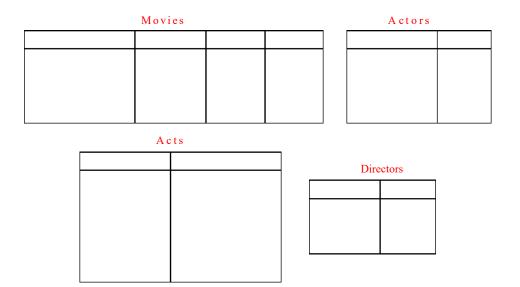
Practice Session – Relational Algebra and SQL Queries

Trishla Shah

trishla.shah@smu.ca

Example Database



Find movies made after 1997

$$\sigma_{myear>1997}(Movies)$$

Find movies made by Hanson after 1997

 $\sigma myear > 1997 \land director = `Hanson'$ (Movies)

Find all movies and their ratings

 $\pi_{title, rating}(Movies)$

Find all actors and directors

 $\pi_{actor}(Actors) \cup \pi_{director}(Directors)$

Find Coen's movies with McDormand

```
\begin{aligned} & \text{e1} = \pi_{title}(\sigma_{actor} = `McDormand^r(\text{Acts})) \\ & \text{e2} = \pi_{title}(\sigma_{director} = `Coen^r \text{ (Movies)}) \\ & \text{result} = e_1 \cap e_2 \end{aligned}
```

Find actors who have acted in all of Coen's movies

CMovies = $\pi_{title}(\sigma_{director='Coen'}(Movies))$

Example Database

employee(employee-name, street, city)
works(employee-name, company-name, salary)
company(company-name, city)
manages(employee-name, manager-name)

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

```
select employee.employee-name, employee.street,
employee.city from employee, works
where employee.employee-name=works.employee- name
and company-name = 'First Bank Corporation' and salary
> 10000)
```

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

```
select e.employee-name
from employee e, works w, company c
where e.employee-name = w.employee-name and e.city =
c.city and w.company-name = c.company-name
```

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

```
select p.employee-name
from employee p, employee r, manages m
where p.employee-name = m.employee-name and
m.manager-name = r.employee-name and p.street =
r.street and p.city = r.city
```

• Find the names of all employees in the database who do not work for 'First Bank Corporation'. Assume that all people work for exactly one company.

```
select employee-name
from works
where company-name <> 'First Bank Corporation'
```

 Find the names of all employees in the database who earn more than every employee of 'Small Bank Corporation'.
 Assume that all people work for at most one company.

```
select employee-name
from works
where salary > all (select salary
from works
where company-name = 'Small Bank Corporation')
```

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 s.company-name
from company s
where not exists
((select city from company where company-name =
'Small Bank Corporation') except
(select city from company t where s.company-name =
t.company-name))
```

 Find the names of all employees who earn more than the average salary of all employees of their company. Assume that all people work for at most one company.

```
select employee-name
from works t
where salary >
(select avg(salary) from works s
where t.company-name = s.company-name)
```

 Find the name of the company that has the smallest payroll.

```
select company-name
from works
group by company-name
having sum(salary) <= all (select sum(salary)
from works
group by company-name)</pre>
```

Self-Join

 The SQL SELF JOIN is used to join a table to itself as if the table were two tables; temporarily renaming at least one table in the SQL statement.

Syntax

```
SELECT a.column_name, b.column_name...
FROM table1 a, table1 b
WHERE a.common field = b.common field;
```

Example

ID	NAME	AGE	CITY	SALARY	Manager_ID
1	Micheal	32	Halifax	2000\$	2
3	Bob	26	Toronto	5000\$	1
4	Alice	22	Vancouver	2500\$	2
5	Trishla	25	Halifax	3000\$	3

SQL> SELECT a.ID, b.Name as "Employee Name", a.Salary, a.Name as "Manager Name", Manager_ID FROM Employee a, Employee b WHERE a.Manager_ID = b.ID;

Example - Answer

ID	Employee Name	SALARY	Manager Name	Manager_ID
	Micheal	2000\$	Lindsay	2
2	Lindsay	3000\$		
3	Bob	5000\$	Micheal	1
4	Alice	2500\$	Lindsay	2
5	Trishla	3000\$	Bob	3

SQL> SELECT a.ID, b.Name as "Employee Name", a.Salary, a.Name as "Manager Name"
FROM Employee a, Employee b
WHERE a.Manager_ID = b.ID;

Assignment Gift!!!

Problem-2(a)

Get the names of courses in the CS department

Solution:

```
T \leftarrow \sigma(Department="CS")(Course)
Result \leftarrow \pi(Course\_name)(T);
```