Test 3-2 (英文课堂) （2018-10-25）

学号： 姓名：

1. Please explain the following terms (4 points):

1NF:

A relational schema R is in first normal form if the domains of all attributes of R are atomic

2NF:

A relation that is in 1NF and every non-primary-key attribute is fully functionally dependent on any candidate key

3NF:

A relation that is in 1NF and 2NF and in which no non-primary-key attribute is transitively dependent on any candidate key.

BCNF:

A relation is in BCNF if and only if every determinant is a candidate key.

2. Given relation schema R, functional dependency set F and decomposition set ρ, Please check if ρ keeps Lossless-join property **and** Dependency Preservation. (3 points)

R(S, A, I, P), F={S→A,SI→P}, ρ={R_1(SA), R_2(SIP)}.

Solution： $R_1 \cap R_2$=SA∩SIP=S , R_1-R_2=SA-SIP=A,

S→A belong to F, So ρ keeps Lossless-join property

ρ keeps Dependency Preservation.

3. Given R(A,B,C,D)，F={D→B,C→A,A→C},please give the candidate keys, and judge whether R is in BCNF，if not, decompose R into BCNF. (3 points)

Solution： There are two candidate keys, i.e. (C,D) and (A,D)

R∈1NF, because Non-primary key attribute B is partially functional dependent on candidate key (C,D), so R is in 1NF and it can be decomposed to

（D,B）, (A,D) and（A,C）

Or （D,B）, (C,D) and（A,C）

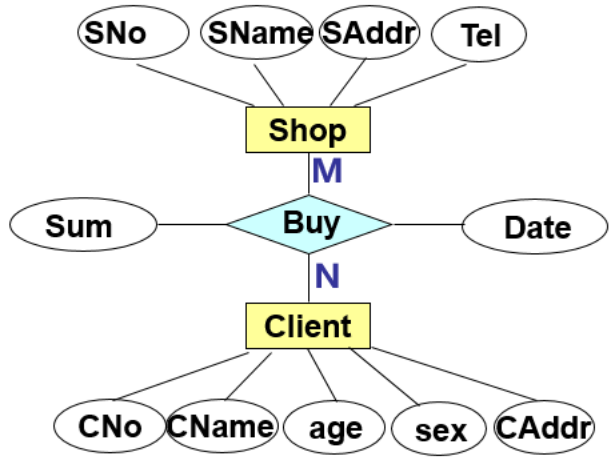
4. DB design (5 points)

Suppose there are two entities, i.e. Shop and Client. The attributes for Shop are shop number, name, address, Telephone number. The attributes for Client are client number, name, address, age, sex. One shop can have many clients and one client can go to many shops for shopping. There are a sum and a date in each order sheet. Each client goes shopping in one shop at most once each day.

(1)Please draw E-R model

(2)Transform the above E-R model to relational data model (logical model).

E-R Diagram



Client（Cno, Cname, age,sex, CAddr）
Shop（SNo，SName，SAddr，Tel）
Buy（CNo，SNo，Date， Sum）