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 $A \rightarrow B$, 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 <u>ab</u>c and c->b It's not in BCNF

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

2) 3NF

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

R

<u>UnitID</u>	<u>StudentID</u>	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

	<u>UnitID</u>	Topic
	U1	GMT
	U2	Gln
	U5	PhF
R2	U4	AVQ

	Tutor ID	TutEmail
	Tut1	tut1@fhbb.ch
	Tut3	tut3@fhbb.ch
B 3	Tut5	tut5@fhbb.ch
113		1

	<u>Topic</u>	Room	Book
	GMT	629	Deumlich
	Gln	631	Zehnder
	PhF	632	Dummlers
PΛ	AVQ	621	Swiss Topo
114			

3) 2NF

R

ProjectName	ProjectManager	Position	Budget	TeamSize
Project1	Manager1	сто	1 kk \$	15
Project2	Manager2	СТО2	1.5 kk \$	12

	<u>ProjectName</u>	<u>ProjectManager</u>
	Project1	Manager1
D1	Project2	Manage2
L/T	I	

	ProjectName	Budget	TeamSize
	Project1	1 kk \$	15
R2	Project2	1.5 kk \$	12

	<u>ProjectManager</u>	Position
	Manager1	СТО
DЭ	Manage2	CTO2
LO.		

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

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

-		
	Group	Faculty
	g1	f1
R1	g2	f2

	<u>Faculty</u>	Speciality
	f1	s1
22	f2	s2

	<u>Faculty</u>	NumOfSpec
	f1	n1
DЗ	f2	n2
112		

	Speciality	GroupsOfSpec
	s1	gs1
₽/I	s2	gs2

5)

R

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

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

	<u>ProjectID</u>	Department	Curator	TeamSize
	p1	d1	e1	100
D1	p2	d2	e2	120

	<u>ProjectID</u>	Department	ProjectGroupsNumber
	p1	d1	5
R2	p2	d2	6

6)

Our goals of database design with functional dependencies are:

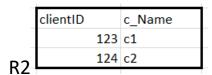
- 1. BCNF. Information minimization
- 2. Losslessness.
- 3. Dependency preservation

1. Desirable

maintaining connections and minimizing information

	employeeID	emp_Name	clientID	c_Name
	111	n1	123	c1
R	121	n2	124	c2

111 n1 1	23
R1 121 n2 1	24



2. Undesirable

repetition of information and loss of connections

R

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

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

	ProjectID	Department	Curator	TeamSize
	p1	d1	e1	100
R1	p2	d2	e2	120

	ProjectID	Department	ProjectGroupsNumber
	p1	d1	5
R 2	p2	d2	6