Laboratory work 1

1. 1) $\Pi_{ID}(\sigma_{company\_name=\text{“BigBank”}}(company))$

   2) $\Pi_{employee.ID,\ person\_name,\ employee.city}(\sigma_{employee.ID=company.ID \wedge company\_name=\text{“BigBank”}}\ (employee \times company))$

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

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

2. 1) $\Pi_{employee.ID,\ person\_name}\ (\sigma_{\ employee.ID=company.ID \wedge company\_name\neq\text{“BigBank”}}(employee \times company))$

   2) $\Pi_{employee.ID,\ employee.person\_name}\ (\sigma_{employee.ID=works.ID \wedge salary>=avg(salary)}(employee \times works))$

3. If we add tuple with dept_name = “IT” into instructor table and department table does not have department IT, it causes violation. If we delete tuple with dept_name = “IT” and instructor table has at least one person with dept_name = “IT”, it also causes violation.

4. Primary key for the employee database is ID, because it is unique for each person. We could consider taking person_name as primary key, however there might be situation were two employee have the same name. Thus, using ID as primary key is more convenient.