Subject Abdel Rahman Abd Abdelfattah Sheet 2 Date 17/12/2296

6.2] Two relations are Union compatible if both have same numbe of attributes & the domains of the attributes are the same.

And UNION, Intersection, Difference require that the relations to have the same attributes and the domains to be the same.

6.3] NATURAL JOIN if the foreign key doesn't have the same name in both relations. & EQUIJOIN all names have to be the same in the relations to be able to be executed

6.16] ~~a)~~ ~~$\sigma_{(Dno=5) AND Employee}$~~

$R_1 \leftarrow \sigma_{(Dno=5)}(EMPLOYEE)$

$R_2 \leftarrow (\pi_{SSN} R_1 \bowtie_{SSN=ESSN} (WORKS\_ON))$

a) $R_1 \leftarrow \sigma_{(Dno=5)}(EMPLOYEE)$

$R_2 \leftarrow R_1 \bowtie_{SSN=ESSN} (WORKS\_ON)$

$R_3 \leftarrow \sigma_{(Pname = ProductX)}(PROJECT)$

R_4 ~~RESULT~~ $\leftarrow R_2 \bowtie_{Pno = Pnumber} (R_3)$

$Result \leftarrow \sigma_{(Hours \geq 10)} R_4$

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b) $R_1 \leftarrow EMPLOYEE \bowtie_{SSN == ESSN} (DEPENDENT)$

$Result \leftarrow R_1 \bowtie_{DEPENDENT\_NAME = Fname} (EMPLOYEE$

c) $R_1 \leftarrow \sigma_{(Fname = Franklin\ AND\ Lname = Wong)} Employee$

$Result \leftarrow \pi_{SSN} R_1 \bowtie_{SSN = Super\_SSN} EMPLOYEE$

d) ~~$R_1 \leftarrow \pi_{SSN, Pnumber}(PROJECT)$~~

$R_1 \leftarrow \sigma_{(all)} PROJECT$

for each (Pnumber) → Pnumber I

$R_1 \leftarrow \sigma_{(Pnumber\ I = Pn)}(WORKES\_ON)$

$Result \leftarrow SUM\ HOURS\ \mathcal{E}_{Hours}(R_1)$

e) $R_1 \leftarrow \pi_{Pn}(\sigma_{(all)}\ Projects)$

$R_2 \leftarrow R_1 \bowtie_{Pno = Pnumber} (WORKES\_ON)$

$R_3 \leftarrow \sigma_{(ESSN\ Projects\ all)} R_2$

$Result \leftarrow R_3 \bowtie_{ESSN = SSN} EMPLOYEE$

f) $R_1 \leftarrow \pi_{ESSN} WORKES\_ON$

$R_2 \leftarrow R_1 \bowtie \pi_{SSN} EMPLOYEE$

2) $Result \leftarrow R_2 - R_1$

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g) for all ~~Projects~~ Departments → DEP

~~$R_1 \leftarrow \sigma$ Dnumber = DEP.Dnumber~~

$R_1 \leftarrow \sigma$ Dno = DEP.Dnumber (EPLOYEES)

$R_2 \leftarrow \Sigma \pi_{salary} R_1$

Result ← R_2 / Number of Eplayees

h) $R_1 \leftarrow \Sigma \pi_{salary}(\sigma(sex=F)$ EMPLOYEE)

Result ← R_2 / Number of σ(sex=F EmployEE)

i) $R_1 \leftarrow \sigma$ (Plocation = Houston) PROJECT

$R_2 \leftarrow$ ~~$\bowtie_{Plocation}$~~ $R_1 \bowtie_{Plocation\ Dnum = Dnumber}$ (DEP_Locations)

Result ← $R_2 \bowtie_{Dnumber - DNO}$ EMPLOYEE

j) $R_1 \leftarrow \pi_{ESSN}(\sigma$ (all) DEPEDENT)

$R_2 \leftarrow \pi_{Mgr\_SSN}$ (DEPARTMENT)

Result ← $R_2 - R_1$

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6.18) a) $R_1 \leftarrow \sigma$ (Title = The Lost Tribe) BOOK

$R_2 \leftarrow \pi_{Book\_Id}\ R_1$

$R_3 \leftarrow R_2 \bowtie_{Book\_Id = Book\_Id}$ BOOK COPIES

$R_4 \leftarrow \pi_{Branch\ ID}(\sigma_{Branch\_name = Shop Town}$ LIBRARY_BRANCH

Result $\leftarrow \pi_{No\ of\ Copies}(R_3 \bowtie_{Brone\ ID = Branch\ ID} R_4)$

b) → R_3

for each Branc Id

Result $\leftarrow \pi_{Copies}\ R_3$

c) ~~$\pi_{card\ no}\ \sigma$ (Date_out = NULL) BOOK LOANS~~

$R_1 \leftarrow \pi_{card\ no}$ (BOOK LOANS)

$R_2 \leftarrow \pi_{card\ no}$ BORROWER

Result $\leftarrow R_2 - R_1$

d) $R_1 \leftarrow \sigma$ (Due_date = Today) Book_Loans

$R_2 \leftarrow \sigma$ (Name = Share Town) BRANCHES

$R_3 \leftarrow R_2 \bowtie_{ID = Branch\ ID} R_1$

$R_4 \leftarrow R_3 \bowtie_{Card\_no = card\_no}$ BORROWER

$R_5 \leftarrow \pi_{Address, Name}\ R_4$

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$R_6 \leftarrow \pi_{Title}(R_3 \bowtie_{Book\ Id = Book\ Id} Book)$

Result $\leftarrow R_5$ & R_6

e) for each Branch

$R_1 \leftarrow \sigma(Branch_{ID} = Branch\ Id)$ BRANCH

$R_2 \leftarrow R_1 \bowtie (Branch\ ID = Branch\ Id)$ LOANS

Result $\leftarrow \Sigma R_2$