

1)  $\Pi_{ID, person\_name}(\sigma_{company\_name = "BIGBANK"}(works))$

2)  $\Pi_{ID, person\_name, city}(employee \bowtie_{employee.id = works.id} (\sigma_{company\_name = "BIGBANK"}(works)))$

3)  $\Pi_{ID, person\_name, street\ address, city}(employee \bowtie_{employee.id = works.id} (\sigma_{company\_name = "BIGBANK" \wedge salary > 100\ 000}(works)))$

4)  $\Pi_{ID, person\_name}(employee \bowtie_{employee.id = works.id} (\sigma_{company\_name = city}))$

2.

1)  $\Pi_{ID, person\_name}(\sigma_{company\_name \neq "BIGBANK"}(works))$

2)  $\Pi_{id, person\_name}(\sigma_{works.salary < employee.salary}(employee \times works(employee)))$

3. Inserting

(14214, Ivanov, Database, 140000)

In table where is absent *dept\_name* can destroy integrity because they have not department. Database would violate foreign key

Deleting

(Economics, Ivan, 87000)

From department table, where at least one student or instructor tuple has economics, would violate foreign key.

4. *employee (person\_name, street, city)*

The appropriate primary keys are person\_name from employee and works relations, company\_name.