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Assignment1 :TRC Queries
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Question 20. A)

$$\{ (d.dept, sm.major) \mid EmployedBy(d) \wedge StudentMajor(sm) \wedge d.sid = sm.sid \wedge d.salary >= 20{,}000 \}$$

Question 20.b)

$$\{(s1.sid, s2.sid) \mid student(s1) \wedge student(s2) \wedge s1.sid \neq s.sid \wedge \neg\exists hf1 \in hasfriend \neg\exists eb1 \in employedby \neg\exists hf2 \in hasfriend \neg\exists eb2 \in employedby($$
$$(s1.sid = hf1.sid \wedge$$
$$eb1.sid = hf1.sid2 \wedge$$
$$eb1.deptname = \text{‘CS’}) - (s2.sid = hf2.sid1 \wedge$$
$$hf2.sid2 = eb2.sid \wedge$$
$$eb2.deptname = \text{‘CS’})) \wedge$$
$$\neg\exists hf3 \in hasfriend \neg\exists eb3 \in employedby \neg\exists hf4 \in hasfriend \neg\exists eb4 \in employedby($$
$$(s2.sid = hf3.sid1 \wedge$$
$$hf3.sid2 = eb3.sid \wedge$$
$$eb3.deptname = \text{‘CS’}) - (s1.sid = hf4.sid \wedge$$
$$eb1.sid = hf4.sid2 \wedge$$
$$eb1.deptname = \text{‘CS’}))\}$$

Question 20. c)

{(m.major) | major(m) ∧
∃sm1 ∈ studentmajor1 ∃sm2 ∈
(s2.sid = hf3.sid1 ∧
hf3.sid2 = eb3.sid ∧
eb3.deptname = 'CS') – (s1.sid = hf4.sid ∧
eb1.sid = hf4.sid2 ∧ eb1.deptname = 'CS'))}

Question 22. a)

∃m(Major(m) ∧∀sm1∀sm2(studentMajor(sm2) ∧
sm1.major = m.major ∧
sm1.major = m.major ∧
sm1.sid = sm2.sid))

Question 23. a)

¬∃s¬∃e(Student(s) ∧ employedby()∧ s.sid = e.sid ∧
¬∃h¬∃e1(hasfriend(h) ∧ employedby(e1) ∧ s.sid = h.sid1 ∧
e1.sid = h.sid2 ∧ e.deptname = e1.deptname ∧
e.salary = e1.salary))

Question 24. a)

∀d(department(d)
∀e1∀e2(employedby(e1)…employedby(e2) ∧
e1.deptname = d.deptname…e2.deptname = d.deptname ∧
e1.salary = e2.salary ∧
∀sm1∀sm2(studentmajor(sm1) ∧ studentmajor(sm2) ∧

$sm1.sid = e1.sid \wedge sm2.sid = e2.sid \ldots sm1.major = sm2.major))$