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Laboratory work 5

1)

Will the conversion to BCNF be dependency preserving in any case? Proof
your statement and give a reasoning for choosing BCNF design.

Answer:

No, a table is said to be in BCNF if and only if, for each nontrivial dependence of the form A → B, A is a superkey of R. BCNF is a stricter version of 3NF, in which 3NF decomposition occurs to reduce redundancy, but with the loss of dependencies

Proof:

Let’s say we have abc and a->b, b->c
It’s not in BCNF

ac and cb
in BCNF, but we lost ab->c

2) 3NF

R

UnitID	StudentID	Date	Tutor ID	Topic	Room	Grade	Book	TutEmail
U1	St1	23.02.03	Tut1	GMT	629	4.7	Deumlich	tut1@fhbb.ch
U2	St1	18.11.02	Tut3	Gln	631	5.1	Zehnder	tut3@fhbb.ch
U1	St4	23.02.03	Tut1	GMT	629	4.3	Deumlich	tut1@fhbb.ch
U5	St2	05.05.03	Tut3	PhF	632	4.9	Dümmlers	tut3@fhbb.ch
U4	St2	04.07.03	Tut5	AVQ	621	5.0	SwissTopo	tut5@fhbb.ch

R1

UnitID	StudentID	Date	Tutor ID	Grade
U1	St1	23.02.03	Tut1	4,7
U2	St1	18.11.02	Tut3	5,1
U1	St4	23.02.03	Tut1	4,3
U5	St2	05.05.03	Tut3	4,9
U4	St2	04.07.03	Tut5	5

R2

UnitID	Topic
U1	GMT
U2	Gln
U5	PhF
U4	AVQ

R3

Tutor ID	TutEmail
Tut1	tut1@fhbb.ch
Tut3	tut3@fhbb.ch
Tut5	tut5@fhbb.ch

R4

Topic	Room	Book
GMT	629	Deumlich
Gln	631	Zehnder
PhF	632	Dummlers
AVQ	621	Swiss Topo

3) 2NF

R

ProjectName	**ProjectManager**	Position	**Budget**	TeamSize
Project1	Manager1	CTO	1 kk $	15
Project2	Manager2	CTO2	1.5 kk $	12

R1

ProjectName	ProjectManager
Project1	Manager1
Project2	Manage2

R2

ProjectName	Budget	TeamSize
Project1	1 kk $	15
Project2	1.5 kk $	12

R3

ProjectManager	Position
Manager1	CTO
Manage2	CTO2

4) 3NF

Faculties have a number of specialities, each speciality consists of a set of particular groups.

Group	Faculty	Speciality
g1	**f1**	**s1**
g2	**f2**	**s2**

R

Group	Faculty	Speciality	NumOfSpec	GroupsOfSpec
g1	f1	s1	n1	gs1
g2	f2	s2	n2	gs2

R1

Group	Faculty
g1	f1
g2	f2

R2

Faculty	Speciality
f1	s1
f2	s2

R3

Speciality	NumOfSpec
s1	n1
s2	n2

R4

NumOfSpec	GroupsOfSpec
n1	gs1
n2	gs2