Tutorial 3

Structured Query Language

RA SQL

- Given the following tables:

  employee (person_name, street, city)

  works (person_name, company_name, salary)

  company (company_name, city)

  manages (person_name, manager_name)

- Find the name of employees who earn more than $10,000 and live in Hong Kong.

$$\pi_{person\_name}(\sigma_{salary>10,000 \wedge city="\text{Hong Kong}"}(\text{employee} \bowtie_{\text{person\_name}} \text{works}))$$

- Alternative Solution:

$\pi_{person\_name}(\sigma_{salary > 10000}(works)) \cap \pi_{person\_name}(\sigma_{city="Hong\ Kong"}(employee))$

RA SQL

- Given the following tables:

  employee (person_name, street, city)

  works (person_name, company_name, salary)

  company (company_name, city)

  manages (person_name, manager_name)

- Find the name of the employees who are not managers.

  $\pi_{person\_name}(employee) - \pi_{manager\_name}(manages)$

employee (person_name, street, city)
works (person_name, company_name, alary)
company (company_name, city)
manages (person_name, manager_name)

- Alternative solutions

```
select  person_name
from    employee
where not exists
        (select  *
         from    manages
         where employee.person_name = manages.manager_name)
```

```
select   person_name
from     employee
where  person_name not in
        (select  manager_name
         from    manages)
```

employee (person_name, street, city)
works (person_name, company_name, alary)
company (company_name, city)
manages (person_name, manager_name)

- Find the names of all persons who work for “First Bank Corporation” and live in the city where the company is located.

```
select  E.person_name
from  employee as E, works as W, company as C
where E.person_name = W.person_name
        and  W.company_name = C.company_name
        and C.company_name = “First Bank Corporation”
        and  E.city = C.city
```

employee (person_name, street, city)
works (person_name, company_name, alary)
company (company_name, city)
manages (person_name, manager_name)

- Find the names of the employees who work in all companies in Boston.

```
select w.person_name
from works as w
where not exists (
        (select  company_name
         from    company
         where city = "Boston")
        except
        (select  company_name
         from    works as w1
         where w1.person_name = w.person_name))
```

X: all companies in Boston

Y: all companies that *w* works for

X – Y = φ ⇔ X □ Y

- Find all cities where employees live or where companies are located

(**select** *city*
from *employee*)
union
(**select** *city*
from *company*)

employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city)
manages (person_naame, manager_name)

- Display the names of all employees who work (in at least a company) and the city of the company，
  in ascending order of employee.person_names

```
select  w.person_name, c.city
from    works as w, company as c
where   c.company_name = w.company_name
order by w.person_name asc
```

employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city)
manages (person_naame, manager_name)

- Find the names of all employees who earn more than SOME employee of Small Bank Corporation.

```
select  w1.person_name
from    works as w1
where w1.salary > some
        (select   w2.salary
         from     works as w2
         where    w2.company_name = "Small Bank Corporation")
```

- Alternative solution

```
select  w1.person_name
from    works as w1
where exists
        (select   *
         from     works as w2
         where    w2.company_name = "Small Bank Corporation" and
                  w1.salary > w2.salary)
```

employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city)
manages (person_naame, manager_name)

employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city)
manages (person_name, manager_name)

- Find all companies located in Hong Kong and have total payroll 薪资 less than 100,000

```
select  company.company_name
from  works, company
where
        works.company_name = company.company_name
                and  company.city = "Hong Kong"
group by  company.company_name
having  sum(works.salary) < 100,000
```