Database System
Homework 2
Key answer

1.

1) $r1 \leftarrow student \bowtie takes$

$\pi_{name}(\sigma_{r1.course\_id==course.course\_id \wedge dept\_name=='Comp.\ Sci'}(r1 \times course))$

2) $r1 \leftarrow (\pi_{ID}(\sigma_{dept\_name=='EE.'}(courses) \bowtie takes))$

$\pi_{ID,name}(student - (r1 \bowtie student))$

3) $s \leftarrow \pi_{salary}(instructor)$

$r1 \leftarrow \pi_{ID}(\sigma_{instructor.salary<s.salary}(instructor \times s))$

$\pi_{ID}(instructor) - r1$

2.

1) $\pi_{person\_name}(\sigma_{company\_name=='First\ Bank\ Corp.'}(works))$

2) $\pi_{person\_name,\ city}(\sigma_{company\_name=='First\ Bank\ Corp.'}(employee \bowtie works))$

3) $\pi_{person\_name,\ street,\ city}(\sigma_{company\_name=='First\ Bank\ Corp.' \wedge salary>10000}(employee \bowtie works))$

4) $\pi_{person\_name}(employee \bowtie works \bowtie company))$

5) $r1 \leftarrow employee \bowtie manages$

$m \leftarrow employee$

$\pi_{r1.person\_name}(\sigma_{r1.manages\_name==m.person\_name \wedge r1.street=m.street\ r1.city=m.scity}(r1 \times m))$

/* 也可直接把 m 的地方都直接用 employee, 上面的寫法只是會比較清楚 m 代表管理者的角色*/

6) $\pi_{person\_name}(employee) - \pi_{person\_name}(\sigma_{company\_name=='First\ Bank\ Corp.'}(works))$

7) $s \leftarrow \pi_{salary}(\sigma_{company\_name=='small\ Bank\ Corp.'}(works))$

$r1 \leftarrow \pi_{person\_name}(\sigma_{works.salry < s.salry}(works \times s))$

$\pi_{person\_name}(works) - r1$