Umair Naveed
U0414943

CS5530 – Assignment 2

Problem 1

1 $\pi_{card}(\sigma_{location} =' Boston' (Bank\_location \bowtie Issuer))$

2 $\pi_{card}(\sigma_{location} \neq' NY' (Bank\_location \bowtie Issuer))$

3 $\pi_{Bank}\big(Issuer \bowtie (\sigma_{\max\_limit} < 100{,}000(Max\_limits))\big)$

4 $\rho(Temp1(1 \to bank1, 2 \to card1, 3 \to bank2, 4 \to card2), Issuer \bowtie Issuer)$

$\pi_{Bank}(Issuer) - \pi_{bank1}(\sigma_{card1 \neq card2}(Temp1))$

5 $\pi_{Bank}\big(\sigma_{card} =' MasterCard'(Issuer)\big) \cap \pi_{Bank}(\sigma_{card} =' Visa'(Issuer))) - \pi_{Bank}(\sigma_{card} \neq' MasterCard'(Issuer) \wedge \pi_{Bank}(\sigma_{card} \neq' Visa'(Issuer))$

6 $\pi_{Bank}(\pi_{bank,card}(Issuer)/ (\pi_{card}(Max\_limits))$

Problem 2

A $\pi_{name,SSN}(\sigma_{PNo=5 \wedge hours>100}(HourLog \bowtie Employee))$

B $\pi_{name,SSN}(\sigma_{DNo=1 \wedge PNo=2}(Employee \bowtie HourLog))$

C $\rho\left(Temp1, \pi_{ssn,name,PNo}(Employee \bowtie HourLog)\right)$

$\rho(Temp2(1 \to ssn1, 2 \to name1, 3 \to Pno1, 4 \to ssn2, 5 \to name2, 6 \to Pno2), Temp1\ X\ Temp1)$

$\pi_{ssn1,name1}(\sigma_{ssn1=ssn2 \wedge Pno1 \neq Pno2}(Temp2))$

D $\rho\big(Temp1, \pi_{ssn,PNo}(Employee) \div \pi_{PNo}(HourLog)\big)$

$\pi_{ssn,name}(Employee \bowtie Temp1)$

Problem 3

1 $\pi_{person-name}\big(\sigma_{company-name} =' First\ Bank\ Corporation' (WORKS)\big)$

2 $\pi_{person-name, city}\big(LIVES \bowtie \sigma_{company-name} =' First\ Bank\ Corporation' (WORKS)\big)$

3 $\rho\big(Temp1, (WOKERS \bowtie LOCATED - IN)\big)$

$\pi_{person-name}(LIVES \bowtie Temp1)$

4 $\rho(Temp1_{-person-name,street,city}$ (LIVES⋈ $\pi_{person-name}MANAGES))$

$\rho(Temp2_{manager-name,street,city},$ (LIVES⋈ $\pi_{manager-name}MANAGES))$

$\pi_{person-name}(Temp1 \bowtie Temp2)$

5 $\pi_{person-name}(WORKS) - \pi_{manager-name}(MANAGES)$

6 $\rho(Temp1(1 \rightarrow name1, 2 \rightarrow manager1, 3 \rightarrow person2, 4 \rightarrow manager2), MANAGES\ X\ MANAGES)$

$\pi_{manager1}(\sigma_{person1 \neq person2\ \wedge manager1\ \neq manager2}(Temp1))$

Problem 4

1

P	Q	R	A	B	C
10	a	5	10	a	6
10	a	5	10	b	5
25	a	6	25	c	3

2

P	Q	R	A	B	C
15	b	8	10	b	6
15	b	8	10	b	5

3

(P/A)	Q	R	B	C
10	a	5	b	6
10	a	5	b	5
25	a	6	b	5

4

P	Q	R	A	B	C
10	a	5	10	b	5