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

   Πperson.ID, person_name (σ company_name=“BigBank” (works))

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

   Πperson.ID, person_name, person_city (σ company_name=“BigBank” (employee))

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

   Πperson.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.

   Πperson.ID, person_name(σ employee.city = company.city (employee X company))

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”.

   Πperson.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.

   Πperson.ID, person_name(σ 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.
   If we try to remove an existing dept_name from the instructor relation, it will be cause a violation of the foreign-key constraint. Or if we try to insert a dept_name that doesn’t exist. It also will be cause a violation of the foreign-key constraint.
4. Consider the employee database of figure above. What are the appropriate primary keys
   Primary key for employee is ID.
   Primary key for works is ID.
   Primary key for company is company_name.