

Relational Algebra Examples: (Not: SQL sorgularını siz yazın)

Consider the following relations:

Student(ssn, name, address, major)

Course(code, title)

Registered(ssn, code)

1. List the codes of courses in which at least one student is registered (registered courses):

$\pi_{\text{code}} (\text{Registered})$

2. List the titles of registered courses (of those in 1.)

$\pi_{\text{code}} (\text{Course} \bowtie \text{Registered})$

3. List the codes of courses for which no student is registered

$\pi_{\text{code}} (\text{Course}) - \pi_{\text{code}} (\text{Registered})$ *Try: Students who are not registered to any courses.*

4. The titles of courses for which no student is registered.

In the previous query we found the codes; natural join with Course to find the titles.

$\pi_{\text{name}} ((\pi_{\text{code}} (\text{Course}) - \pi_{\text{code}} (\text{Registered})) \bowtie \text{Course})$

5. Names of students and the titles of courses they registered to.

$\pi_{\text{name}, \text{title}} (\text{Student} \bowtie \text{Registered} \bowtie \text{Course})$

or, can be written as $\pi_{\text{name}, \text{title}} ((\sigma_{1=4 \wedge 5=6} (\text{Student} \times \text{Registered} \times \text{Course}))$

6. SSNs of students who are registered for 'Database Systems' or 'Analysis of Algorithms'.

$\pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Database Systems'} \text{Course})) \cup$
 $\pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Analysis of Algorithms'} \text{Course}))$

7. SSNs of students who are registered for both 'Database Systems' and 'Analysis of Algorithms'.

$\pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Database Systems'} \text{Course})) \cap$
 $\pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Analysis of Algorithms'} \text{Course}))$

The name of those students:

$A = \pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Database Systems'} \text{Course})) \cap$
 $\pi_{\text{ssn}} (\text{Student} \bowtie \text{Registered} \bowtie (\sigma_{\text{title}='Analysis of Algorithms'} \text{Course}))$
 $\pi_{\text{name}} (A \bowtie \text{Student})$ *used A= instead of $\rho()$ function.*

8. List of courses in which all students are registered.

$\pi_{\text{code, ssn}} (\text{Registered}) / \pi_{\text{ssn}} (\text{Student})$

SQL: (başka türlü de yazılabilir, önerilerinizi bana email ile yazın)

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SELECT code FROM Registered
GROUP BY code
HAVING count(*) = (select count(code) from Course)
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9. List of courses in which all 'ECMP' major students are registered.

$\pi_{\text{code, ssn}} (\text{Registered}) / \pi_{\text{ssn}} (\sigma_{\text{major}='ECMP'} \text{Student})$