

B561 Advanced Database Concepts
Assignment 2
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Answers:

4.a)

$$\pi_{cname,sid,salary}(W \bowtie_{W.sid=K.sid1} K \bowtie_{K.sid2=sS.sid} \sigma_{skill='OperatingSystems'}(sS)) \\ - \pi_{cname,sid,salary}(W \bowtie_{W.cname=W2.cname \wedge W.salary > W2.salary} \rho_{W2}(W))$$

5.a)

$$\pi_{sname,salary,city}(S \bowtie W) \\ - \pi_{sname,salary,city}((S \bowtie W) \bowtie_{W.cname=W2.cname \wedge W.salary < W2.salary} \rho_{W2}(W)) \\ - \pi_{sname,salary,city}((S \bowtie W) \bowtie_{S.city=S2.city} (S2 \bowtie \sigma_{skill='Networks'}(sS)))$$

6.a)

$$\pi_{C1.cname,C2.cname}((C \text{ AS } C1) \times (C \text{ AS } C2)) \\ - \pi_{C1.cname,C2.cname}(((C \text{ AS } C1) \bowtie W \bowtie \sigma_{city='Chicago'}(S)) \times ((C \text{ AS } C2) \bowtie \\ W \bowtie \sigma_{city='Chicago'}(S))))$$

7.

$$\pi_{eid,mid}(M) \subseteq \pi_{eid,mid}(\sigma_{M.mid=K.sid1 \wedge M.eid=K.sid2}(M \bowtie K))$$

8.

$$\begin{aligned} & \pi_{sid}(\sigma_{cname='Amazon'}(W)) \\ & \subseteq \pi_{K1.sid1}(K1 \bowtie_{K1.sid1=K2.sid1 \wedge K1.sid2 \neq K2.sid2} K2 \\ & \bowtie_{K1.sid1=K3.sid1 \wedge K2.sid2 \neq K3.sid2 \wedge K1.sid2 \neq K3.sid2} K3) \end{aligned}$$

9.

$$\begin{aligned} & \pi_{sid,salary}(W \bowtie \sigma_{headquarter='Cupertino'}(C)) \bowtie_{salary < S2.salary} \\ & (\pi_{S.sid \rightarrow S2.sid, S.salary \rightarrow S2.salary}(S - \pi_{S.sid, S.salary}(S \bowtie \pi_{sid}(sS)))) \neq \emptyset \end{aligned}$$