HW3 SQL I

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1. Explain how the select-where-group-by-having works.
   - select is used to retrieve data that in the field which is/ are choosen.
   - from is to choose know which table to used.
   - where is the condition to filter the data to retrieve
   - group_by is used to group
   - having is used to filter all group by specific conditions.
2. Using your own example, Explain each type of SQL join operators:
   - Inner Join : Returns records that have matching values in both tables
   - Natural Join : Returns both data with no duplicate
   - Left-outer Join : Returns all records from the left table and the matching records between both table.
   - Right-outer Join : Returns all records from the right table and the matching records between both tables.
   - Full-outer Join : Returns both match and unmatch

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3. Consider the following expression, which use the result of a relational algebra operation as the input to another operation. For each expression, translate into SQL.

a. $\sigma_{year \geq 2009}(takes) \bowtie student$

```
select *
from takes, student
where takes.year >= 2009 and takes.id = student.ID;
```

b. $\sigma_{year \geq 2009}(takes \bowtie student)$

```
select *
from takes natural join student
where takes.year >= 2009
```

c. $\Pi_{ID, name, course\_id}(student \bowtie takes)$

```
select ID, name, cayse_id
from takes natural join student
where student.ID = takes.ID;
```

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4. Consider the relational database of the following figure. Give SQL command to express each following queries

employee(person_name, street, city)

work (person_name, company_name, salary)

company (company_name, city)

a)
```
select names
from employees
where employees.city = "Miami" ;
```

b)
```
select names
from employees, works
where employees.person_name = work.person_name
    and works.salary > 100,000;
```

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c)
```
select names
from employees, works
where employees.person_name = work.person_name
and employees.city="Miami" and works.salary > 100,000;
```

d)
```
select names
from employees, works
where employees.person_name = works.person_name
and works.company_name = "First Bank Corporation";
```

e)
```
select names, city
from employees, works
where employees.person_name = works.person_name
and works.company_name="First Bank Corporation"
and works.salary > 10,000 ;
```