Laboratory work 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)

Task 1

a) Find the ID and name of each employee who works for "BigBank".
Answer: $\prod_{id,person\_name}(\sigma_{company\_name="BigBank"}(works))$
b) Find the ID, name, and city of residence of each employee who works for "BigBank".
Answer: $\prod_{id,person\_name,city}(\sigma_{company\_name="BigBank"}$
$(\sigma_{employee.id=works.id}(employee \times works)))$
c) Find the ID, name, street address, and city of residence of each employee who works for "BigBank" and earns more than $10000.
Answer: $\prod_{id,person\_name,street,city}(\sigma_{company\_name="BigBank \wedge}$
$_{salary>10000}(\sigma_{employee.id=works.id}(employee \times works)))$
d) 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.
Answer: $\prod_{id,person\_name}(\sigma_{employee.city=company.city}(\sigma_{works.company\_name=company.}$
$_{company\_name}(\sigma_{employee.id=works.id}(employee \times company \times works))))$

Task 2

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

a) Find the ID and name of each employee who does not work for "BigBank".

Answer: $\prod_{id,person\_name}(\sigma_{companny\_name \neq "BigBank"}(works))$

b) Find the ID and name of each employee who earns at least as much as every employee in the database.

Answer: $\prod_{id,person\_name}(\sigma_{salary >= avg(salary)}(\sigma_{employee.id=works.id}(employee \times works))$

Task 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.

Answer: No answer

Task 4

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

Answer: employee(ID), works(ID), company(company_name)