

# B561 Advanced Database Concepts

## Assignment 2: RA Solutions

### Fall 2021

Name: Sricharraan Ramaswamy; Username: sriramas; UID: 2000855651

September 22, 2021

6.

$$\pi_{pid,pname}(P \bowtie \pi_{cname}(\sigma_{cname=Google(w)}) \cap \pi_{p1.pid,p1.pname}(P1 \bowtie_{p1.pid=p1} K \bowtie_{pid1=p1.pid} w1 \bowtie (pid2 = w2.pid \wedge w1.salary > w2.salary \wedge \pi_{w2.cname,w2.pid,w2.salary}(\sigma_{cname=Google(w2)})) \bowtie p2.pid = w2.pid P2)$$

7.

$$\pi_{w.cname,w.pid,p.pname,w.salary}(W \bowtie_{w.pid=p.pid} P \bowtie_{c.cname=w.cname} \pi_{cname}(\sigma_{headquarters=Cupertino(c)}) \bowtie_{cl.cname=w.cname} \pi_{cname}(\sigma_{city \neq Indianapolis(cL)}) \bowtie_{w.salary > w1.salary W1) - \pi_{w.cname,w.pid,p.pname,w.salary}(W \bowtie_{w.pid=p.pid} P \bowtie_{w1.salary < w.salary} w1 \bowtie (w2.salary < w.salary \wedge w2.salary \neq w1.salary) W2 \bowtie (c1.cname = w1.cname \wedge c1.cname = w2.cname) C1)$$

8.

$$\pi_{w.cname,w.pid}(W) - (\pi_{Q1.wcname,Q1.wpid}(\pi_{w5.pid,w5.cname,w.pid,w2.cname}(W2 \bowtie (w2.pid <> w5.pid \wedge w2.cname = w5.cname) W5) - (\pi_{w4.pid,w4.cname,w3.pid,w3.cname}(W3 \bowtie (k1.pid1 = w3.pid) K \bowtie (k1.pid2 = w4.pid \wedge w3.pid <> w4.pid \wedge w3.cname = w4.cname))) Q1)$$

9.

$$\pi_{skill}(S) - \pi_{pS.skill}(pS \bowtie (w.pid = pS.pid) \pi_{\sigma_{pid}}((\sigma_{cname=Netflix} \vee \sigma_{cname=Yahoo})(W)))$$

10.

$$\pi_{p.pid,p.pname}(P \bowtie_{p.pid=h.mid} M \bowtie (w.pid = h.eid \wedge w.cname = Google) W) \cap \pi_{p1.pid,p1.pname}(P1 \bowtie (w1.cname = Google \wedge p1.pid = w1.pid) W1)$$

11.

$$\pi_{w.pid}(W \bowtie (w.pid = M.mid) M \bowtie (M.eid = w1.pid \wedge w.salary < w1.salary) W1)$$

12.

$$\pi_{p.pid}(\sigma_{cname=Google}(W1)) - \pi_{w.pid}(P \bowtie_{w.pid} (\sigma_{w.cname=Google}(W1)) \bowtie (w.pid = k.pid1) K \bowtie (k.pid2 = w1.pid) \pi_{w1.pid}(\sigma_{w.cname=w1.cname \wedge w1.cname=Google}(W1)))$$

13.

$$\pi_{M \bowtie (M.mid=k.pid2 \wedge M.eid=k.pid1) K \bowtie_{M.eid=P.pid} P)$$

14.

$$\pi_{M.eid}(M \bowtie (M.eid = w.pid) W \bowtie (M.mid = w1.pid \wedge w1.cname = w.cname) W1 \bowtie (M.eid = p.pid) P)$$

15.

$$(\sigma_{p.pname <> p1.pname \wedge p.city <> p1.city = \emptyset})(P1 \bowtie_{p.pid=p1.pid} P1))$$