CIS/CSC384

HomeWork 6: Due Apr 8, 2010 before class

You will turn in the assignment via bb. Turn in a single word/pdf document.

1. For the patient table given below, list the FDs with the column PatZip as the determinant that are not true due to the sample data. With each FD that does not hold, list 2 rows that contradict it. [1.5 pts]

VisitNo	VisitDate	PatNo	PatAge	PatCity	PatZip	ProvNo	ProvSpecialty	Diagnosis
V10020	1/13/2007	P1	35	DENVER	80217	D1	INTERNIST	EAR INFECTION
V10020	1/13/2007	P1	35	DENVER	80217	D2	NURSE PRACTITIONER	INFLUENZA
V93030	1/20/2007	P3	17	ENGLEWOOD	80113	D2	NURSE PRACTITIONER	PREGNANCY
V82110	1/18/2007	P2	60	BOULDER	85932	D3	CARDIOLOGIST	MURMUR

2. Consider the following FDs on the patient table above. [2 pts]
   PatNo -> PatAge, PatCity, PatZip
   PatZip -> PatCity
   ProvNo -> ProvSpecialty
   VisitNo -> PatNo, VisitDate, PatAge, PatCity, PatZip
   VisitNo, ProvNo -> Diagnosis

   Apply the simple synthesis procedure using the above FDs to come up with the 3NF schema. Note that, after Step 2 (after removing derived FDs), the minimal set of FDs is given below:
   PatNo -> PatAge, PatZip
   PatZip -> PatCity
   ProvNo -> ProvSpecialty
   VisitNo -> PatNo, VisitDate
   VisitNo, ProvNo -> Diagnosis

3. Consider the FDs listed below for an order entry table. Apply the synthesis procedure to come up with the 3NF design. (Note that there are no derived FDs, so the following lists the FDs after step 2). You must identify all candidate keys for every table. [2 pts]

   CustNo $\rightarrow$ CustBal, CustDiscount
   OrderNo $\rightarrow$ CustNo, ShipAddr, OrderDate
   ItemNo $\rightarrow$ ItemDesc
   ItemNo, PlantNo $\rightarrow$ ReorderPoint, QtyOnHand
   OrderNo, ItemNo $\rightarrow$ LineNo, QtyOrdered, QtyOutstanding
   OrderNo, LineNo $\rightarrow$ ItemNo, QtyOrdered, QtyOutstanding

4. Consider the following FDs for a simplified expense report table. Note that there are three candidate keys: <ExpItemNo>, the combination <ERNo, CatNo>, and the combination <ERNo, CatName>

   ERNo -> UserNo, ERSubmitDate, ERStatusDate
   ExpItemNo -> ExpItemDesc, ExpItemDate, ExpItemAmt, CatNo, ERNo
   UserNo -> UserFirstName, UserLastName, UserPhone, UserEmail
   CatNo -> CatName, CatLimit
   ERNo, CatNo -> ExpItemNo
   UserEmail -> UserNo
   CatName -> CatNo

   (a) If we have all the columns in 1 table, is the design in 2NF? (Remember: a schema violates 2NF, if there is a FD X -> Y, where X is part of a candidate key, and Y is a non-key column). If the design is not in 2NF, you must specify all the FDs that violate 2NF. [1 pt]

   (b) If we have all the columns in 1 table, is the design in 3NF? (Remember: a schema violates 3NF, if there is a FD X -> Y, where Y is a non-key column, and X is a not part of any key). If the design is not in 3NF, you must specify all the FDs that violate 3NF. [1 pt]

   (c) Come up with the set of 3NF tables for this scenario, using the synthesis procedure. Note that the FDs given are minimal (result of Step 2 of the synthesis procedure). [2.5 pts]