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.

It is not always possible to be independency preserving when you converse relation to BSNF design, but still BSNF design is convenient and correct for many cases. For example, table of Student(ID, name, tot_credit, dept_name, building, budget) can be decomposed into Student(ID, name, tot_credit, dept_name) and Department(dept_name, building). It is convenient to use BSNF, because if some attribute depends on another attribute, and it is not a PK, then it is very inconvenient to store data in this table.

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

UnitID	StudentID	Date	TutorID	Room	Grade
U1	St1	23.02.03	Tut1	629	4.7
U2	St1	18.11.02	Tut3	631	5.1
U1	St4	23.02.03	Tut1	629	4.3
U5	St2	05.05.03	Tut3	632	4.9
U4	St2	04.07.03	Tut5	621	5.0

TutorID	TurEmail
Tut1	tut1@fhbb.ch
Tut3	tut3@fhbb.ch
Tut1	tut1@fhbb.ch
Tut3	tut3@fhbb.ch
Tut5	tut5@fhbb.ch

UnitID	Topic	Book
U1	GMT	Deumlich
U2	Gln	Zehnder
U1	GMT	Deumlich
U5	PhF	Dümmlers
U4	AVQ	SwissTopo

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

ProjectName	ProjectManager	TeamSize
Project1	Manager1	15
Project2	Manager2	12

ProjectName	Position	Budget
Project1	CTO1	1 kk $
Project2	CTO2	1.5 kk $

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

Group	Speciality
G1	S1
G2	S2

Speciality	Faculty
S1	F1
S2	F2

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 related departments, ProjectGroupsNumber depends on TeamSize.

ProjectID	Curator	Department	TeamSize
P1	E1	D1	100
P2	E2	D2	120

TeamSize	ProjectGroupsNumber
100	5
120	6

Task 6. List the three design goals for relational databases, and explain why each isdesirable. Give an example of both desirable and undesirable types ofdecompositions.

The three desirable design goals for relation database scheme are:

- lossless-join decompositions
- dependency preserving decompositions
- minimizations of reputation of information. T

They are desirable so we can maintain an accurate database, check correctness of updates quickly, and use the smallest amount of space possible.