

Laboratory work №2

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1.

- $\Pi \text{ id, person_name } (\sigma \text{ company_name} = \text{"BigBank"} \text{ (works)})$
- $\Pi \text{ employee.id, employee.person_name, city } (\sigma \text{ company_name} = \text{"BigBank"} \wedge \text{employee.id} = \text{works.id} \text{ (employee x works)})$
 $(\Pi \text{ employee.id, employee.person_name, city } (\sigma \text{ employee.id} = \text{works.id} \text{ (employee x } (\sigma \text{ company_name} = \text{"BigBank"} \text{ (works)))))$
- $\Pi \text{ employee.id, employee.person_name, street, city } (\sigma \text{ company_name} = \text{"BigBank"} \wedge \text{salary} > 10000 \text{ } (\sigma \text{ works.id} = \text{employee.id} \text{ (works x employee))))$
 $(\Pi \text{ employee.id, employee.person_name, street, city } (\sigma \text{ employee.id} = \text{works.id} \text{ (employee x } (\sigma \text{ company_name} = \text{"BigBank"} \wedge \text{salary} > 10000 \text{ (works)))))$
- $\Pi \text{ employee.id, person_name } (\sigma \text{ company.city} = \text{employee.city} \text{ (company x employee)})$
 $\Pi \text{ employee.id, employee.person_name } (\sigma \text{ employee.city} = \text{company.city} \text{ } (\sigma \text{ employee.id} = \text{works.id} \text{ (employee x } (\sigma \text{ works.company_name} = \text{company.company_name} \text{ (works x company)))))$
 $(\Pi \text{ employee.id, employee.person_name } (\sigma \text{ employee.city} = \text{company.city} \wedge \text{employee.id} = \text{works.id} \wedge \text{works.company_name} = \text{company.company_name} \text{ (employee x works x company))))$

2.

- $\Pi \text{ employee.id, employee.person_name } (\sigma \text{ works.id} = \text{employee.id} \text{ (employee x } (\sigma \text{ company_name} \neq \text{"BigBank"} \text{ (works)))))$
 $(\Pi \text{ id, person_name } (\sigma \text{ company_name} \neq \text{"BigBank"} \text{ (works))))$

- Π employee.id, employee.person_name (σ salary \geq avg(salary) (σ employee.id = works.id (employee x works))) (Π id, person_name (σ salary \geq avg(salary) (works)))

3.

For instance, if we will think in a way that dept_name "Marketing" in department relation. In case, if we will try to insert (01101, Elvira, Marketing, 100000) we will get violation of the foreign key constraint.

Also with delete operation. If we will delete this tuple -> (01101, Elvira, Marketing, 100000) from department relation, it will lead to the violation of foreign-key constraint.

4.

Superkey K is a candidate key if K is minimal.

One of the candidate key is selected to be the primary key.

In our case from employee relation we can choose primary key if in employee relation has several candidate keys. If ID, person_name, street, city are individually taken candidate keys, then we can just select one of them as our primary key. For example: ID. (primary key of works -> ID, company -> company_name).