Laboratory work 1
MAIDAN SANZHAR

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”.

  πid, person_name(σcompany_name = ‘’BigBank’’ (works))

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

  πid, person_name, city(σcompany_name = ‘’BigBank’’ (works x employee))

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

  πid, person_name, street, city(σcompany_name = “BigBank” ^ salary > 10000(works)) x works.person_name=employee.person_name 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.

  πid,person_name,city(employee x (σcompany_name = “BigBank”(works)))

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".

     πid, person_name (σcompany_name ≠ "BigBank" (Works))

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

     πperson_name (works) − (πworks.person_name (works (works.salary ≤ works_2.salary ∧ works_2.company_name = "BigBank") ρworks_2(works)))

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.
   If we insert (12333, Arman, FIT, 125,000) into the instructor table, where the department table does not have the department FIT, would violate the foreign key constraint.

   If we delete (MKM, Kairat, 22000) from the department table, where at least one student or instructor tuple has dept name as Biology, would violate the foreign key constraint.

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

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

   In employee person_name
   In works person_name
   In company company_name