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CSCD327 – Lab2

1. (8 points) Write the following queries in **relational algebra**, using the schema below, where the primary keys are underlined.

   Sailors(<u>sid</u>, sname, rating, age)
   Reserves(<u>sid</u>, <u>bid</u>, <u>day</u>)
   Boats(<u>bid</u>, bname, color)

   a. Find names of sailors who have reserved boat 103 (i.e., bid = 103).
   b. Find names of sailors who have reserved a red boat.
   c. Find names of sailors who have reserved a red or a green boat.
   d. Find names of sailors who have reserved a red and a green boat.

a) $\Pi_{sname}(\sigma_{sid=103}(Reserves \bowtie Sailors))$

b) $\Pi_{sname}((\sigma_{color='red'} Boats) \bowtie Reserves \bowtie Sailors)$

c) $\Pi_{sname}((\sigma_{color='red' \vee color='green'} Boats) \bowtie Reserves \bowtie Sailors)$

d) $\Pi_{sname}((\Pi_{sid}(\sigma_{color='red'} Boats) \bowtie Reserves) \cap (\Pi_{sid}(\sigma_{color='green'} Boats) \bowtie Reserves)) \bowtie Sailors)$

2. (4 points) Write the following queries in **relational algebra**, using the university schema I gave you in class.
   a. Find the names of all students who have taken at least one Comp. Sci. course.
   b. Find the IDs and names of all students who have not taken any course offered before 2009.

a) $\Pi_{name}(student \bowtie takes \bowtie \Pi_{course\_id}(\sigma_{dept\_name="Comp.Sci"}(course)))$

b) $\Pi_{ID,name}(student) - \Pi_{ID,name}(\sigma_{year<2009}(student \bowtie takes))$

3. (4 points) Write the following queries in **relational algebra**, using the schema below, where the primary keys are underlined.

employee (pname, street, city)
works (pname, cname, salary)
company (cname, city)
manages (pname, manager_name)

a. Find the names, street addresses, and cities of residence of all employees who work for "First Bank Corporation" and earn more than $10,000.

b. Find the names of all employees in this database who live in the same city as the company for which they work.

a) $\Pi_{pname, street, city}(\sigma_{(cname = \text{"First Bank Corporation"} \wedge salary > 10000)} works \bowtie employee)$

b) $\Pi_{pname}(employee \bowtie works \bowtie company)$