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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”.

  Answer:

$\prod_{ID,person\_name}(\sigma_{company\_name=BigBank}(company\ x\ employee))$

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

  Answer:

$\prod_{ID,person\_name,city}(\sigma_{company\_name=BigBank}(employee\ x\ company))$

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

  Answer:

$\prod_{ID,person\_name,street,city}(\sigma_{company\_name=BigBank\ \wedge\ salary>10000}(employee\ x\ works))$

- 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:

$\prod_{ID,person\_name}(\sigma_{employee.city=company.city}(employee\ x\ company))$

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”.

Answer:

$$\prod_{ID,person\_name}(\sigma_{company\_name\ =BigBank}(\boldsymbol{works})) - \prod_{ID,person\_name}(\sigma_{company\_name=BigBank}(\boldsymbol{employee}))$$

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

  Answer:

  $$\sigma_{employee.person\_name\ =works.salary}\ (\boldsymbol{employee\ x\ works})$$

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.

   Answer:
   If we insert tuple (34353,Aliba,Physics,10000) into the table, where it department table ,doesn't have Physics - department , it will disturb foreign key constraint.
   If we delete tuple(23355,Babaika,Music,13000) from the department table , it will null there , so it means it will empty , which will violate the foreign – key constraint.

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

   Answer:
   employee(<u>person_name</u>, street, city)