

Relational Algebra Exercises

Schema

A note about the domain: A course may or may not satisfy the “breadth” requirement.

Student(sID, surName, firstName, campus, email, cgpa)

Course(dept, cNum, name, breadth)

Offering(oID, dept, cNum, term, instructor)

Took(sID, oID, grade)

Offering[dept, cNum] \subseteq Course[dept, cNum]

Took[sID] \subseteq Student[sID]

Took[oID] \subseteq Offering[oID]

Queries

Write a query for each of the following:

1. Student number of all students who have taken csc343.
2. Student number of all students who have taken csc343 and earned an A+ in it.
3. The names of all such students.
4. The names of all students who have passed a breadth course with Professor Picky.
5. sID of all students who have earned some grade over 80 and some grade below 50.
6. Terms when Cook and Pitassi were both teaching something.
7. Terms when either of them was teaching csc363.
8. sID of students who have earned a grade of 85 or more, or who have passed a course taught by Atwood.
9. Terms when csc369 was not offered.
10. Department and course number of courses that have never been offered.
11. SIDs and surnames of all pairs of students who've taken a course together. (The original question asked for just names, but we're including SIDs also in this solution. Having names alone would be fine if that is what one wants, but of course two individuals with the same name would be indistinguishable by name only.) Rather than getting the surnames in two steps we could have done it all at once. To do so, we'd have to bring in two copies of Student, and therefore would need to do some renaming.
12. sID of student(s) with the highest grade in csc343, in term 20099.
13. sID of students who have a grade of 100 at least twice.
14. sID of students who have a grade of 100 exactly twice.
15. sID of students who have a grade of 100 at most twice.
16. Department and cNum of all courses that have been taught in every term when csc448 was taught.
17. Name of all students who have taken, at some point, every course Gries has taught (but not necessarily taken them from Gries).