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Advanced Topics in Database Technologies

– Practical Assignment - Relational Algebra II –

**For all exercises below, use the COMPANY database provided in class.**

**Remember to consult the relational diagram to find the correct relationship between tables.**

1. Write down a) the SQL query and b) the relational algebra expression that returns the number of male employees on the COMPANY database that have dependents.

* Select e.fname , e.sex, count(e.sex) from employee as e, dependent as d where e.ssn= d.essn and e.sex = 'M' group by e.fname, e.sex;
* γ (*fname*, *sex*, *COUNT* (sex)) σ (e. *ssn* =d. *essn AND* e. *sex* ="M") (ρ e *employee* × ρ d *dependent*)

1. Write down a) the SQL query and b) the relational algebra expression that returns from the COMPANY database the first and last name of the employees, and the name of the project they work on. If an employee works on more than one project, their name should appear once for each project.

* Select e.fname, e.lname, p.pname from employee as e, project as p where dno = dnum group by e.fname, e.lname, p.pname
* γ (*fname*, *lname*, *pname*) σ (*dno* = *dnum)* (ρ e *employee* × ρ p *project*)

1. Write down a) the SQL query and b) the relational algebra expression that returns from the COMPANY database the first name, last name, and number or dependents of employees who have any dependents.

* Select e.fname, e.lname, count(d.Dependent\_name) from employee as e, dependent as d where e.ssn = d.essn group by e.fname, e.lname;
* γ (*fname*, *lname*, *COUNT* (dependent\_name)) σ (e. *ssn* =d. *essn)* (ρ e *employee* × ρ d *dependent*)

1. Write a relational algebra expression that is equivalent to the SQL statement below:

SELECT dlocation, COUNT(d.dnumber) FROM dept\_locations l JOIN department d ON l.dnumber = d.dnumber

GROUP BY dlocation;

* γ (*dlocation*, *COUNT* (dnumber)) (ρ l *dept*\_locations ⋈ (l.*dnumber* = d.*dnumber)* ρ d *department*)

1. Write down an SQL query that is equivalent to the relational algebra expression below:



* Select e.fname, e.lname, s.fname, s.lname from employee as e join employee as s on e.super\_ssn = s.ssn ;

1. Explain in simple words what the query in question 5 returns.

* In Question 5 query it indicates that who is the supervisor of the employee and it is also show the relationship between employee and supervisor in the query.