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HOMEWORK 4

4.2

Given R1 and R2. Given $N2 > N1 > 0$.

1) $R1 \cup R2$. Assume that R1 and R2 are union-compatible.
Minimum size = N2 (i.e. $R1 \subseteq R2$)
Maximum size = N1 + N2 (i.e. for all tuples $R1 \neq R2$)

2) $R1 \cap R2$. Assume that R1 and R2 are union-compatible.
Minimum size = 0 (i.e. for all tuples $R1 \neq R2$)
Maximum size = N2 (i.e. $R1 \subseteq R2$)

3) $R1 - R2$. Assume R1 and R2 are union-compatible.
Minum size = 0 (i.e. $R1 \subseteq R2$)
Maximum size = N1 (i.e for all tuples $R1 \neq R2$)

4) $R1 \times R2$.
Minimum size = Maximum size = N1 * N2

5) $\sigma_{a=5}(R1)$. Assume that R1 has an attribute called 'a'.
Minimum size = 0 (i.e. for all tuples in R1, $a \neq 5$)
Maximum size = N1 (i.e. for all tuples in R1, $a = 5$)

6) $\pi_a(R1)$. Assume that R1 has an attribute called 'a'; $N1 > 0$.
Given $N1 > 0$, so there must be atleast one tuple.
Minimum size = 1
Maximum size = N1

7) $R1 / R2$. Assume that the set of attributes of R2 is a subset of the set of attributes of R1.
Minumum size = 0
Maximum size = 0
$\}$ ∵ given $N2 > N1$

4.3 1) $\pi_{sname}(\pi_{sid}((\pi_{pid}\sigma_{color='red'} Parts) \bowtie Catalog) \bowtie Suppliers)$

2) $\pi_{sid}(\pi_{pid}(\sigma_{color='red' \vee color='green'} Parts) \bowtie Catalog)$

3) $\rho(R1, \pi_{sid}(\pi_{pid}(\sigma_{color='red'} Parts) \bowtie Catalog))$

$\rho(R2, \pi_{sid}(\pi_{pid}(\sigma_{address='221 Packer Street'} Parts) \bowtie Catalog))$

$R1 \cup R2$

4) $\rho(R1, \pi_{sid}(\pi_{pid}(\sigma_{color='red'} Parts) \bowtie Catalog))$

$\rho(R2, \pi_{sid}(\pi_{pid}(\sigma_{color='green'} Parts) \bowtie Catalog))$

$R1 \cap R2$

5) $(\pi_{sid,pid} Catalog) / (\pi_{pid} Parts)$

6) $(\pi_{sid,pid} Catalog) / (\pi_{pid}\sigma_{color='red'} Parts)$

7) $(\pi_{sid,pid} Catalog) / (\pi_{pid}\sigma_{color='red' \vee color='green'} Parts)$

8) $\rho(R1, ((\pi_{sid,pid} Catalog) / (\pi_{pid}\sigma_{color='red'} Parts)))$

$\rho(R2, ((\pi_{sid,pid} Catalog) / (\pi_{pid}\sigma_{color='green'} Parts)))$

$R1 \cup R2$

9) $\pi_{sid,sid1}(\sigma_{cost>cost1}(Catalog \bowtie_{pid=pid1} (\rho_{sid1\to sid, pid1\to pid, cost1\to cost}(Catalog))))$

10) $\pi_{pid}(\sigma_{sid\neq sid1}(Catalog \bowtie_{pid=pid1} (\rho_{sid1\to sid, pid1\to pid}(Catalog))))$

~~11) $\rho(T,$ $(\sigma_{sname='Yosemite Sham'}(Catalog \bowtie Suppliers))$~~

11) $\rho(T, \pi_{pid,cost}(\sigma_{sname='Yosemite Sham'}(Catalog \bowtie Suppliers)))$

$(\pi_{pid}(T)) \setminus (\pi_{pid}(\sigma_{cost<cost1}(T \times \rho_{pid1 \to pid, cost1 \to cost} T)))$

12) $\rho(R1, \pi_{pid}(\sigma_{cost>200} Catalog))$

$\rho(R2, ((\pi_{pid,sid} Catalog) / (\pi_{sid} Suppliers)))$

$R2 \setminus R1$

4.4 1) Names of suppliers who supply a red part which costs less than \$100.

2) Returns NULL. (You're trying to project an sname when you only have sid)

3) Names of suppliers who supply a red part that costs less than \$100 and a green part that costs less than \$100.

4) Suppliers IDs of suppliers who supply a red part that costs less than \$100 and a green part that costs less than \$100.

5) Names of suppliers who supply a red part that costs less than \$100 and a green part that costs less than \$100.