Laboratory work 1

employee (ID, 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”.

$\prod_{\text{ID, person\_name}}(\sigma_{\textit{company\_name = “BigBank”}}(\textit{works}))$

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

$\prod_{\text{ID, person\_name, city}}(\sigma_{\textit{employee.ID = works\_ID} \wedge \textit{company\_name = “BigBank”}}(\text{employee} \times \text{works}))$

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

$\prod_{\text{ID, person\_name, street, city}}(\sigma_{\textit{employee.ID = works\_ID} \wedge \textit{salary > 10000} \wedge \textit{company\_name = “BigBank”}}(\textit{employee} \times \textit{works}))$

• 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.

$\prod_{\text{ID, person\_name}}(\sigma_{\textit{employee.ID = works\_ID} \wedge \textit{works.company\_name = company.company\_name} \wedge \textit{employee.city = company.city}}(\text{employee} \times \textit{works} \times \text{company}))$

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”.

$\prod_{\text{ID, person\_name}}(\sigma_{\textit{company\_name} \neq \textit{“BigBank”}}(\textit{works}))$

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

$\prod_{\text{ID, person\_name}}(\sigma_{\textit{salary >= avg(salary)}}(\textit{works}))$

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.

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