#1a

SELECT professor.pnum, professor.lastname

FROM professor

JOIN section ON professor.pnum = section.pnum

JOIN enrollment ON section.cnum = enrollment.cnum

AND section.term = enrollment.term

AND section.section = enrollment.section

WHERE professor.dept LIKE 'CS'

AND section.cnum LIKE 'CS348'

AND enrollment.grade < 60;

Sigma

#1b

SELECT professor.pnum, professor.lastname

FROM professor

JOIN section ON professor.pnum = section.pnum

JOIN enrollment ON section.cnum = enrollment.cnum

AND section.term = enrollment.term

AND section.section = enrollment.section

WHERE professor.dept LIKE 'CS'

AND NOT (section.cnum LIKE 'CS348' OR section.cnum LIKE 'CS234');

#1c

SELECT s.snum, s.firstname, s.year

FROM student s

WHERE s.year = 4

AND NOT EXISTS (

SELECT 1

FROM enrollment e

JOIN section sec ON e.cnum = sec.cnum AND e.term = sec.term AND e.section = sec.section

JOIN course c ON e.cnum = c.cnum

WHERE s.snum = e.snum

AND c.cnum LIKE 'C%'

AND (e.grade IS NULL OR e.grade < 90)

);

#3a

SELECT professor.pnum, professor.lastname

FROM professor

JOIN section ON professor.pnum = section.pnum

JOIN enrollment ON section.cnum = enrollment.cnum

AND section.term = enrollment.term

AND section.section = enrollment.section

WHERE section.cnum = 'CS245'

AND enrollment.grade = (

SELECT MIN(grade)

FROM enrollment

WHERE cnum = 'CS245'

);

#3b

SELECT COUNT(DISTINCT professor.pnum) \* 100.0 / COUNT(DISTINCT professor.pnum) AS percentage

FROM professor

JOIN section s1 ON professor.pnum = s1.pnum

JOIN section s2 ON professor.pnum = s2.pnum

WHERE s1.cnum = s2.cnum

AND s1.term = s2.term

AND s1.section <> s2.section;