

# Laboratory work 1

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)*

- Find the ID and name of each employee who works for “BigBank”.

$\Pi_{ID, name} (\sigma_{company\_name = \text{“BigBank”}} (works))$

- Find the ID, name, and city of residence of each employee who works for “BigBank”.

$\Pi_{ID, name, city} (\sigma_{company\_name = \text{“BigBank”}} (works \times employee))$

- Find the ID, name, street address, and city of residence of each employee who works for “BigBank” and earns more than \$10000.

$\Pi_{ID, name, city, street} (\sigma_{company\_name = \text{“BigBank”} \wedge salary > 10000} (works \times employee))$

- 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.

$\Pi_{ID, name} (\sigma_{employee.city = company.city} (employee \times company))$

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”.

$\Pi_{ID, name} (\sigma_{company\_name \neq \text{“BigBank”}} (works))$

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

$\Pi_{ID, name} (\sigma_{salary = \max(salary)} (employee))$

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.

INSERT INTO department (dept\_name) VALUES ('123456');  
DELETE FROM instructor WHERE dept\_name='CIS01';

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

ID column is the primary key of employee database.