Laboratory work 5

1)

At times it can’t be a dependency preserving decomposition into BNCF.

We only need to give a counter example: Consider the following schema;

a b c and c->b

Clearly the above schema is in 3NF, because ab->c is a superkey dependency and ,from c->b we can see that b-c=b, which is a subset of the primary key (such dependency is also allowed in 3NF).

But, the above schema is not in BCNF because c->b is neither super-key nor trivial dependency.

So we decompose above schema , keeping it lossless.

Only possible lossless decomposition is: ac and cb. (because,their intersection c is primary key for the 2nd table).

But clearly the dependency ab->c is lost

2)

UnitID	Topic
U1	GMT
U2	Gln
U5	PhF
U4	AVQ

UnitID	StudentID
U1	St1
U2	St1
U5	St2
U4	St2

StudentID	Topic	Grade
St1	GMT	4.7
St1	Gln	5.1
St4	GMT	4.3
St2	PhF	4.9
St2	AVQ	5.0

Topic	Room	TutorID	Book	Date
GMT	629	Tut1	Deumlich	23.02.03
Gln	631	Tut3	Zehnder	18.11.02
PhF	632	Tut3	Dummlers	05.05.03
AVQ	621	Tut5	SwissTopo	04.07.03

3)

ProjectName	ProjectManager
Project1	Manager1
Project2	Manager2

ProjectName	TeamSize	Budget
Project1	15	1 kk
Project2	12	1.5 kk

ProjectManager	Position
Manager1	CTO
Manager2	CTO2

4)

Group	Speciality
g1	s2
g2	s2

Speciality	Faculty
s2	f2
s2	f2

5)

ProjectID	Departament	Curator	TeamSize
p1	d1	e1	100
p2	d2	e2	120

TeamSize	PGN
100	5
120	6

6)

1. BCNF is the advance version of 3NF. It is stricter than 3NF. A table is in BCNF if every functional dependency X → Y, X is the super key of the table. For BCNF, the table should be in 3NF, and for every FD, LHS is super key.

2. Lossless-join decomposition is a process in which a relation is decomposed into two or more relations. This property guarantees that the extra or less tuple generation problem does not occur and no information is lost from the original relation during the decomposition. It is also known as non-additive join decomposition.

3. The dependency preservation decomposition is another property of decomposed relational database schema D in which each functional dependency X -> Y specified in F either appeared directly in one of the relation schemas R_i in the decomposed D or could be inferred from the dependencies that appear in some Ri.