Laboratory work 5

Task 1. Will the conversion to BCNF be dependency preserving in any case? Proof your statement and give a reasoning for choosing BCNF design.

No, a table is said to be in BCNF if and only if, for each nontrivial dependence of the form A $\longrightarrow$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

Task 2. Given table in 1NF, convert to 3NF if PK is UnitID:

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

UnitId	StudentID	Date	Grade	Tutor ID
U1	St1	23.02.03	4.7	Tut1
U2	St1	18.11.02	5.1	Tut3
U1	St4	23.02.03	4.3	Tut1
U5	St2	05.05.03	4.9	Tut3
U4	St2	04.07.03	5.0	Tut5

Topic	Room	Book
GMT	629	Deumlich
Gln	631	Zehnder
PhF	632	Dümmlers
AVQ	621	SwissTopo

UnitId	Topic
U1	GMT
U2	Gln
U5	PhF
U4	AVQ

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

Task 3. Given table in 1NF, convert to 2NF if PK is {ProjectName, ProjectManager},use decomposition:

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

ProjectName	**ProjectManager**
Project1	Manager1
Project2	Manager2

ProjectManager	Position	TeamSize
Manager1	CTO	15
Manager2	CTO2	12

ProjectName	**Budget**
Project1	1 kk $
Project2	1.5 kk $

Task 4. Given table, convert to 3NF if PK is Group, use decomposition:

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

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

GroupID	Group name	SpecialityID
g1	Group1	s1
g2	Group2	s2

SpecialityID	Speciality name	FacultyID
s1	Information Systems	f1
s2	Automation and Control	f1

FacultyID	Faculty name
f1	FIT
f2	ISE

Task 5. Given table, convert to BCNF if PK is {ProjectID, Department}, usedecomposition:

Curator depends on projectID and related departments, teamSize directly relates to project and relateddepartments, ProjectGroupsNumber depends on TeamSize.

ProjectID	Department	Curator	Team Size	ProjectGroupsNumber
p1	d1	e1	100	5
p2	d2	e2	120	6

ProjectID	Curator	TeamID
p1	e1	T1
p2	e2	T2

TeamID	Team Size	ProjectGroupsNumber
T1	100	5
T2	120	6

CuratorID	Department
e1	d1
e2	d2

Task 6

The three design goals are lossless-join decompositions, dependency preserving decompositions, and minimization ofrepetition of information. They are desirable so we can maintain an accurate database, check correctness of updates quickly, and use the smallest amount of space possible.