

Laboratory work 1

Please write your answers to the pdf file for defense:

1. Consider the employee database of figure below. Give an expression in the relational algebra to express each of the following queries:

employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city)

Figure

- Find the ID and name of each employee who works for "BigBank".
 $\pi_{ID, person_name}(\sigma_{company_name="BigBank"}(works))$
- Find the ID, name, and city of residence of each employee who works for "BigBank".
 $\pi_{ID, person_name, city}(\sigma_{company_name="BigBank"}((\sigma_{employee.id=works.id}(works \times employee)))$
- Find the ID, name, street address, and city of residence of each employee who works for "BigBank" and earns more than \$10000.
 $\pi_{ID, person_name, city, street}(\sigma_{company_name="BigBank" \wedge salary > 10000}((\sigma_{employee.id=works.id}(works \times employee)))$

- Find the ID and name of each employee in this database who lives in the same city as the company for which she or he works.

$\pi_{ID, person_name}(\sigma_{employee.city=company.city} (employee \bowtie_{employee.id = works.id} works \bowtie_{works.company_name = company.company_name} company))$

2. Consider the employee database of figure above. Give an expression in the relational algebra to express each of the following queries:

- Find the ID and name of each employee who does not work for "BigBank".
 $\pi_{ID, person_name}(\sigma_{company_name \neq "BigBank"}(works))$
- Find the ID and name of each employee who earns at least as much as every employee in the database.
 $\pi_{ID, person_name}(employee) - \pi_{ID, person_name}()$

3. Consider the foreign-key constraint from the *dept_name* attribute of instructor to the *department* relation. Give examples of inserts and deletes to these relations that can cause a violation of the foreign-key constraint.

4. Consider the employee database of figure above. What are the appropriate primary keys?

The appropriate primary key of employee and works is person_name.
 The appropriate primary key of company is company name.