**HW2**

**1.**

**a)**

ρ Class1 (classcode, semester, roomID, period, cap)(Class)

σ Class1.period = Class.period AND Class1.roomID = Class.roomID  (Class1 X Class) = ∅

**b)**

CIS(studentID, classID, period, cap) = σ classID = 'CIS4301'(Enroll)

COT(studentID, classID, period, cap) = σ classID = 'COT3100' AND grade ≤ D (Enroll)

CIS ⨝ CIS.studentID = COT.studentID COT = ∅

**c)**

ρ S1 (studentID, , classID, semester, grade)(Class)

ρ S2 (studentID, , classID, semester, grade)(Class)

ρ S3 (studentID, , classID, semester, grade)(Class)

Group(S1.classID) = πS1.classID(σ S1.studentID ≠ S2.studentID AND S1.classID = S2.classID AND S1.semester = S2.semester AND S1.studentID ≠ S3.studentID AND S1.classID = S3.classID AND S1.semester = S3.semester AND S2.studentID ≠ S3.studentID AND S2.classID = S3.classID AND S2.semester = S3.semester (S1 X S2 X S3))

ρ Group(classID)

πclassID(Class) – Group = ∅

2.

2n-2 + 2n- 3- 2n-4

**3.**

AE → D

AC → B

B → E

D → A

EC → D

AC → E

AC → D

EC → A

{A}+ = A

{C}+ = C

{E}+ = E

{AC}+ = E

{C,E}+ = A

FD of R1

AC → E

CE → A

b)

A,C is a key

C,E is a key

**4.**

R

R1(B,C,D,E) R2(A,C)

C+ =BCDE A+ = A

D+ = BDE C+ = C

C → BCDE FD: ∅

D → BE

R3(B,D,E) R4(C,D)

D+ = BDE C+ = D

B+ = B D+ = D

E+ = E C → D

D → BE

R1(D,B,E)

R2(C,D)

R3(A,C)