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CS166 - W22

Relational Algebra

Used for copy and paste: π , σ , $\bowtie$, $\wedge$, $\vee$

Problem #1:

1) <u>Find the names of all employees who work at Bank4U:</u>

$\pi_{(employee\text{-}name)}$ (employee $\bowtie$ ($\sigma_{(company\text{-}name = 'Bank4U')}$ works))

2) <u>Find the names and cities of residence of all employees who work at Bank4U and earn more than $15,000 a year</u>

$\pi_{(employee\text{-}name, \, city(employee))}$ (employee $\bowtie$ ($\sigma_{(company\text{-}name = 'Bank4U' \, \wedge \, salary > 15000)}$ works))

3) <u>Find the names, streets and cities of residence of all employees who live in the same city as the company they work in</u>

$\pi_{(employee\text{-}name, \, street, \, city(employee))}$
(employee$\bowtie_{(employee\text{-}name = employee\text{-}name \, \wedge \, city = city)}$ (works $\bowtie_{(company\text{-}name = company\text{-}name)}$ company))

Problem #2:

1) <u>Find the Sno and course grades for students who take "OS" or "DBMS"</u>

$\pi_{(Sno \, , \, Grade)}$
(STUDENTS $\bowtie_{(Sname = Cname)}$ (($\sigma_{(Cname = 'OS' \, \vee \, Cname = 'DBMS')}$COURSES) $\bowtie$ ENROLLMENT))

2) <u>Find the Sno of students whose courses include all courses taken by the student with Sno = 10</u>

$\pi_{(Sno)}$
(STUDENTS $\bowtie_{(Sname = Cname)}$ COURSES / ($\pi_{(Cname)}$(($\sigma_{(Sno = 10)}$STUDENTS) $\bowtie$ COURSES)))

3) <u>Find the Sname and Sdept for all students who do not enroll in the course with Cno = 3</u>

$\pi_{(SName, \, Sdept)}$
(STUDENTS -
($\pi_{(Sno, \, Sname, \, SDept, \, Age)}$ (STUDENTS $\bowtie_{(Sname = Cname)}$ COURSES /
($\pi_{(Cname)}$(($\sigma_{(Sno = 3)}$STUDENTS) $\bowtie$ COURSES))))

Problem #3:

1) <u>Find the bars that serve a beer that drinker Smith likes</u>

$\pi_{(BAR(VISITS))}$ ($\sigma_{(DRINKER = 'Smith')}$(VISITS $\bowtie_{(DRINKER = DRINKER)}$(SERVES $\bowtie_{(BEER = BEER)}$ LIKES)))

2) <u>Find the bars that serve all beers that drinker Smith likes</u>

$\pi_{(BAR)}$(SERVES / $\pi_{(BEER)}$(($\sigma_{(DRINKER = 'Smith')}$VISITS) $\bowtie_{(BAR = BAR)}$ LIKES))
(NOTE: Projection of BAR may be unnecessary as dividing the relation of the projection of BEER already results in a relation containing only the attribute BAR)