Lab 2, Task 4: Relational-algebra queries

1) **task 3, problem 1**

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

2) **task 3, problem 5**

$\pi_{\text{name}} (\sigma_{\text{dept\_name = 'computer science'}} (\text{Student} \bowtie_{\text{id = student\_id}} \text{MajorsIn}))$

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 3, problem 6**

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*

  $\pi_{\text{name}} (\text{Student} \bowtie \text{Non460})$