

1)

$\Pi_{\text{person_name}, \text{id}}(\sigma_{\text{company_name}='BigBank'}(\text{works} \bowtie \text{employee}))$

$\Pi_{\text{person_name}, \text{id}, \text{city}}(\sigma_{\text{company_name}='BigBank'}(\text{works} \bowtie \text{employee}))$

$\Pi_{\text{id}, \text{person_name}, \text{street}, \text{address}, \text{city}}(\sigma_{\text{company_name}='BigBank' \vee \text{salary} \geq \$1000}(\text{works} \bowtie \text{employee}))$

$\Pi_{\text{id}, \text{person_name}, \text{id}}(\sigma_{\text{employee.city}=\text{company.city}}(\text{works} \bowtie \text{employee} \bowtie \text{company}))$

2)

$\Pi_{\text{person_name}, \text{id}}(\sigma_{\text{company_name} \neq 'BigBank'}(\text{works} \bowtie \text{employee}))$

$\Pi_{\text{person_name}, \text{id}}(\text{works} \bowtie \text{employee}) - \sigma_{\text{a.salary} > \text{b.salary}}(\text{company_name})$

3)

Insert tuple: (3, Beks, Kazakh, 42500) you cannot delete where the department does not have "Kazakh" department

Delete a tuple: (Russian, Beks, 42500) you cannot delete where at least one has a dept name as Russian
they would violate foreign key constraint

4)

{id, person_name}