LAB WORK 5

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

Answer:

To convert to the normal form of Boyce - Code, it is required to do a decomposition. Decomposition is splitting a table into parts. A requirement for this normal form: Key attributes of a composite key must not depend on non-key attributes. Thus, some dependencies are not preserved during decompositions.

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

Answer:

StudentID	Date	UnitID	Grade
St1	23.02.03	U1	4.7
St1	18.11.02	U2	5.1
St4	23.02.03	U1	4.3
St2	05.05.03	U5	4.9
St2	04.07.03	U4	5.0

UnitID	Topic	Book	Tutor ID	Room
U1	GMT	Deumlich	Tut1	629
U2	Gln	Zehnder	Tut3	631
U1	GMT	Deumlich	Tut1	629
U5	PhF	Dummlers	Tut3	632
U4	AVQ	SwissTopo	Tut5	621

Tutor ID	TutEmail
Tut1	Tut1@fhbb.ch
Tut3	Tut3@fhbb.ch
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

Answer:

ProjectID	ProjectName	Budget
1	Project1	1 kk $
2	Project2	1.5 kk $

ManagerID	ManagerName	TeamSize
1	Manager1	15
2	Manager2	12

ProjectID	ManagerID
1	1
2	2

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

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

Answer:

Group_ID	group	Speciality_id
1	G1	1
2	G2	2

Speciality_ID	Specialty	faculty
1	S1	F1
2	S2	F2

Task 5:

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

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

Answer:

Curator_ID	CuratorName	Department
1	E1	D1
2	E2	D2

ProjectID	TeamSize	ProjectGroupsNumber	Curator_ID
P1	100	5	1
P2	120	6	2

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.

Answer:

The main goal of designing a database is to reduce the redundancy of stored data, therefore, to save used memory, reduce the cost of multiple operations of redundant copies and eliminate the possibility of inconsistencies due to storing information about the same object in different places.