

Lab 2, Task 3: Relational-algebra queries

1) task 2, problem 1

$\Pi_{\text{name, capacity}} (\sigma_{\text{name LIKE 'CAS%' OR name LIKE 'CGS\%'}} (\text{Room}))$

2) task 2, problem 6

$\Pi_{\text{name}} (\sigma_{\text{dept_name = 'computer science'}} (\text{Student} \bowtie_{\text{id = student_id}} \text{MajorsIn}))$

or

$\Pi_{\text{name}} (\text{Student} \bowtie_{\text{id = student_id and dept_name = 'computer science'}} \text{MajorsIn})$

or

$\Pi_{\text{name}} (\text{Student} \bowtie_{\text{id = student_id}} (\sigma_{\text{dept_name = 'computer science'}} \text{MajorsIn}))$

or

$\Pi_{\text{name}} (\sigma_{\text{id = student_id and dept_name = 'computer science'}} (\text{Student} \times \text{MajorsIn}))$

or...

3) task 2, problem 7

If we assume student names are unique:

$\Pi_{\text{name}} (\text{Student}) - \Pi_{\text{name}} (\text{Student} \bowtie_{\text{id = student_id and course_name = 'CS 460'}} \text{Enrolled})$

If we don't make that assumption, we would use a two-step process:

- *first, find the ids of students not enrolled in 460 and assign that set of ids to a variable*
 $\text{Non460} \leftarrow \Pi_{\text{id}} (\text{Student}) - \Pi_{\text{student_id}} (\sigma_{\text{course_name = 'CS 460'}} \text{Enrolled})$
- *second, perform a natural join of the Student relation with the result of the first step and project the name column from the result of the natural join*
 $\Pi_{\text{name}} (\text{Student} \bowtie \text{Non460})$