1a

SEnroll(I, c, s, n, a) <- Student(I, n, m, a , b, g) AND Enroll(I, c, s, gr)

ANS(nl, nr, al) <- SEnroll(il, cl, sl, nl, al) AND SEnroll(ir, cr, sr, nr, ar) AND il < ir AND sl = sr AND cl = cr

AND al = ar

1b

NotMassive(cl, cnl, sl, rl, pl, cl, cpl) <- Class(cl, cnl, sl, rl, pl, crl, cpl) AND Class(cr, cnr, sr, rr, pr, crr, cpr)

AND cpl < cpr AND sl = sr

Massive(ci, s) <- Class(ci, c, s, r, p, c, cp) AND NOT NotMassive(ci, c, s, r, p, c, cp)

ME(i) <- Massive(ci, s) AND Enroll(i, ci, s, gr)

ANS(i, n) <- ME(i) AND Student(i, n, m, a, b, g)

1c

Precede(il, cl, cr, sl, gl) <- Enroll(il, cl, sl, gl) AND Enroll(ir, cr, sr, gr) AND il = ir AND cl <> cr AND sl < sr

AND gl ≥ 2.0

notPrecede(il, cl, cr, sl, gl) <- Precede(il, cl, cr, sl, gl) AND Precede(i, clr, crr, sr, gr) AND cl = crr

AND cr = clr

PrecedeTrue(cl, cr) <- Precede(i, cl, cr, s, g) AND NOT notPrecede(i, cl, cr, s, g)

ANS(cl, cr, nl, nr) <- PrecedeTrue(cl, cr) AND Class(cl, nl, s, r, p, c, cap) AND Class(cr, nr, s, r, p, c, cap)

2a

SELECT name, birthday

FROM Student, Enroll

WHERE classID = “CIS4301” AND StudentID = ID

2b

SELECT ID, name, gender

FROM Student

WHERE ID IN

{

SELECT E1.studentID

FROM Enroll E1, Enroll E2

WHERE E1.classID = “CIS4301” AND E1.grade <= 2.0 AND E1.semester < E2.semester

AND E1.studentID = E2.studentID AND E1.classID = “CIS4301”

}

2c

SELECT ID, name, birthday (SUM(credits \* grade) / SUM(credits)) AS CGPA

FROM Student

JOIN Enroll ON studentID = ID

JOIN Class ON Enroll.classID = Class.classID

ORDER BY CGPA, birthday ASC

**2D on the next page**

2d

SELECT C1.classID, C2.classID, C1.classname , C2.classname

FROM

Class C1 Cross Join Class C2

Where (C1.classID, C2.classID) IN

(

SELECT classID1, classID2

FROM

(

SELECT E1.classID AS classID1, E2.classID AS classID2

FROM Enroll E1, Enroll E2

WHERE E1.studentID = E2.studentID AND E1.courseID <> E2.courseID

AND E2.semester = E1.semester + 1

)Precede,

(

SELECT P1.classID1 AS classID1, P1.classID2 AS classID2

FROM

Precede P1 Join Precede P2 ON P1.classID1 = P2.classID2

AND P1.classID2 = P2.classID1

)NotPrecede

WHERE Precede EXCEPT NotPrecede

)