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**Relational Databases**

1. Consider the insurance database of Fig 1, where the primary keys are underlined. Construct the following SQL queries for this relational database.

*person(driver-id, name, address)*

*car(car-license, model, year)*

*accident(report-number, date, location)*

*owns(drive-id, car-license)*

*participated(driver-id, car-license, report-number, damage amount)*

*Figure 1. Insurance database*

* 1. Find the total number of people who owned cars that were involved in accidents in 1989.

select \*

from owns

natural join participated natural join accident

where date like '%1989%'

* 1. Find the number of accidents in which the cars belonging to “John Smith” were involved.

select count(car\_license)

from participated

where car\_license in (

select car\_license

from person

natural join owns

where name='John Smith’)

* 1. Add a new accident to the database; assume any values for required attributes.

insert into accident

values (2,'25 Jan 2021','Maryland’)

* 1. Delete the Mazda belonging to “John Smith”.

delete

from car

where model like '%Mazda%' and car\_license in (

select car\_license

from owns

natural join person

where name='John Smith'

)

* 1. Update the damage amount for the car with license number “AABB2000” in the accident with report number “AR2197” to $3000.

update participated

set damage\_amount=3000

where report\_number='AR2197'

1. Consider the employee database of Fig. 2, where the primary keys are underlined. Given an SQL query for each of the following questions.

*employee(employee-id, employee-name, street, city)*

*works(employee-id, company-id, salary)*

*company(company-id, company-name, city)*

*manages(employee-id, manager-id)*

*Figure 2. Employee database*

* 1. Find the names of all employees who work for First Bank Corporation.

select employee.employee\_name

from employee

natural join works JOIN company on works.company\_id=company.company\_id

where company\_name='First Bank'

* 1. Find the names and cities of residence of all employees who work for First Bank Corporation.

select employee.employee\_name, employee.city

from employee

natural join works JOIN company on works.company\_id=company.company\_id

where company\_name='First Bank'

* 1. Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000.

select employee.employee\_name, employee.street,employee.city

from employee

natural join works JOIN company on works.company\_id=company.company\_id

where company\_name='First Bank' and salary>10000

* 1. Find all employees in the database who live in the same cities as the companies for which they work.

select employee\_name

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id and employee.city=company.city

* 1. Find all employees in the database who live in the same cities and on the same streets as do their managers.

select emp1.employee\_name

from employee as emp1, employee as emp2, mamages as m

where emp1.employee\_id=m.employee\_id and m.manager\_id=emp2.employee\_id

and emp1.street=emp2.street and emp1.city=emp2.city

* 1. Find all employees in the database who do not work for the First Bank Corporation.

select employee\_name

from employee, works , company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

and company.company\_name <> 'First Bank'

* 1. Find all employees in the database who earn more than each employee of Small Bank Corporation.

select employee\_name from employee,works

where employee.employee\_id=works.employee\_id and

salary > all (

select salary from Works,company

where company\_name='Small Bank Corporation'

and works.company\_id=company.company\_id )

* 1. Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.

select company\_name

from company

where city = (select city

from company

where company\_name='First Bank')

* 1. Find all employees who earn more than the average salary of all employees of their company.

select employee\_name

from(

select employee\_name,salary,AVG(salary) over (partition by company\_name) as AverageSalary

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

) as T

where salary>AverageSalary

* 1. Find the company that has the most employees.

select company\_name

from (

select company\_name,COUNT(employee.employee\_id) as cnt2

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

group by company\_name

) as T3

where cnt2= (

select MAX(cnt)

from(

select company\_name,COUNT(employee.employee\_id) as cnt

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

group by company\_name

) as T2

)

* 1. Find the company that has the smallest payroll.

select company\_name

from (

select company\_name,AVG(salary) as AvgSal2

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

group by company\_name

) as T5

where AvgSal2= (

select min(AvgSal)

from(

select company\_name,AVG(salary) as AvgSal

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

group by company\_name

) as T4

)

* 1. Find those companies whose employees earn a higher salary, on average, than the average of First Bank Corporation.

select distinct(company\_name)

from(

select company\_name, salary,AVG(salary) over (partition by company\_name) as AverageSalary

from employee,works,company

where employee.employee\_id=works.employee\_id and works.company\_id=company.company\_id

) as T

where AverageSalary > (

select AVG(salary) from Works,company

where company\_name='First Bank'

and works.company\_id=company.company\_id

)