TUGAS PRAKTIKUM BASIS DATA

Jobsheet 8: Normalisasi Data 1NF Hingga 3NF

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JURUSAN TEKNOLOGI INFORMASI POLITEKNIK NEGERI MALANG 2024

Praktikum 1

Langkah 1

- 1) Bukalah berkas spreadsheet bernama 'DataSoftwareHouseAustria.XLSX' yang dilampirkan bersama jobsheet ini.
- 2) File tersebut berisi data pegawai software house di Austria beserta atribut lain yang mendukung project yang dikerjakan di perusahaan tersebut.
- 3) Teliti setiap atribut yang tertulis pada data tersebut dan amati ketidak sesuaian atribut yang ada sehingga mempersulit proses insert, update, delete dan modifikasi.
- 4) Pertimbangkan pula bagaimana bentuk yang baik dan sesuai dengan aturan normalisasi yang efisien.

Langkah 2

1) Normalisasi data sesuai bentuk normal kesatu karena data pada langkah 1 tidak memenuhi bentuk normal data bagian satu (1NF). Maka akan menghasilkan dekomposisi tabel sebagai berikut:

num_proje •	name_proje •	num_employe •	name_employee	street_address -	city	postal_coc •	num_jobcla: •	name_jobclass -	chr_per_ho(•	hours_billle •
15	Evergreen	103	June E. Arbough	Pazmaniteng 24-9	Vienna	A-1020	E01	Elec. Engineering	€84.50	23.8
15	Evergreen	101	John G. News	Weihburggasse 26	Vienna	A-1020	E02	Database Designer	€105.00	19.4
15	Evergreen	105	Alice K. Johnson	Pazmaniteng 25-19	Vienna	A-1020	E02	Database Designer	€105.00	35.7
15	Evergreen	106	William Smithfield	Gartenweg 8	Rafing	A-1010	E03	Programmer	€ 35.75	12.6
15	Evergreen	102	David H. Senior	Wiener Hauptstraße 10/A/4/15	Wien	A-1014	E04	System Analyst	€ 96.75	23.8
18	Amber Wave	114	Annelise Jones	Pazmaniteng 1-1	Vienna	A-1020	E05	Application Desiger	€48.10	24.6
18	Amber Wave	118	James J. Frommer	Gartenweg 20	Rafing	A-1010	E06	General Support	€18.36	45.3
18	Amber Wave	104	Anne K. Ramoras	Sterzinger Straße 1	Innsbruck	A-6020	E04	System Analyst	€ 96.75	32.4
18	Amber Wave	112	Darlene M. Smithson	Liebiggasse 5/1/5	Wien	A-1014	E07	DSS Analyst	€45.95	44
22	Einsten	105	Alice K. Johnson	Pazmaniteng 25-19	Vienna	A-1020	E02	Database Designer	€105.00	64.7
22	Einsten	104	Anne K. Ramoras	Sterzinger Straße 1	Innsbruck	A-6020	E04	System Analyst	€ 96.75	48.4
22	Einsten	113	Delbert K. Joenbrood	Liebiggasse 3/1/10	Wien	A-1014	E05	Application Desiger	€48.10	23.6
22	Einsten	111	Geoff B. Wabash	Krakaudorf 32	Krakaudorf	A-8854	E08	Clerical Support	€ 26.87	22
22	Einsten	106	William Smithfield	Gartenweg 8	Rafing	A-1010	E03	Programmer	€ 35.75	12.8
25	Phoenix	107	Maria D. Alonzo	Krakaudorf 11	Krakaudorf	A-8854	E03	Programmer	€ 35.75	24.6
25	Phoenix	115	Travis B. Bawangi	Liebiggasse 3/1/10	Wien	A-1014	E04	System Analyst	€ 96.75	45.8
25	Phoenix	101	John G. News	Weihburggasse 26	Vienna	A-1020	E02	Database Designer	€105.00	56.3
25	Phoenix	114	Annelise Jones	Pazmaniteng 1-1	Vienna	A-1020	E05	Application Desiger	€48.10	33.1
25	Phoenix	108	Ralph B. Washington	Krakaudorf 22	Krakaudorf	A-8854	E04	System Analyst	€ 96.75	23.6
25	Phoenix	118	James J. Frommer	Gartenweg 20	Rafing	A-1010	E06	General Support	€18.36	30.5
25	Phoenix	112	Darlene M. Smithson	Liebiggasse 5/1/5	Wien	A-1014	E07	DSS Analyst	€ 45.95	41.4

2) Lakukan pengecekan (Lossless–Join Decomposition) pada tabel baru hasil dekomposisi tersebut!<SOAL>

project {num_project, name_project, num_employee, name_employee, street_address, city, postal_code, num_jobclass, name_jobclass, chr per hour, hours billed}

project{num_project, name_project}

employee{num_project, num_employee,
name_employee, street_address, city,
postal_code, num_jobclass, name_jobclass,
chr_per_hour, hours_billed}

Langkah 3

1) Pengecekan FD pada tabel hasil langkah 2 akan menghasilkan data FD sebagai berikut:

```
Pada tabel project
num project → name project
```

Pada tabel employee

- {num_project, num_employee, num_jobclass} {num_project, num_employee, num_jobclass} {num_project, num_employee, num_jobclass} {num_project, num_employee, num_jobclass} city

- {num_project, num_employee, num_jobclass} → postal_code
- {num_project, num_employee, num_jobclass} \(\frac{1}{2} \) name_jobclass
- {num_project, num_employee, num_jobclass} \(\frac{\rightarrow}{\rightarrow} \) chr_per_hour
- {num_project, num_employee, num_jobclass} → hours_billed

FD

```
<u>num_project</u> → name_project
no_employee → {name_employee, street_address, city, postal_code}
no_jobclass → {name_jobclass, chr_per_hours}
{ num_project, num_employee,num_jobclass} → hours_bille
```

- 2) Normalisasi tabel menjadi bentuk 2NF. Berdasarkan informasi FD maka dekomposisi tabel yang semula 2 tabel menjadi 4 tabel sebagai berikut :
- project{num_project, name_project}
- employee{no_employee, name_employee, street_address, city, postal_code}
- jobclass{no_jobclass, name_jobclass, chr_per_hours}
- hours { num project, num employee, num jobclass, hours billed}
- 3) Lakukan pengecekan (Lossless–Join Decomposition) dan (dependency preservation) pada tabel baru hasil dekomposisi tersebut! <SOAL>

Langkah 4

1) Mencari hubungan syarat 3NF dengan mempertimbangkan X A sesuai dengan ketentuan 3NF

Terdapat beberapa non key yang memiliki ketergantungan dengan non key lain, sesuai FD baru sebagai berikut:

- {city, street_address} → postal_code dimana X adalah superkey
- name_project → {name_employee, name_jobclass} dimana X adalah superkey
- {name employee, name jobclass} → chr per hours dimana X adalah superkey
- 2) Berdasarkan FD tersebut maka tabel pada langkah 3 diperbaharui dekomposisinya menjadi
- project{num_project, name_project}

- employee{no_employee, name_employee, street_address}
- jobclass{no_jobclass, name_jobclass, chr_per_hours}
- hours{<u>num_project</u>, <u>num_employee</u>, <u>num_jobclass</u>, hours_billed}
- address{city, street_address, postal_code}
- jobclass_detail{name_project, name_employee, name_jobclass}
- charge{<u>name employee</u>, <u>name jobclass</u>, chr_per_hours}
- 3) Lakukan pengecekan (Lossless–Join Decomposition) dan (dependency preservation) pada tabel baru hasil dekomposisi tersebut! <SOAL>

Tugas

- 1. Jawablah **<SOAL>** dengan terlebih dahulu melakukan langkah-langkah kegiatan diatas!
- 2. Lakukan normalisasi sesuai dengan langkah-langkah percobaan diatas sekaligus lakukan pengecekan mulai bentuk 1NF sampai dengan 3NF yang sesuai dengan 3 kriteria bentuk normal yang baik pada studi kasus di bawah ini!

Sebuah data peminjaman perpustakaan di Politeknik Negeri Balikpapan berikut memiliki keistimewaan pada jumlah hari peminjaman buku. Semakin lama jumlah hari peminjaman diartikan semakin banyak jumlah halaman buku yang dipinjam.

No.Trans.	No.Anggota	Nama	Status	KodeBuku	Judul	Pengarang	Penerbit	ISBN	Jml	TglPinjam	TglKembali	JmlHari
12001	A-001	Budi	Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	10-12-2016	15-12-2016	5
12001	A-001	Budi	Tetap	B-002	Visual Basic	Joni	Erlangga	978-979-518-852-0	1	10-12-2016	15-12-2016	5
12001	A-001	Budi	Tetap	B-003	Foxpro	Andrea	Andi	978-979-8340-17-8	1	10-12-2016	15-12-2016	5
12002	A-002	Aulia	Tidak Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	11-12-2016	14-12-2016	3
12002	A-002	Aulia	Tidak Tetap	B-002	Visual Basic	Joni	Erlangga	978-979-518-852-0	1	11-12-2016	14-12-2016	3
12003	A-003	Susan	Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	12-12-2016	17-12-2016	5
12003	A-003	Susan	Tetap	B-004	Pascal	Abdul	Modula	978-979-692-046-4	1	12-12-2016	17-12-2016	5

3. Lakukan normalisasi pada studi kasus di bawah ini mulai bentuk 1NF sampai dengan 3NF, sekaligus lakukan pengecekan yang sesuai dengan 3 kriteria bentuk normal yang baik! (Bentuk normalisasi tidak dibatasi, silahkan disesuaikan dengan kondisi studi kasus)

Indonesia Air memiliki data penerbangan domestik yang rutin dilaksanakan dalam periode tertentu.



PESONA PENERBANGAN INDONESIA

No	FROM	то	FLIGHT NO.	ETA	ETD	DAY OF SERVICES	FLEET	REMARKS
1	BANDUNG	PADANG	18 6420	06:00	07:40	DAILY	A320	DIRECT
		PALEMBANG	18 6440	10:10	11:20	DAILY	A320	DIRECT
		MEDAN	18 6440	10:10	13:20	DAILY	A320	VIA PALEMBANG
		PEKANBARU	18 6450	17:30	19:10	DAILY	A320	DIRECT
2	MEDAN	PALEMBANG	18 6441	13:50	15:30	DAILY	A320	DIRECT
		BANDUNG	18 6441	13:50	17:05	DAILY	A320	VIA PALEMBANG
3	PADANG	BANDUNG	18 6251	08:05	09:45	DAILY	A320	DIRECT
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15	DAILY	A320	DIRECT
5	PALEMBANG	BANDUNG	18 6441	15:55	17:05	DAILY A	A320	DIRECT
		MEDAN	18 6440	11:45	13:02	DAILY	A320	DIRECT
6	PONTIANAK	SINTANG	18 200	08:00	08:45	FRIDAY & SUNDAY	ATR42	DIRECT
		PANGKALANBUN	18 206	10:15	11:15	MON, FRI, SAT, SUN	ATR42	DIRECT
		KETAPANG	18 202	08:10	08:45	MONDAY & SATURDAY	ATR42	DIRECT
7	SINTANG	PONTIANAK	18 201	09:00	09:45	FRIDAY & SUNDAY	ATR42	DIRECT
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30	MON, FRI, SAT, SUN	ATR42	DIRECT
9	KETAPANG	PONTIANAK	18 203	09:00	09:35	MONDAY & SATURDAY	ATR42	DIRECT

Jawaban!

1. Langkah 2

num_project	name_project
15	Evergreen
18	Amber Wave
22	Einsten
25	Phoenix

num_employee	name_employee	street_address	city	postal_code
101	John G. News	Weihburggasse 26	Vienna	A-1020
102	David H. Senior	Wiener Hauptstraße 10/A/4/15	Wien	A-1014
103	June E. Arbough	Pazmaniteng 24-9	Vienna	A-1020
104	Anne K. Ramoras	Sterzinger Straße 1	Innsbruck	A-6020
105	Alice K. Johnson	Pazmaniteng 25-19	Vienna	A-1020
106	William Smithfield	Gartenweg 8	Rafing	A-1010
107	Maria D. Alonzo	Krakaudorf 11	Krakaudorf	A-8854
108	Ralph B. Washington	Krakaudorf 22	Krakaudorf	A-8854
111	Geoff B. Wabash	Krakaudorf 32	Krakaudorf	A-8854
112	Darlene M. Smithson	Liebiggasse 5/1/5	Wien	A-1014
113	Delbert K. Joenbrood	Liebiggasse 3/1/10	Wien	A-1014
114	Annelise Jones	Pazmaniteng 1-1	Vienna	A-1020
115	Travis B. Bawangi	Liebiggasse 3/1/10	Wien	A-1014
118	James J. Frommer	Gartenweg 20	Rafing	A-1010

Tabel Jobclass		
num_jobclass	name_jobclass	chr_per_hour
E01	Elec. Engineering	€ 84.50
E02	Database Designer	€ 105.00
E03	Programmer	€ 35.75
E04	System Analyst	€ 96.75
E05	Application Desiger	€ 48.10
E06	General Support	€ 18.36
E07	DSS Analyst	€ 45.95
E08	Clerical Support	€ 26.87

num_project	num_employee
15	103
15	101
15	105
15	106
15	102
18	114
18	118
18	104
18	112
22	105
22	104
22	113
22	111
22	106
25	107
25	115
25	101
25	114
25	108
25	118
25	112

Primary key : num_project Primary key : num_employee Primary key : num_jobclass

Langkah 3 (2NF)

	Tabel Project			Tabel Employee							Tabel Jobclass	
\rightarrow	num_project	name_project	~	num employee	nai	me_employee	stree	t_address	(—	num_jobclass	name_jobclass
	15	Evergreen		101	John	G. News	Weihburgg	asse 26			E01	Elec. Engineering
	18	Amber Wave		102	David	I H. Senior	Wiener Hau 10/A/4/15	uptstraße			E02	Database Designer
	22	Einsten		103	June	E. Arbough	Pazmaniter	ng 24-9			E03	Programmer
	25	Phoenix		104	Anne	K. Ramoras	Sterzinger	Straße 1			E04	System Analyst
				105	Alice	K. Johnson	Pazmaniter	ng 25-19			E05	Application Desiger
				106	Willia	m Smithfield	Gartenweg	8			E06	General Support
				107	Maria	D. Alonzo	Krakaudorf	11			E07	DSS Analyst
				108	Ralph	B. Washington	Krakaudorf	22			E08	Clerical Support
				111	Geoff	B. Wabash	Krakaudorf	32				
				112	Darle	ne M. Smithson	Liebiggass	e 5/1/5				
				113	Delbe	ert K. Joenbrood	Liebiggass	e 3/1/10				
				114	Annel	lise Jones	Pazmaniter	ng 1-1				
				115	Travis	B. Bawangi	Liebiggass	e 3/1/10				
				118	Jame	s J. Frommer	Gartenweg	20				
	Tabel Hours											
	num_project	num_employee		num_jobclass		hours_bi	lled					
	15	101	E02			19.4						
	15	102	E04			23.8						
	15	103	E01			23.8						
	15	105	E02			35.7						
	15	106	E03			12.6						
	18	104	E04			32.4						
	18	112	E07			44						
	18	118	E06			45.3						
	22	104	E04			48.4						
	22	105	E02			64.7						
	22	106	E03			12.8						
	22	111	E08			22						
	22	113	E05			23.6						
	25	101	E02			56.3						
	25	107	E03			24.6						
	25	108	E04			23.6						
	25	112	E07			41.4						
	25	115	E04			45.8						
	25	118	E06			30.5						

chr_per_hour

€ 84.50 € 105.00

€ 35.75

€ 96.75 € 48.10 € 18.36

€ 45.95

€ 26.87

Langkah 4 (3NF)

Tabel Project			Tabel Employee								Tabel Jobclass		
num project	name_project	\rightarrow	num employee	na	me_employee	stree	t_address		(-	num_jobclass	name_jobclass	chr_per_hour
15	Evergreen		101	John	G. News	Weihburgg	asse 26				E01	Elec. Engineering	€ 84.50
18	Amber Wave		102	David	d H. Senior	Wiener Ha 10/A/4/15	uptstraße				E02	Database Designer	€ 105.00
22	Einsten		103	June	E. Arbough	Pazmanite	ng 24-9				E03	Programmer	€ 35.75
25	Phoenix		104	Anne	K. Ramoras	Sterzinger	Straße 1				E04	System Analyst	€ 96.75
	1		105	Alice	K. Johnson	Pazmanite	ng 25-19				E05	Application Desiger	€ 48.10
			106	Willia	am Smithfield	Gartenweg	8				E06	General Support	€ 18.36
			107	Maria	a D. Alonzo	Krakaudorf	11				E07	DSS Analyst	€ 45.95
			108	Ralpi	h B. Washington	Krakaudorf	22				E08	Clerical Support	€ 26.87
			111	Geof	f B. Wabash	Krakaudorf	32					1	
			112	Darle	ene M. Smithson	Liebiggass	e 5/1/5						
			113	Delb	ert K. Joenbrood	Liebiggass	e 3/1/10	\dashv			Tabel Address		
			114	Anne	lise Jones	Pazmanite	ng 1-1				<u>city</u>	street_address	postal_code
			115	Travi	s B. Bawangi	Liebiggass	e 3/1/10	\dashv			Vienne	Weihburggasse 26	A-1020
			118	Jame	es J. Frommer	Gartenweg	20	┰			Wien	Wiener Hauptstraße 10/A/4/15	A-1014
								_		Ì	Vienna	Pazmaniteng 24-9	A-1020
abel Hours		,						1	J		Innsbruck	Sterzinger Straße 1	A-6020
num_project	num_employee		num_jobclass		hours_bi	lled					Vienna	Pazmaniteng 25-19	A-1020
	101	E02			19.4	-					Rafing	Gartenweg 8	A-1010
	102	E04			23.8						Krakaudorf	Krakaudorf 11	A-8854
	103	E01			23.8						Krakaudorf	Krakaudorf 22	A-8854
	105	E02			35.7						Krakaudorf	Krakaudori 22 Krakaudori 32	A-8854 A-8854
	106	E03			12.6						Wien		A-1014
												Liebiggasse 5/1/5	
	18 112 E07			32.4						Wien	Liebiggasse 3/1/10	A-1014	
			44						Vienna	Pazmaniteng 1-1	A-1020		
	118	E06			45.3						Rafing	Gartenweg 20	A-1010
	104	E04			48.4								
	105	E02			64.7								
	106	E03			12.8						Tabel JobclassD		
	111	E08			22				_		name project	name_employee	name_jobclass
22	113	E05			23.6						Evergreen	June E. Arbough	Elec. Engineering
25	101	E02			56.3						Evergreen	John G. News	Database Designer
25	107	E03			24.6						Evergreen	Alice K. Johnson	Database Designer
25	108	E04			23.6						Evergreen	William Smithfield	Programmer
25	112	E07			41.4						Evergreen	William Smithfield	Programmer
25	115	E04			45.8						Evergreen	David H. Senior	System Analyst
25	118	E06			30.5						Amber Wave	Annelise Jones	Application Desiger
											Amber Wave	James J. Frommer	General Support
											Amber Wave	Anne K. Ramoras	System Analyst
											Amber Wave	Darlene M. Smithson	DSS Analyst
Tabel Charge													
name employe	name_jobclass	,	chr_per_hour								Einstein	Alice K. Johnson	Database Designer
name employe	name_jobclass Database Designe	+	chr_per_hour € 105.00	1							Einstein Einstein	Alice K. Johnson Anne K. Ramoras	Database Designer System Analyst
name employe		+		:									System Analyst
name employe John G. News David H. Senior	Database Designe System Analyst	er	€ 105.00	·							Einstein Einstein	Anne K. Ramoras	System Analyst
name employe Iohn G. News David H. Senior Iune E. Arbough	Database Designe System Analyst Elec. Engineering	er	€ 105.00 € 96.75	-							Einstein Einstein	Anne K. Ramoras Delbert K. Joenbrood	System Analyst Application Desiger
name employe Iohn G. News David H. Senior Iune E. Arbough	Database Designe System Analyst Elec. Engineering System Analyst	er	€ 105.00 € 96.75 € 84.50	-							Einstein Einstein	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash	System Analyst Application Desiger Clerical Support
name employe John G. News David H. Senior June E. Arbough Anne K. Ramora:	Database Designe System Analyst Elec. Engineering s System Analyst Database Designe	er	€ 105.00 € 96.75 € 84.50 € 96.75								Einstein Einstein Einstein Einstein Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield	System Analyst Application Desiger Clerical Support Programmer
name employe John G. News David H. Senior June E. Arbough Anne K. Ramora: Alice K. Johnson William Smithfield	Database Designe System Analyst Elec. Engineering s System Analyst Database Designe	er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00	-							Einstein Einstein Einstein Einstein Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo	System Analyst Application Desiger Clerical Support Programmer Programmer
name employee tohn G. News David H. Senior tune E. Arbough Anne K. Ramora: Alice K. Johnson William Smithfield Maria D. Alonzo Ralph B.	Database Designe System Analyst Elec. Engineering System Analyst Database Designe d Programmer	er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00 € 35.75								Einstein Einstein Einstein Einstein Phoenix Phoenix	Anne K. Ramoras Delibert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo Travis B. Bawangi	System Analyst Application Desiger Clerical Support Programmer Programmer System Analyst
name employe John G. News David H. Senior June E. Arbough Anne K. Ramora: Alice K. Johnson Alliam Smithfield Maria D. Alonzo Ralph B. Washington	Database Designe System Analyst Elec. Engineering System Analyst Database Designe d Programmer Programmer System Analyst	er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00 € 35.75 € 96.75								Einstein Einstein Einstein Einstein Phoenix Phoenix Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo Travis B. Bawangi John G. News Annelise Jones	System Analyst Application Desiger Clerical Support Programmer Programmer System Analyst Database Designer Application Desiger
John G. News David H. Senior June E. Arbough Anne K. Ramorat Allice K. Johnson William Smithfield Maria D. Alonzo Rajbh B. Washington Geoff B. Wabash Darlene M.	Database Designe System Analyst Elec. Engineering s System Analyst Database Designe d Programmer Programmer System Analyst	er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00 € 35.75 € 96.75 € 96.75								Einstein Einstein Einstein Einstein Phoenix Phoenix Phoenix Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo Travis B. Bawangi John G. News Annelise Jones Ralph B. Washington	System Analyst Application Desiger Clerical Support Programmer Programmer System Analyst Database Designer Application Desiger System Analyst
name employee John G. News David H. Senior June E. Arbough Anne K. Ramora: Alice K. Johnson William Smithfield Maria D. Alonzo Ralph B. Washington Geoff B. Wabash Darlene M. Smithson	Database Designe System Analyst Elec. Engineering S System Analyst Database Designe d Programmer Programmer System Analyst Clerical Support DSS Analyst	er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00 € 35.75 € 96.75 € 26.87 € 45.95								Einstein Einstein Einstein Einstein Phoenix Phoenix Phoenix Phoenix Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo Travis B. Bawangi John G. News Annelise Jones Ralph B. Washington James J. Frommer	System Analyst Application Desiger Clerical Support Programmer Programmer System Analyst Database Designer Application Desiger System Analyst General Support
name emoloye John G. News David H. Senior June E. Arbough Anne K. Ramorai Alice K. Johnson William Smithfield Balah B. Alonzo Radah B. Alonzo Geoff B. Wabash Darlene M. Smithson	Database Designe System Analyst Elec. Engineering s System Analyst Database Designe d Programmer Programmer System Analyst	er er	€ 105.00 € 96.75 € 84.50 € 96.75 € 105.00 € 35.75 € 96.75 € 96.75								Einstein Einstein Einstein Einstein Phoenix Phoenix Phoenix Phoenix Phoenix	Anne K. Ramoras Delbert K. Joenbrood Geoff B. Wabash William Smithfield Maria D. Alonzo Travis B. Bawangi John G. News Annelise Jones Ralph B. Washington	System Analyst Application Desiger Clerical Support Programmer Programmer System Analyst Database Designer Application Desiger System Analyst General Support

2. Berikut merupakan normalisasi yang sesuai dengan langkah-langkah percobaan diatas sekaligus lakukan pengecekan mulai bentuk 1NF sampai dengan 3NF

• 1NF

1NF

No.Trans	No.anggota	Nama	Status	KodeBuku	Judul	Pengarang	Penerbit	ISBN	Jml	TglPinjam	TglKembali	JmlHari
12001	A-001	Budi	Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	10-12-2016	15-12-2016	5
12001	A-001	Budi	Tetap	B-002	Visual Basic	Joni	Erlangga	978-979-518-852-0	1	10-12-2016	15-12-2016	5
12001	A-001	Budi	Tetap	B-003	Foxpro	Andrea	Andi	978-979-8340-17-8	1	10-12-2016	15-12-2016	5
12002	A-002	Aulia	Tidak Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	11-12-2016	14-12-2016	3
12002	A-002	Aulia	Tidak Tetap	B-002	Visual Basic	Joni	Erlangga	978-979-518-852-0	1	11-12-2016	14-12-2016	3
12003	A-003	Susan	Tetap	B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2	1	12-12-2016	17-12-2016	5
12003	A-003	Susan	Tetap	B-004	Pascal	Abdul	Modula	978-979-692-046-4	1	12-12-2016	17-12-2016	5

2NF

2NF

Tabel Anggota

No.anggota	Nama	Status
A-001	Budi	Tetap
A-002	Aulia	Tidak Tetap
A-003	Susan	Tetap

Tabel Buku

KodeBuku	Judul	Pengarang	Penerbit	ISBN
B-001	Delphi	Antoni	Informatika Bandung	978-979-769-513-2
B-002	Visual Basic	Joni	Erlangga	978-979-518-852-0
B-003	Foxpro	Andrea	Andi	978-979-8340-17-8
B-004	Pascal	Abdul	Modula	978-979-692-046-4

Tabel Transaksi

No.Trans.	Jml	TglPinjam	TglKembali	JmlHari
12001	1	10-12-2016	15-12-2016	5
12002	1	11-12-2016	14-12-2016	3
12003	1	12-12-2016	17-12-2016	5

Tabel TransaksiAnggota

	₩	₩
No.anggota	KodeBuku	No.Trans.
A-001	B-001	12001
A-001	B-002	12001
A-001	B-003	12001
A-002	B-001	12002
A-002	B-002	12002
A-003	B-001	12003
A-003	B-004	12003

3NF
Tabel Transaksi

No.Trans.	Jml	TglPinjam	TglKembali	JmlHari
12001	1	10-12-2016	15-12-2016	5
12002	1	11-12-2016	14-12-2016	3
12003	1	12-12-2016	17-12-2016	5

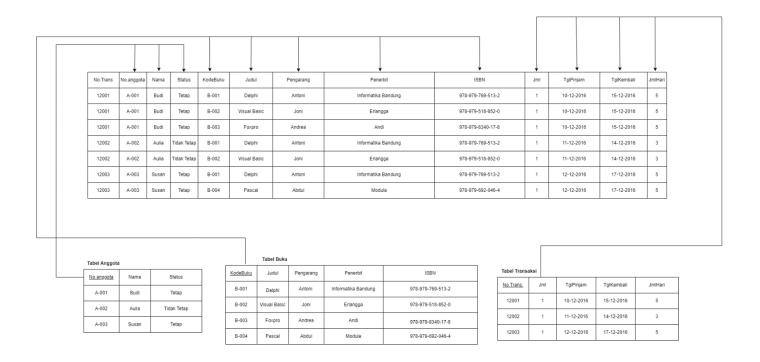
Tabel Detail Durasi

<u>KodeDurasi</u>	TglPinjam	TglKembali	JmlHari
KD01	10-12-2016	15-12-2016	5
KD02	11-12-2016	14-12-2016	3
KD03	12-12-2016	17-12-2016	5

Tabel Detail Transaksi

No.Trans.	KodeDurasi
12001	KD01
12002	KD02
12003	KD03

• Lossless-Join Decomposition



• Dependency Preservation

No.Trans => {Jml, KodeDurasi}

 $KodeDurasi => \{TglPinjam, TglKembali, JmlHari\}$

• Tidak melanggar Boyce-Code Normal Form (BCNF)

3. 1NF

No	FROM	TO	FLIGHT NO.	ETA	ETD	DAY OF SERVICES	FLEET	REMARKS
1	BANDUNG	PADANG	18 6420	6:00	7:40	DAILY	A320	DIRECT
1	BANDUNG	PALEMBANG	18 6440	10:10	11:20	DAILY	A320	DIRECT
1	BANDUNG	MEDAN	18 6440	10:10	13:20	DAILY	A320	VIA PALEMBANG
1	BANDUNG	PEKANBARU	18 6450	17:30	19:10	DAILY	A320	DIRECT
2	MEDAN	PALEMBANG	18 6441	13:50	15:30	DAILY	A320	DIRECT
2	MEDAN	BANDUNG	18 6441	13:50	17:05	DAILY	A320	VIA PALEMBANG
3	PADANG	BANDUNG	18 6251	8:05	9:45	DAILY	A320	DIRECT
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15	DAILY	A320	DIRECT
5	PALEMBANG	BANDUNG	18 641	15:55	17:05	DAILY	CCA320	DIRECT
5	PALEMBANG	MEDAN	18 6440	11:45	13:02	DAILY	A320	DIRECT
6	PONTIANAK	SINTANG	18 200	8:00	8:45	FRIDAY & SUNDAY	ATR42	DIRECT
6	PONTIANAK	PANGKALANBUN	18 206	10:15	11:15	MON, FRI, SAT, SUN	ATR42	DIRECT
6	PONTIANAK	KETAPANG	18 202	8:10	8:45	MONDAY & SATURDAY	ATR42	DIRECT
7	SINTANG	PONTIANAK	18 201	9:00	9:45	FRIDAY & SUNDAY	ATR42	DIRECT
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30	MON, FRI, SAT, SUN	ATR42	DIRECT
9	KETAPANG	PONTIANAK	18 203	9:00	9:35	MONDAY & SATURDAY	ATR42	DIRECT

2NF

	Tabel Penerbangan					
No	FROM	то	FLIGHT NO.	ETA	ETD	DAY OF SERVICES
1	BANDUNG	PADANG	18 6420	6:00	7:40	DAILY
1	BANDUNG	PALEMBANG	18 6440	10:10	11:20	DAILY
1	BANDUNG	MEDAN	18 6440	10:10	13:20	DAILY
1	BANDUNG	PEKANBARU	18 6450	17:30	19:10	DAILY
2	MEDAN	PALEMBANG	18 6441	13:50	15:30	DAILY
2	MEDAN	BANDUNG	18 6441	13:50	17:05	DAILY
3	PADANG	BANDUNG	18 6251	8:05	9:45	DAILY
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15	DAILY
5	PALEMBANG	BANDUNG	18 641	15:55	17:05	DAILY
5	PALEMBANG	MEDAN	18 6440	11:45	13:02	DAILY
6	PONTIANAK	SINTANG	18 200	8:00	8:45	FRIDAY & SUNDAY
6	PONTIANAK	PANGKALANBUN	18 206	10:15	11:15	MON, FRI, SAT, SUN
6	PONTIANAK	KETAPANG	18 202	8:10	8:45	MONDAY & SATURDAY
7	SINTANG	PONTIANAK	18 201	9:00	9:45	FRIDAY & SUNDAY
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30	MON, FRI, SAT, SUN
9	KETAPANG	PONTIANAK	18 203	9:00	9:35	MONDAY & SATURDAY

Tabel Pesawat		
No_Pesawat	Fleet	Remaks
1	A320	DIRECT
2	A320	VIA PALEMBANG
3	CCSA320	DIRECT
4	ATR42	DIRECT

3NF

J1 11	Tabel Penerbangan To FLIGHT NO. ETA ETD 1 BANDUNG PADANG 18 6420 6:00 7:40 1 BANDUNG PALEMBANG 18 6440 10:10 11:20 1 BANDUNG MEDAN 18 6440 10:10 13:20 1 BANDUNG PEKANBARU 18 6450 17:30 19:10 2 MEDAN PALEMBANG 18 6441 13:50 15:30				
	Tabel Penerbangan				
No	FROM	ТО	FLIGHT NO.	ETA	ETD
1	BANDUNG	PADANG	18 6420	6:00	7:40
1	BANDUNG	PALEMBANG	18 6440	10:10	11:20
1	BANDUNG	MEDAN	18 6440	10:10	13:20
1	BANDUNG	PEKANBARU	18 6450	17:30	19:10
2	MEDAN	PALEMBANG	18 6441	13:50	15:30
2	MEDAN	BANDUNG	18 6441	13:50	17:05
3	PADANG	BANDUNG	18 6251	8:05	9:45
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15
5	PALEMBANG	BANDUNG	18 641	15:55	17:05
5	PALEMBANG	MEDAN	18 6440	11:45	13:02
6	PONTIANAK	SINTANG	18 200	8:00	8:45
6	PONTIANAK	PANGKALANBUN	18 206	10:15	11:15
6	PONTIANAK	KETAPANG	18 202	8:10	8:45
7	SINTANG	PONTIANAK	18 201	9:00	9:45
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30
9	KETAPANG	PONTIANAK	18 203	9:00	9:35

Tabel Pesawat			
No_Pesawat	Fleet	Remaks	Daily of Service
1	A320	DIRECT	DAILY
2	A320	VIA PALEMBANG	DAILY
3	CCSA320	DIRECT	DAILY
4	ATR42	DIRECT	FRIDAY & SUNDAY
5	ATR42	DIRECT	MON, FRI, SAT, SUN
6	ATR42	DIRECT	SATURDAY

Tabel JadwalPenerbangan			
No_Pesawat	Flight No		
1	18 6420		
1	18 6440		
2	18 6440		
1	18 6450		
1	18 6441		
2	18 6441		
1	18 6251		
1	18 6451		
3	18 641		
1	18 6440		
4	18 200		
5	18 206		
6	18 202		
4	18 201		
5	18 207		
6	18 203		

• Lossless-Join Decomposition

	→	—	→	↓	→	√	*	→
No	FROM	TO	FLIGHT NO.	ETA	ETD	DAY OF SERVICES	FLEET	REMARKS
1	BANDUNG	PADANG	18 6420	6:00	7:40	DAILY	A320	DIRECT
1	BANDUNG	PALEMBANG	18 6440	10:10	11:20	DAILY	A320	DIRECT
1	BANDUNG	MEDAN	18 6440	10:10	13:20	DAILY	A320	VIA PALEMBANG
1	BANDUNG	PEKANBARU	18 6450	17:30	19:10	DAILY	A320	DIRECT
2	MEDAN	PALEMBANG	18 6441	13:50	15:30	DAILY	A320	DIRECT
2	MEDAN	BANDUNG	18 6441	13:50	17:05	DAILY	A320	VIA PALEMBANG
3	PADANG	BANDUNG	18 6251	8:05	9:45	DAILY	A320	DIRECT
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15	DAILY	A320	DIRECT
5	PALEMBANG	BANDUNG	18 641	15:55	17:05	DAILY	CCA320	DIRECT
5	PALEMBANG	MEDAN	18 6440	11:45	13:02	DAILY	A320	DIRECT
6	PONTIANAK	SINTANG	18 200	8:00	8:45	FRIDAY & SUNDAY	ATR42	DIRECT
6	PONTIANAK	PANGKALANBUN	18 206	10:15	11:15	MON, FRI, SAT, SUN	ATR42	DIRECT
6	PONTIANAK	KETAPANG	18 202	8:10	8:45	MONDAY & SATURDAY	ATR42	DIRECT
7	SINTANG	PONTIANAK	18 201	9:00	9:45	FRIDAY & SUNDAY	ATR42	DIRECT
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30	MON, FRI, SAT, SUN	ATR42	DIRECT
9	KETAPANG	PONTIANAK	18 203	9:00	9:35	MONDAY & SATURDAY	ATR42	DIRECT

	Tabel Penerbangan					
No	FROM	TO	FLIGHT NO.	ETA	ETD	DAY OF SERVICES
1	BANDUNG	PADANG	18 6420	6:00	7:40	DAILY
1	BANDUNG	PALEMBANG	18 6440	10:10	11:20	DAILY
1	BANDUNG	MEDAN	18 6440	10:10	13:20	DAILY
1	BANDUNG	PEKANBARU	18 6450	17:30	19:10	DAILY
2	MEDAN	PALEMBANG	18 6441	13:50	15:30	DAILY
2	MEDAN	BANDUNG	18 6441	13:50	17:05	DAILY
3	PADANG	BANDUNG	18 6251	8:05	9:45	DAILY
4	PEKAN BARU	BANDUNG	18 6451	19:35	21:15	DAILY
5	PALEMBANG	BANDUNG	18 641	15:55	17:05	DAILY
5	PALEMBANG	MEDAN	18 6440	11:45	13:02	DAILY
6	PONTIANAK	SINTANG	18 200	8:00	8:45	FRIDAY & SUNDAY
6	PONTIANAK	PANGKALANBUN	18 206	10:15	11:15	MON, FRI, SAT, SUN
6	PONTIANAK	KETAPANG	18 202	8:10	8:45	MONDAY & SATURDAY
7	SINTANG	PONTIANAK	18 201	9:00	9:45	FRIDAY & SUNDAY
8	PANGKALAN BUN	PONTIANAK	18 207	15:30	16:30	MON, FRI, SAT, SUN
9	KETAPANG	PONTIANAK	18 203	9:00	9:35	MONDAY & SATURDAY

Tabel Pesawat					
No_Pesawat	Fleet	Remaks			
1	A320	DIRECT			
2	A320	VIA PALEMBANG			
3	CCSA320	DIRECT			
4	ATR42	DIRECT			

• Dependency Preservation

```
NoPesawat => { fleet, remarks }
No => { from, to)
```

• Tidak melanggar Boyce–Code Normal Form (BCNF)

Dokumentasikan	jawaban	pertanyaan	1	sampai	3	dalam	sebuah	laporan	dengan	form at
PDF!										