

Tutorial 6 Relational Algebra

Exercise 1:

Give the following queries in the relational algebra and in SQL using the relational schema given above, that is

student(id, name)
enrolledIn(id, code)
subject(code, lecturer)

1. What are the names of students enrolled in CSC380?
2. Which subjects is Yazeed taking?
3. Who teaches CSC380?
4. What are the names of students in both CSC380 and CSC383?
5. What are the names of students taking a subject taught by Dr Assalman?
6. Count the number of students enrolled in CSC380.

1. What are the names of students enrolled in CS380 ?

Π name(σ csc380=code(student \bowtie enrolledIn))

2. Which subjects is Yazeed taking?

Π code(σ name=Yazeed(student \bowtie enrolledIn))

3. Who teaches CSC 380?

Π lecturer(σ code=csc380(subject))

4. What are the names of students in both CSC 380 and CSC 383?

Π name(σ code=csc380(student \bowtie enrolledIn)) \cap Π name(σ code=csc383(student \bowtie enrolledIn))

Exercise 2:

Consider the following relations containing airline flight information:

Flights(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time)

Aircraft(aid: integer, aname: string, cruisingrange: integer)

Certified(eid: integer, aid: integer)

Employees(eid: integer, ename: string, salary: integer)

Write the following queries in relational algebra:

1. Find the eids of pilots certified for some Boeing aircraft.
2. Find the names of pilots certified for some Boeing aircraft.
3. Find the aids of all aircraft that can be used on non-stop flights from Bonn to Madras.
4. Identify the flights that can be piloted by every pilot whose salary is more than SR100,000.

1. $\pi_{eid}(\sigma_{aname='Boeing'}(Aircraft \bowtie Certified))$

2. $\pi_{ename}(\sigma_{aname='Boeing'}(Aircraft \bowtie Certified \bowtie Employees))$

3. $\rho(BonnToMadras, \sigma_{from='Bonn' \wedge to='Madrid'}(Flights))$
 $\pi_{aid}(\sigma_{cruisingrange > distance}(Aircraft \times BonnToMadras))$

4. $\pi_{flno}(\sigma_{distance < cruisingrange \wedge salary > 100,000}(Flights \bowtie Aircraft \bowtie Certified \bowtie Employees)))$