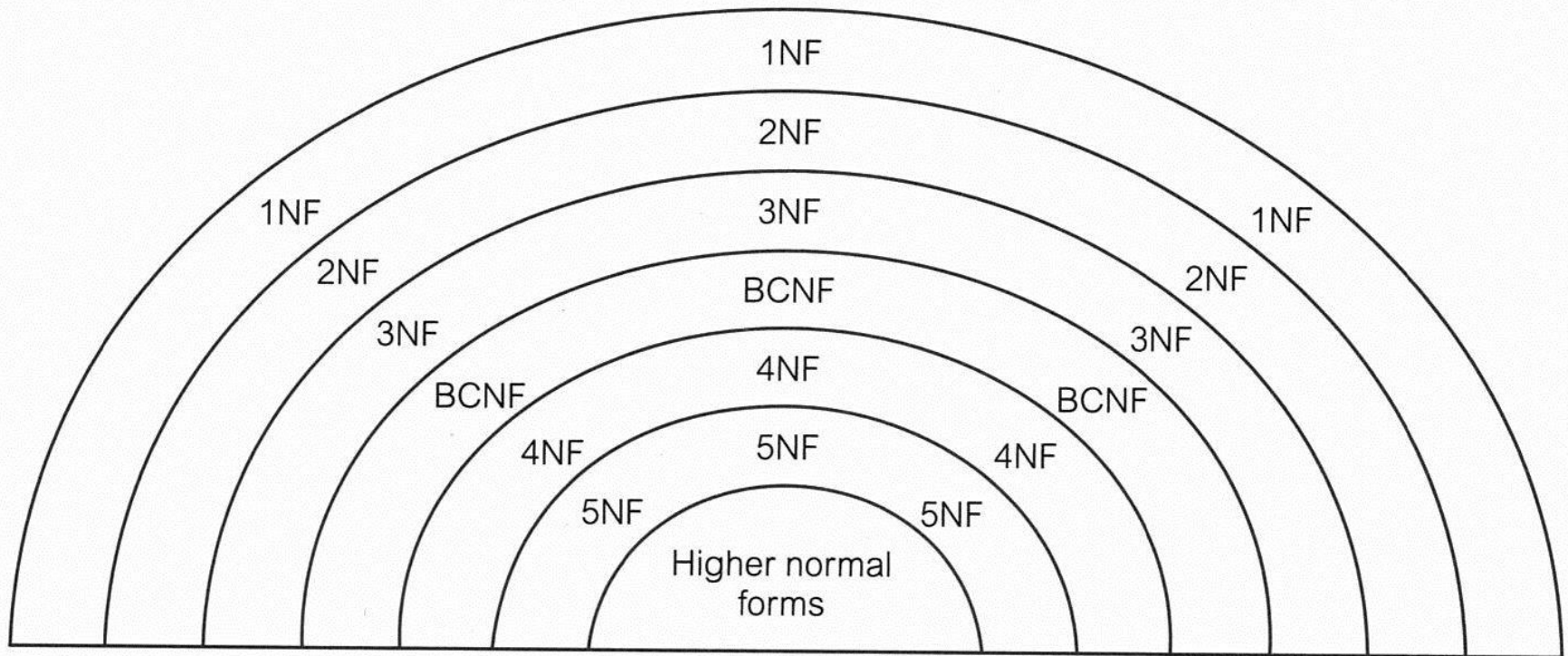


Figure 14.7 Diagrammatic illustration of the relationship between the normal forms.

Process of Normalization (page 379)

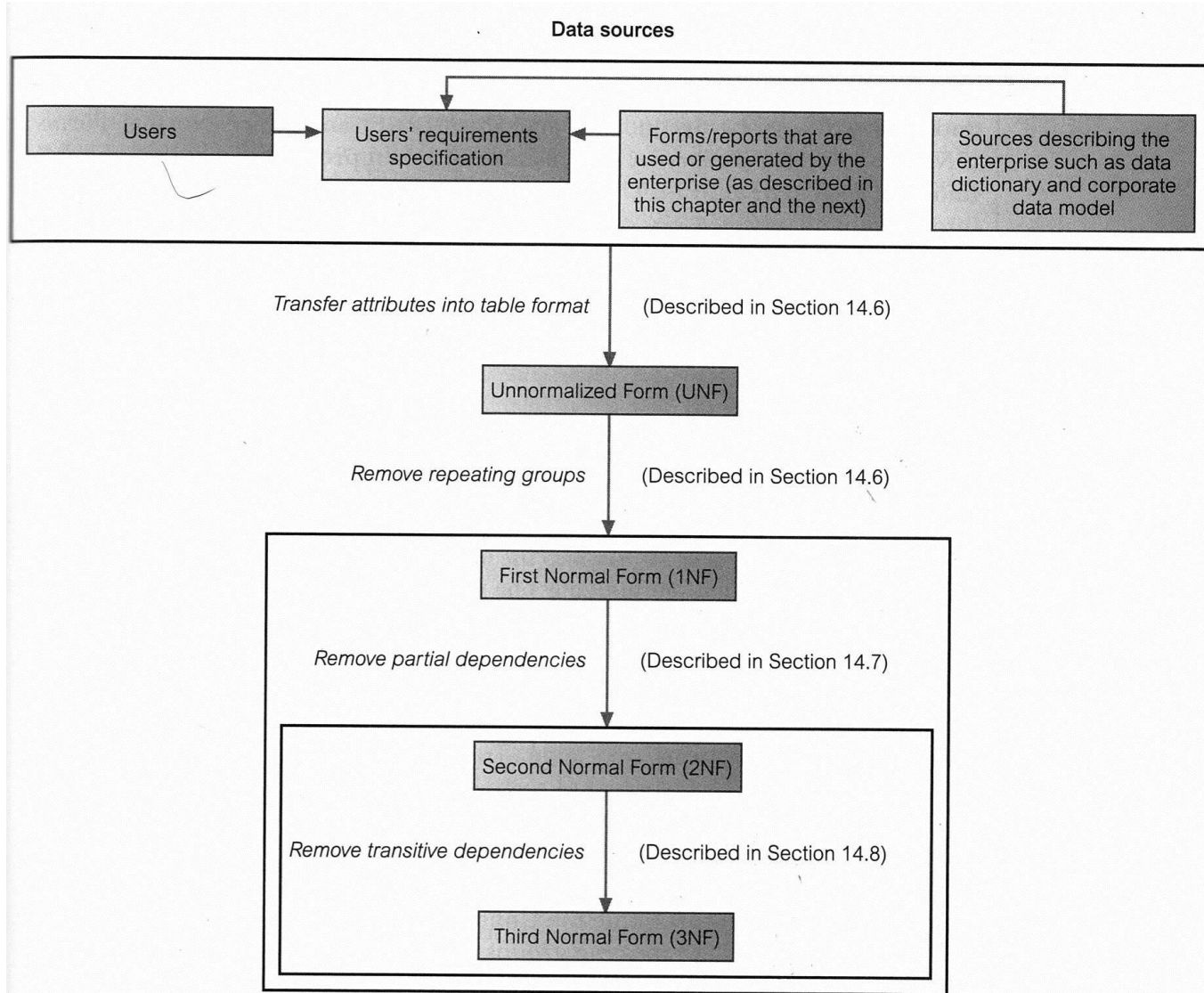


Figure 14.8 Diagrammatic illustration of the process of normalization.

Functional Dependencies

Functional dependency – describes a relationship between the attributes in a relation.

$A \rightarrow B$, can be read:

- ▶ **“A functionally determines B”** or
- ▶ **“B is functionally determined by A”**
- ▶ **Each value of A is associated with exactly one value of B.**

Functional Dependencies

Multiple attributes on each side of \rightarrow mean different things

Example: $A_1, A_2, \dots, A_k \rightarrow B_1, B_2, \dots, B_n$

- Multiple attributes on the left, mean that each combination of values on the left are associated with exactly one value of B
- Multiple attributes on the right are just a shorthand notation

Determinants

Determinant – the set of attributes that appear on the left-hand side of the arrow of a functional dependency

Example

Give any FDs among the following attributes. State any necessary assumptions:

courseId

courseName

noCredits

semester

section

instructorId

instructorName

room

time

Normalization, Exercise 14.14

Wellmeadows Hospital Patient Medication Form							
Patient Number: <u>P10034</u>							
Full Name: <u>Robert MacDonald</u>				Ward Number: <u>Ward 11</u>			
Bed Number: <u>84</u>				Ward Name: <u>Orthopaedic</u>			
Drug Number	Name	Description	Dosage	Method of Admin	Units per Day	Start Date	Finish Date
10223	Morphine	Pain Killer	10mg/ml	Oral	50	24/03/08	24/04/09
10334	Tetracycline	Antibiotic	0.5mg/ml	IV	10	24/03/08	17/04/08
10223	Morphine	Pain Killer	10mg/ml	Oral	10	25/04/09	02/05/10

Figure 14.18 The Wellmeadows Hospital Patient Medication Form.

14.15b Find all the FDs in the following (state any assumptions that you use)

staffNo	dentistName	patNo	patName	appointment date	time	surgeryNo
S1011	Tony Smith	P100	Gillian White	12-Sep-08	10.00	S15
S1011	Tony Smith	P105	Jill Bell	12-Sep-08	12.00	S15
S1024	Helen Pearson	P108	Ian MacKay	12-Sep-08	10.00	S10
S1024	Helen Pearson	P108	Ian MacKay	14-Sep-08	14.00	S10
S1032	Robin Plevin	P105	Jill Bell	14-Sep-08	16.30	S15
S1032	Robin Plevin	P110	John Walker	15-Sep-08	18.00	S13

Figure 14.19 Table displaying sample dentist/patient appointment data.

Normalization, Figure 14.11

ClientRental

clientNo	propertyNo	cName	pAddress	rentStart	rentFinish	rent	ownerNo	oName
CR76	PG4	John Kay	6 Lawrence St, Glasgow	1-Jul-07	31-Aug-08	350	CO40	Tina Murphy
CR76	PG16	John Kay	5 Novar Dr, Glasgow	1-Sep-08	1-Sep-09	450	CO93	Tony Shaw
CR56	PG4	Aline Stewart	6 Lawrence St, Glasgow	1-Sep-06	10-Jun-07	350	CO40	Tina Murphy
CR56	PG36	Aline Stewart	2 Manor Rd, Glasgow	10-Oct-07	1-Dec-08	375	CO93	Tony Shaw
CR56	PG16	Aline Stewart	5 Novar Dr, Glasgow	1-Nov-09	10-Aug-10	450	CO93	Tony Shaw

Figure 14.11 First Normal Form ClientRental relation.