

Database I Homework # 1

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2.1 The appropriate primary keys is underlined
 employee (person-name, street, city)
 works (person-name, company-name, salary)
 company (company-name, city)

2.2

- Inserting a tuple (33333, Peter, Chemistry, 90,000) into the instructor table can cause the violate the foreign key ^{constant} because the department table doesn't contain the Chemistry values
- Delete the tuple from department table (Comp Sci, Taylor, 100,000) ^{constant} can cause the violate the foreign key because at least one student or instructor tuple has dept-name as Comp. Sci.

6.1 a) $\pi_{title} (\sigma_{dept_name = 'Comp.Sci' \wedge Credit = 3} (course))$

b) $temp \leftarrow (teachers \bowtie instructor)$

$\pi_{takes.id} (\sigma_{temp.name = 'Einstein'} (takes \bowtie temp))$

d) $instructor \bowtie (G_{max(salary)} \text{ as } salary (instructor))$

6.2 a) $P_{employee2} (employee)$

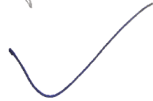
$temp \leftarrow employee \bowtie managers$

$(\pi_{person_name} (temp \bowtie (manag_name = employee2.manger_name \wedge employee.street = employee2.street \wedge employee.city = employee2.city)))$ (employee2)

b) $\pi_{\text{person-name}} (\sigma_{\text{company-name} \neq \text{"First Bank Corporation"}} (\text{works}))$

c) $\text{Temp} \leftarrow \pi_{\text{works.person-name}} (\text{works} \bowtie (\text{work.salary} \leq \text{work2.salary} \wedge \text{work2.company-name} = \text{"Small Bank Corporation"}) \rho_{\text{work2}} (\text{works}))$

$\pi_{\text{person-name}} (\text{works}) - \text{Temp}$



6.10 a) $\pi_{\text{name}} (\sigma_{\text{course.dept-name} = \text{"Comp. Sci"}} (\text{takes} \bowtie \text{course} \bowtie \text{student}))$

b) $\pi_{\text{id, name}} (\text{student} \bowtie \text{takes}) - (\pi_{\text{id, name}} (\sigma_{\text{year} < 2009} (\text{student} \bowtie \text{takes})))$
Some students may not choose any class/courses

6.11 a) $\pi_{\text{person-name}} (\sigma_{\text{company-name} = \text{"First Bank Corporation"}} (\text{works}))$

b) $\pi_{\text{person-name, city}} (\sigma_{\text{company-name} = \text{"First Bank Corporation"}} (\text{works} \bowtie \text{company}))$

c) $\pi_{\text{person-name, street, city}} (\sigma_{\text{company-name} = \text{"First Bank Corporation"} \wedge \text{salary} > 10,000} (\text{employee} \bowtie \text{works}))$

d) $\pi_{\text{person-name}} (\sigma_{\text{company.city} = \text{employee.city}} (\text{employee} \bowtie \text{company}))$

✓ 2/2