

## 5.2 Multiple Forms Normalisation -- Part 1

**you should perform the normalisation one form at a time until all relations are in 3NF.**

### Unit report

UNITS CURRENTLY APPROVED			REPORT DATE: 22/07/2022
Unit Number	Unit Name	Unit Description	Unit Value
FIT9131	Programming Foundations	Introduction to programming	6
FIT9132	Introduction to Databases	Database Fundamentals	6
FIT9134	Computer Architecture and Operating Systems	Fundamentals of computer systems and the computing environment	6
FIT9135	Data Communications	Fundamentals of data and computer communications	6

\* Unit value may be either 3, 6 or 12 points

### UNF

UNIT(unit\_number, unit\_name, unit\_description, unit\_value)

### 1NF

UNIT(unit\_number, unit\_name, unit\_description, unit\_value) Assign primary key

CKs (Unique): unit\_number

Partial dependencies: no partial dependency(it only happens when the CK are multi-valued)

### 2NF

UNIT(unit\_number, unit\_name, unit\_description, unit\_value)

Transitive dependencies(A transitive dependency occurs when an attribute depends on another non-key attribute, rather than on the primary key directly.): no transitive dependency

### 3NF

UNIT(unit\_number, unit\_name, unit\_description, unit\_value)

Full dependencies:

Unit\_number---> unit\_name

Unit\_number--->unit\_description

Unit\_number--->unit\_value

### Lecturer report

LECTURER DETAILS		REPORT DATE: 22/07/2022
LECTURER'S NUMBER: 10234 LECTURER'S NAME: GUISEPPE BLOGGS LECTURER'S OFFICE No.: 169 LECTURER'S PHONE No.: 99037111		
UNIT ADVISER FOR:		
UNIT NUMBER	UNIT NAME	
FIT9131	Programming Foundations	
FIT9134	Computer Architecture and Operating Systems	

\* A given unit may have several advisers

\* Some lecturers share offices, although each has their own phone

**choose a single name for synonyms. For example, mentor is the same as lecturer.**

#### UNF

LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone, (unit\_num, unit\_name))

#### 1NF

LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone)

CKs: lec\_num, lec\_phone

ADVICE(lec\_num, unit\_num, unit\_name) (include PK, it's about which lecturer teaches which unit)

CKs: lec\_num, unit\_num

Partial dependencies: unit\_num ---> unit\_name

#### 2NF

LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone)

ADVICE(lec\_num, unit\_num)

UNIT(unit\_num, unit\_name)

Transitive dependencies(non-key to non-key): no transitive dependencies here.

(number-->phone (is CK therefore it's not transitive)-->name)

### 3NF

LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone)

ADVICE(lec\_num, unit\_num)

UNIT(unit\_num, unit\_name)

Full dependencies:

Lect\_num---> lec\_name, lec\_office, lec\_phone

Unit\_no---> unit\_name

### Student report

<b>STUDENT DETAILS</b>			<b>REPORT DATE:</b> 22/07/2022
<b>STUDENT No.:</b> 12345678 <b>STUDENT NAME:</b> Poindexter Jones <b>STUDENT ADDRESS:</b> 23 Wide Road, Caulfield, 3162 <b>COURSE ENROLLED:</b> MIT <b>MODE OF STUDY:</b> On-Campus  <b>MENTOR NUMBER:</b> 10234 <b>MENTOR NAME:</b> Guiseppe Bloggs  <b>ACADEMIC RECORD:</b>			
<b>UNIT NUMBER</b>	<b>UNIT NAME</b>	<b>YEAR / SEMESTER</b>	<b>GRADE</b>
FIT9131	Programming Foundations	2021/2	N
FIT9131	Programming Foundations	2022/1	D
FIT9132	Introduction to Databases	2022/1	D

\* Grade may have the value N, P, C, D or HD

\* Mode of Study must be On-campus (O) or Distance Education (D)

### UNF

STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no, lec\_name(unit\_no, unit\_name, year, semester, grade))

### 1NF

STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no, lec\_name)

CKs: stu\_no

AC\_RECORD(stu\_no, unit\_no, unit\_name, ar\_year, ar\_semester, grade)

CKs: unit\_no, stu\_no, ar\_year, ar\_semester

Partial dependencies: unit\_no ---> unit\_name

### 2NF

STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no, lec\_name)

AC\_RECORD(stu\_no, unit\_no, ar\_year, ar\_semester, grade)

UNIT(unit\_no, unit\_name)

Transitive dependencies: lec\_no --> lec\_name

### 3NF

STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no)

AC\_RECORD(stu\_no, unit\_no, ar\_year, ar\_semester, grade)

UNIT(unit\_no, unit\_name)

Lecturer(lec\_no, lec\_name)

Full dependencies:

Stu\_no --> stu\_name, stu\_addr, stu\_course, stu\_mode, lec\_no

Lec\_no ---> lec\_name

Unit\_no, stu\_no, ar\_year, ar\_sem --> ar\_grade

Unit\_no --> unit\_name

## Attribute synthesis

Collected 3NF:

1. UNIT(unit\_number, unit\_name, unit\_description, unit\_value)
2. LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone)

3. ADVICE(lec\_num, unit\_num)
4. UNIT(unit\_num, unit\_name)
5. STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no)
6. AC\_RECORD(stu\_no, unit\_no, ar\_year, ar\_semester, grade)
7. UNIT(unit\_no, unit\_name)
8. LECTURER(lec\_no, lec\_name)

**Merge 1,4,7**

**Merge 2, 8**

Final relations: remove all duplicate relations.

1. UNIT(unit\_number, unit\_name, unit\_description, unit\_value)
2. LECTURER(lec\_num, lec\_name, lec\_office, lec\_phone)
3. ADVICE(lec\_num, unit\_num)
4. STUDENT(stu\_no, stu\_addr, stu\_name, stu\_course, stu\_mode, lec\_no)
5. AC\_RECORD(stu\_no, unit\_no, ar\_year, ar\_semester, grade)

## 5.3 Multiple Forms Normalisation -- Part 2

PROPERTY MAINTENANCE REPORT		
<b>Property No:</b> 1965 <b>Property Address:</b> Unit 1 100-102 Platypus St, Oakleigh, VIC, 3166  <b>Owner No:</b> 9321 <b>Owner:</b> <b>Given Name:</b> Lilian <b>Family Name:</b> Potter <b>Owner Address:</b> 14 Puffin Rd, Wantirna, VIC, 3152		
<b>MAINTENANCE RECORD:</b>		
DateTime	Description	Cost
2022-06-01 9:00	Roof leak	\$854
2022-06-10 10:00	Lawn repair	\$230
2022-06-10 14:00	Minor crack repair	\$428

PROPERTY TENANT LEDGER (Sample 1)				
<b>Property No:</b> 1965 <b>Property Address:</b> Unit 1 100-102 Platypus St, Oakleigh, VIC, 3166 <b>Lease Start Date:</b> 2021-01-14 <b>Weekly Rental Rate:</b> \$425 <b>Bond:</b> \$1,842  <b>Tenant No:</b> 512736 <b>Tenant Name:</b> Johanston Karkov				
<b>PAYMENT RECORD:</b>				
Number	Date	Type	Amount	Paid By
80010	2021-01-10	Bond	\$1,842	bank cheque
80024	2021-01-10	Rental	\$1,842	direct deposit
80501	2021-02-10	Rental	\$1,842	bpay
80612	2021-02-28	Damage	\$523	credit card
80615	2021-02-28	Damage	\$312	credit card
80892	2021-03-12	Rental	\$1,842	bpay
81073	2021-04-13	Rental	\$1,842	credit card

PROPERTY TENANT LEDGER (Sample 2)				
<b>Property No:</b> 1965 <b>Property Address:</b> Unit 1 100-102 Platypus St, Oakleigh, VIC, 3166 <b>Lease Start Date:</b> 2022-05-05 <b>Weekly Rental Rate:</b> \$475 <b>Bond:</b> \$2,059  <b>Tenant No:</b> 623124 <b>Tenant Name:</b> Kiky Longbottom				
<b>PAYMENT RECORD:</b>				
Number	Date	Type	Amount	Paid By
101829	2022-05-01	Bond	\$2,059	bank cheque
101934	2022-05-03	Rental	\$2,059	credit card
102104	2022-06-04	Rental	\$2,059	credit card