**CS385 HW7**

**8.29**

**a.** cl(B) = {B, D, A, C, D, E}

**b.** Prove using Armstrong’s Axioms that AF is a Superkey

r(A, B, C, D, E, F)

F = {A, B, C, D, E, F}

Reflexivity:

A -> A

B -> B

C -> C

D -> D

E -> E

F -> F

Decomposition:

A -> B

A -> C

A -> D

Union:

A -> BCD

Transitivity:

A -> DE

Union:

A -> ABCDE

Transitivity since A -> ABCDE and F-> F then AF -> ABCDEF

**c.** Canonical cover

Singleton right hand:

B -> D

D -> A

A -> B

A -> C

A -> D

BC -> E

BC -> D

Extraneous Removal:

BC -> E

BC -> D

B+ = BDE

C+ = CDE

C can be removed from BC -> E and BC -> D because it is extraneous

Redundant Removal:

B -> D

D -> A

A -> B

A -> C

A -> D

B -> E

B+ = BE

D+ = D

A+ = ACD

A -> D can be removed because D can already be implied from the relation D -> A

**d.** 3NF decomposition using canonical cover

R” = (A, B, C, D, E, F)

F’ = {B -> D, D -> A, A -> B, A -> C, B -> E)

R1 = {A, B, C, D, E} : P.K {B}

R2 = {F} : P.K {F}

**e.** BCNF decomposition using original set of relations

R” = (A, B, C, D, E, F)

F’ {A -> BCD, BC -> DE, B -> D, D -> A}

R1 = {A, B, C, D, E} : P.K {A}

R2 = {F} : P.K {F}

**f.** Yes you can get the same BCNF decomposition as the set above using the canonical cover