Homework 3

Jeremy Desser

December 10, 2015

15.26

a.

i.

$A \rightarrow B$ Does not hold.

ii.

$B \rightarrow C$ Dependancy holds.

iii.

$C \rightarrow B$ Does not hold.

iv.

$B \rightarrow A$ Dependancy holds.

v.

$C \rightarrow A$ Does not hold.

b.

Since a candidate key is a set of attributes x such that $x \rightarrow ABC$, x can only be B, thus B is the only candidate key.

15.28

15.31

a.

The Books relation is in 1NF since book_ title -¿ book $_type and book\_type- > List\_price$

b.

2NF:
book1(Book_title, Authorname)
book2(Book_title, Publisher, Book_type, Listprice)
book3(Authorname, Author_ affil)
3NF:
book1(Book_title, Authorname)
book2(Book_title, Publisher, Book_ type)
book3(Book_title, list_ price)
book4(Authorname, Author_ affil)

BCNF:
book1(Book_title, Authorname)
book2(Book_title, Publisher)
book3(Book_title, Book_ type)
book4(Book_title, list_ price)
book5(Authorname, Author_ affil)

16.28

Input: A universal relation R and a set of functional dependencies F on the attributes of R .
Set D := R ;
While there is a relation schema Q in D that is not in BCNF
do
choose a relation schema Q in D that is not in BCNF;
find a functional dependency X Y in Q that violates BCNF;
replace Q in D by two relation schemas (Q Y) and (X Y);
; $R = A, B, C, D, E, F, G, H, I$
$D = R$
$F = A, B-> C, A-> D, E, B-> F, F-> G, H, D-> I, J$

$Q1 = A, D, E, I, J$
$Q1 - Y1 = A, D, E$
$X1UY1 = D, I, J$

$Q2 = B, F, G, H$
$Q2 - Y2 = B, F$
$X2UY2 = F, G, H$
$D = Q1 - Y1 = A, D, E$
$X1UY1 = D, I, J$
$Q2 - Y2 = B, F$
$X2UY2 = F, G, H$
$G = A, BC, B, DE, F, A, DG, H, AI, HJ$
$Q1 = A, D, G, H, J, I$
$Q1 - Y1 = AGH$
$X1UY1 = AI$
$Q2 - Y2 = A, D, H, J$
$Q2 - Y2 = A, D, H$
$X2UY2 = H, J$
$Q3 = B, D, E, F$

28.15

There is only one frequent itemset of size 3, milk,bread,eggs. We can try the rule milk,eggs -¿ bread. The confidence of this rule is 0.3/0.3 which is higher than the min confidence value of 0.7. We can also try is bread -¿ milk,eggs. The confidence of this rule is 0.3/0.4 which again is higher than the required minimum confidence.