Given:

***employee*(*person_name, street, city*)**

***works*(ID, *person_name, company_name, salary*)**

***company*(*company_name, city*)**

1.

- **Find the ID and name of each employee who works for "BigBank".**

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

- **Find the ID, name, and city of residence of each employee who works for "BigBank"**

$\Pi_{employee.ID,employee.person\_name,city}(\sigma_{company\_name="BigBank"}(employee \times works))$

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

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

- **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**

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

2.

- **Find the ID and name of each employee who does not work for "BigBank"**

$\Pi_{employee.ID,employee.person\_name}(\sigma_{company\_name \neq "BigBank"}(employee \times works))$

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

$\Pi_{ID,person\_name}(\sigma_{salary >= average(salary)}(works))$

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

• Inserting a tuple: (12345, Alibek, HelloWorld, 15000)

into the works table, where the company table does not have the company HelloWorld, would violate the foreign key constraint.

• Deleting the tuple: (Tesla, Satbayev st.)

from the company table, where at least one works tuple has company name as Tesla, would violate the foreign key constraint.

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

employee(*ID*, *person_name*, *street*, *city*) *works*(*ID*, *person_name*, *company_name*, *salary*) *company*(*ID*, *company_name*, *city*)