1.

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

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

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

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

2.

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

• $\Pi_{ID,\ person\_name}\ (\sigma_{salary\ \geq\ MIN(salary)}(works))$;

3.

• Both instructor and department relations have “dept_name” attributes. If we insert in instructor schema data with non-existing dep_name in department, violation of foreign key occurs. For example, (45444, Aisha, Literature, 45000) causes violation, as Literature is not listed in department schema. Also, if we delete one dep_name from department: delete(Finance, Painter, 120000), it will be a violation because instructor has a person who works in that department.

4.

• Primary key is to identify the record, so ID can be primary key to:
- to distinguish people with the same name in employee and works tables;
-to identify the company name;