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(company_name, salary)
company(company_name, city)
```

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

Answer:

$$\prod_{ID,name}(\sigma_{company\_name} = "BigBank"(works))$$

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

Answer:

$$\prod_{ID,name,city}(\sigma_{company\_name} = "BigBank"(works \times employee))$$

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

Answer:

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

• 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.

Answer:

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

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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:

$$\prod_{ID,name}(\sigma_{\neg company\_name = "BigBank"}(works))$$

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

Answer:

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

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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:

- Insert into department values;
- Delete from instructor where departament name;

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

Answer:

The primary key of empoyee database is id column.