Suggested Solution to Even Numbered Problem in Relational Algebra

(2) $\sigma_{major='CSCI'}(student)$

(4) $\pi_{fName, lName, credit}(\sigma_{Major='CSCI' \text{ and } credit >= 40}(student))$

(6) $\pi_{deptCode}(\sigma_{rank='Professor'}(faculty))$

(8) $\pi_{fName, lName}(student \ |x| \ \sigma_{classId = 10000}(enroll))$

(10) $\pi_{fName, lName, deptName, f\_fName, f\_lName}(student \ |x| \ \rho_{Major <- deptCode}(department) \ |x| \ f \ \rho_{advisor <- facId, f\_fName <- fName, f\_lName <- lName}(faculty))$

Note that the renaming are necessary to differentiate columns from different tables with the same names.

(12) $\pi_{fName, lName, deptName}(student \ |x| \ \rho_{major <- deptCode}(department) \ |x| \ \sigma_{grade='A'}(enroll) \ |x| \ class \ |x| \ \sigma_{deptCode='CSCI'}(faculty))$

(14) $\pi_{classId, facId, room}(class \ |x| \ (\pi_{classId}(\sigma_{StuId=100001}(enroll))))$

(16) $\pi_{classId, facId, room}(class \ |x| \ (\pi_{classId}(\sigma_{StuId=100001}(enroll)) \cap \pi_{classId}(\sigma_{StuId=100002}(enroll))))$

Or

$\pi_{classId, facId, room}(class \ |x| \ \pi_{classId}(\sigma_{StuId=100001}(enroll)) \ |x| \ \pi_{classId}(\sigma_{StuId=100002}(enroll)))$

(18) $\pi_{stuId, fName, lName}(student \ |x| \ (\pi_{stuId}(class) - \pi_{stuId}(enroll)))$

(20) $\pi_{stuId, fName, lName}(student \ |x| \ (\sigma_{room<>room\_2}(\pi_{stuId, room}(enroll \ |x| \ class) \ |x| \ \rho_{room\_2 <- room}(\pi_{stuId, room}(enroll \ |x| \ class))))$

(22) $\pi_{stuId}(\sigma_{major='CSCI'}(student)) - \pi_{stuId}(\sigma_{facId= 1012}(enroll \ |x| \ class))$

(24) $\pi_{stuId, classId}(enroll) / \pi_{classId}(\sigma_{facId=1014}(enroll))$