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Laboratory work №5

1. In general, there may not be a dependency preserving decomposition into BCNF.
   For example:
   address (city, street_name, zip_code) with Functional Dependencies:
   (city, street_name) → zip_code
   zip_code → city
   Can't decompose while preserving (city, street_name) → zip_code, but *address* is not in BCNF.
   BCNF is better than 3NF because there is no problem with the repetition of information and we won't have to use null values to represent some of the possible meaningful relationships among data items.

2.

UnitID	Topic
U1	GMT
U2	Gln
U5	PhF
U4	AVQ

UnitID	StudentID
U1	St1
U2	St1
U1	St4
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

TutorID	TutEmail
Tut1	tut1@fhbb.ch
Tut3	Tut3@fhbb.ch
Tut5	Tut5@fhbb.ch

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
s1	f2
s2	f2

5.

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

TeamSize	ProjectGroupsNumber
100	5
120	6

6. Goal for a relational database design is:
    - BCNF.

      Is desirable because there is no problem with the repetition of information and we won't have to use null values to represent some of the possible meaningful relationships among data items.

    - Lossless join.

      Is desirable because there is no loss of information by joining two relation schemas R1 and R2 into R
    - Dependency preservation

      Is desirable because doesn't make it computationally hard to enforce functional dependency

Lossy Decomposition

S_id	S_name	S_age	subject_id	Teacher_id
136579	Petr	18	1	567
623458	Petr	19	2	92

S_id	S_name	S_age
136579	Petr	18
623458	Petr	19

S_name	subject_id	Teacher_id
Petr	1	567
Petr	2	92

S_id	S_name	S_age	subject_id	Teacher_id
136579	Petr	18	1	567
136579	Petr	19	2	92
623458	Petr	18	1	567
623458	Petr	19	2	92

Lossless Decomposition

S_id	S_name	S_age	subject_id	Teacher_id
136579	Petr	18	1	567
623458	Petr	19	2	92

S_id	S_name	S_age
136579	Petr	18
623458	Petr	19

S_id	subject_id	Teacher_id
136579	1	567
623458	2	92

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