Assignment1

Ojaas Hampiholi

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TRC Representation of Queries

3.1 - Find the id, name, and salary of each employee who lives in Indianapolis and whose salary is in the range [30000; 50000].

$$\{e.id, e.ename, e.salary \mid Employee(e) \wedge \\ e.city = Indianapolis \wedge e.salary \geq 30000 \wedge \\ e.salary \leq 50000\}$$

3.2 - Find the id and name of each employee who works in a city located in Chicago and who has a manager who lives in Bloomington.

$$\{e.id, e.ename \mid Employee(e) \wedge \\ \exists c(Company(c) \wedge e.cname = c.cname \wedge c.city =' Chicago') \\ \exists m \exists e1(manages(m) \wedge employee(e1) \wedge m.eid = e.id \\ \wedge m.mid = e1.id \wedge e1.city =' Bloomington')\}$$

3.3 - Find the id and name of each employee who lives in the same city as at least one of his or her managers.

$$\{e.id, e.ename \mid Employee(e) \wedge \\ \exists m \exists e1(manages(m) \wedge employee(e1) \wedge m.mid = e1.id \wedge \\ m.eid = e.id \wedge e1.city = e.city)\}$$

3.4 - Find the id and name of each employee who has at least 3 job skills.

$$\{e.id, e.ename \mid Employee(e) \wedge \\ \exists j1 \exists j2 \exists j3(jobskill(j1) \wedge jobskill(j2) \wedge jobskill(j3) \wedge \\ e.id = j1.id \wedge e.id = j2.id \wedge e.id = j3.id \wedge \\ j1.skill \neq j2.skill \wedge j1.skill \neq j3.skill \wedge j3.skill \neq j2.skill)\}$$

3.5 - Find the id, name, and salary of each manager who manages an employee who manages at least one other employee who has a programming job skill.

$$\{e.cname, e.id, e.salary \mid Employee(e) \wedge \\ \exists m1 \exists m3 \exists j(manages(m1) \wedge manages(m2) \wedge jobskill(j) \wedge \\ e.id = m1.mid \wedge m1.eid = m2.mid \wedge m2.eid = j.id \wedge \\ j.skill =' Programming')\}$$

3.6 - For the pairs (id1, id2) of different employees who have a common manager.

$$\{m1.eid, m2.eid \mid Manages(m1) \wedge Manages(m2) \wedge \\ m1.mid = m2.mid \wedge m1.eid \neq m2.eid \wedge\}$$

3.7 - Find the cname of each company that does not have employees who live in Bloomington.

$$\{c.cname \mid company(c) \wedge \neg(\exists e(employee(e) \wedge \\ e.cname = c.cname \wedge e.city =' Bloomington'))\}$$

3.8 - For each company, list its name along with the ids of its employees who have the highest salary.

$$\{e.cname, e.id \mid Employee(e) \wedge \neg(\exists e1(employee(e1) \wedge \\ e.cname = e1.cname \wedge e1.salary > e.salary))\}$$

3.9 - Find the id and name of each employee who does not have a manager with a salary higher than that of the employee.

$$\{e.id, e.ename \mid Employee(e) \wedge \\ \neg(\exists m \exists e2(manages(m) \wedge employee(e2) \wedge \\ m.eid = e.id \wedge m.mid = e2.id \wedge e2.salary > e.salary))\}$$

3.10 - Find the id and name of each manager who has none of the skills of the employees that he or she manages.

$$\{e.id, e.ename \mid employee(e) \wedge manages(m) \wedge e.id = m.mid \wedge \\ \neg(\exists e1 \exists j1 \exists j2(employee(e1) \wedge jobskill(j1) \wedge jobskill(j2) \wedge \\ m.eid = e1.id \wedge e1.id = j2.id \wedge e.id = j1.id \wedge j1.skill = j2.skill))\}$$