B461 Database Concepts
Assignment 2
Fall 2023

September 21, 2023

1. Reconsider Problem 1. "*Find each triple* (c, p, s) *where:*

   - c *is the* `cname` *of a company.*
   - p *is the* `pid` *of a person who earns the lowest salary at that company* c *and knows at least someone who works at Apple.*
   - s *is the* `salary` *of* p*".*

   (a) • Formulate this query in Relational Algebra in standard notation.

   Let Q & $Q2$ be as follows:

   $$\pi_{\text{pid}}\left((\pi_{\text{cname, pid, salary}}(W)) - \pi_{\text{cname, pid, salary}}\left(W_1 \bowtie_{W_1.\text{pid} \neq W_2.\text{pid} \wedge W_1.\text{cname}=W_2.\text{cname} \wedge W_1.\text{salary} > W_2.\text{salary}} W_2\right)\right)$$

   $$\pi_{pid}(Q) \cap \pi_{pid1}(K \bowtie_{pid2 = pid} \pi_{pid}(\sigma_{cname="Apple"}(W)))$$

   Then the answer is:

   $$\pi_{cname,pid,salary}(P \bowtie W \bowtie Q_2)$$

2. Reconsider Problem 2. "*Find each pair* (c_1, c_2) *such that:*

   - c_1 *and* c_2 *are* `cnames` *of different companies and*
   - *no employee of* c_1 *and no employee of* c_2 *live in Chicago".*

   (a) • Formulate this query in Relational Algebra in standard notation.

Let P and CH be as follows:

$$\pi_{pid}(\sigma_{city="Chicago"}(P))$$

$$\pi_{cname}(P \bowtie W)$$

Let Q1 and Q2 be:

$$\pi_{cname}(C1) - \pi_{cname}(CH1)$$

$$\pi_{cname}(C2) - \pi_{cname}(CH2)$$

Then the answer is:

$$\pi_{Q1.cname,Q2.cname}(Q1 \bowtie_{Q1.cname<>Q2.cname} (Q2))$$