**Lab work 1**

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**1**. Consider the employee database of figure below. Give an expression in the relational algebra to express each of the following queries:



**Figure**

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

Π*person.ID, person\_name* (σ *company\_name=“BigBank”* (*works X employee*))

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

Π*person.ID, person\_name, person\_city* (σ *company\_name=“BigBank”* (*works X employee*))

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

Π*person.ID, person\_name, street, person\_city* (σ *company\_name=“BigBank”* ∧ *salary > 10000$* (*works X 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.

Π*person.ID, person\_name* (σ *employee\_city = company\_city* (*company X employee*))

**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”.

Π*person.ID, person\_name* (σ *company\_name* ≠ *“BigBank”* (*works X employee*))

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

Π*person.ID, person\_name* (σ *company\_name* ≠ *“BigBank”* (*works X employee*))

**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.

instructor(ID, name, dept name, salary) department(dept name, building, budget)

\* insert to Instructor table: (001452, Jack,Pysics, 550000)

where the department table does not have the department Pysics, would violate the foreign-key constraint.

\* delet from department table: (Math, California, 4200000)

where at least one instructor tuple has dept\_name as Math, would violate the foreign-key onstraint.

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

Employee (**person name**, street, city)

works (**person name**, company name, salary)

company (**company name**, city)