

CS3402 Practice 5:

1. **Answer:**(a) $T1 \times T2$

P	Q	R1	A	B	R2
10	a	5	10	b	6
10	a	5	25	c	3
10	a	5	10	b	5
15	b	8	10	b	6
15	b	8	25	c	3
15	b	8	10	b	5
25	a	6	10	b	6
25	a	6	25	c	3
25	a	6	10	b	5

(b) $T1 \bowtie_{T1.P=T2.A} T2$

P	Q	R1	A	B	R2
10	a	5	10	b	6
10	a	5	10	b	5
25	a	6	25	c	3

(c) $T1 \bowtie_{T1.Q=T2.B} T2$

P	Q	R1	A	B	R2
15	b	8	10	b	6
15	b	8	10	b	5

(d) $T1 \bowtie_{T1.R>T2.R} T2$

P	Q	R1	A	B	R2
15	b	8	10	b	6
15	b	8	25	c	3
15	b	8	10	b	5
25	a	6	25	c	3
25	a	6	10	b	5
10	a	5	25	c	3

(e) $T1 * T2$

P	Q	R	A	B
10	a	5	10	b
25	a	6	10	b

2. **Answer:**

- (a) Find the SSn (social security number) of all employees who are not supervisors

$$\pi_{\text{ssn}} (\text{EMPLOYEE}) - \pi_{\text{Super_ssn}} (\text{EMPLOYEE})$$

- (b) Find the SSn of all employees who either work in department 5 or directly supervise an employee who works in department 5

$$\pi_{\text{Ssn}} (\sigma_{\text{Dno}=5} (\text{EMPLOYEE})) \cup \pi_{\text{Super_ssn}} (\sigma_{\text{Dno}=5} (\text{EMPLOYEE}))$$

- (c) Retrieve each department number, and the number of projects controlled by the department.

$$\text{Dnum} \bowtie \text{COUNT Pnumber} (\text{PROJECT})$$

- (d) List the first names of all employees who have a dependent with the same first name as themselves

$$\pi_{\text{Fname}} (\text{EMPLOYEE} \bowtie_{\text{Ssn=Essn AND Fname=Dependent_name}} \text{DEPENDENT})$$

- (e) Retrieve the salary of all employees in department 5 who work more than 10 hours per week on the project named 'ProjectX'

$$\text{WORK_PROJ} \leftarrow \text{WORKS_ON} \bowtie_{\text{Pnumber=Pno}} \text{PROJECT}$$

$$\text{PROJECTX10} \leftarrow \sigma_{\text{Pname='ProjectX' AND Hours>10}} (\text{WORK_PROJ})$$

$$\pi_{\text{Salary}} (\text{PROJECTX10} \bowtie_{\text{Essn=Ssn AND Dno=5}} \text{EMPLOYEE})$$