employee (*ID*, *person_name*, *street*, *city*)
works (ID, *company_name*, *salary*)

Figure 1

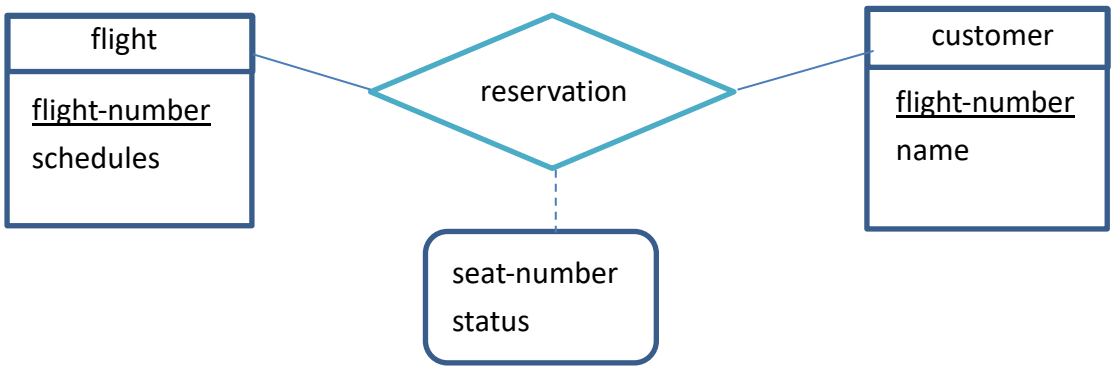
1. (20%) Consider the employee database with two relations in Figure 1.
   (1) Write a function **avg_salary** that takes a company name as an argument and finds the average salary of employees at that company.

```
create function avg_salary(company_name varchar(127))
return num
begin
    declare avg_salary num;
    select avg(salary) into avg_salary
    from works
    where works.company _name =company_name;
    return avg_salary;
end
```

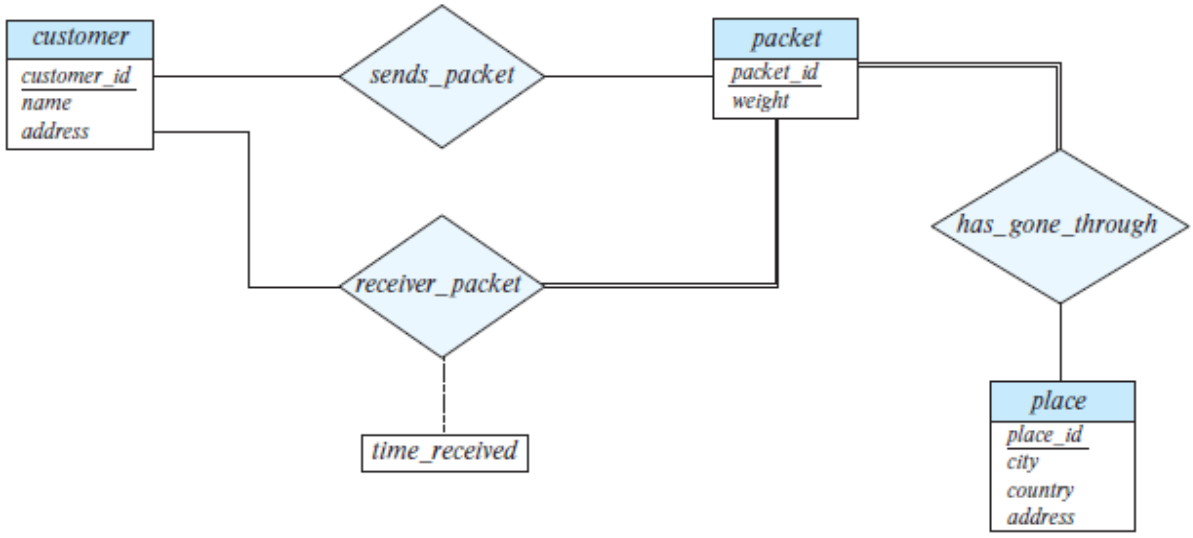
   (2) Write an SQL statement, using the **avg_salary** function, to find companies whose employees earn a higher average salary than the average salary at "FirstBank".

```
Select company_name
Form works
Where avg_salary(company_name)>avg_sa;ary('FirstBank');
```

2. (20%) Design a database using the ER-diagram for an airline. The database must represent the information of each **flight (航班)**, including its flight number and schedules (起飛降落的日期時間). The database also needs to keep track of **customers** and their **reservations** on individual flights, including the status and seat assignments. (Design the proper entity sets and relationship sets. For each entity set, represent the proper primary key and attributes.



3. (20%) Construct appropriate relational schemas for the E-R diagram in Figure 2. For each relational schema, represent the proper attributes and primary key.



sends_packet(packet_id, customer_id)

receiver_packet(packet_id, customer_id, time_received)

has_gone_through(place_id, packet_id)

Figure 2

4. (20%) List two nontrivial functional dependencies satisfied by the relation in Figure 3. Explain your answer.

A	B	C
a1	b1	c1
a1	b1	c2
a2	b1	c1
a2	b1	c3

Figure 3

*可以多對一或是一對一，但不可以一對多

所以:

C->B

B不被包含在C裡,但可以透過C推出唯一的B (c1->b1, c2->b1,c3->b1)

A->B

B不被包含在A裡，但可以透過A推出唯一的B (a1->b1, a2 ->b1)

5. (20%) Consider the schema R = (A, B, C, D, E, G) and the set F of functional dependencies as follows:

{AB → CD, B → D, DE → B, DEG → AB, AC → DE}.

(1) Prove that AB is not a superkey.

{AB}:

DEG → AB → CD, 因為AB具transitively dependent,所以AB不是superkey

(2) Prove that DEG is a superkey.

{DEG}:

DEG → AB , DEG →CD

且DEG不被包含在AB裡, DEG不被包含CD在裡，所以DEG是superkey

Note: Please submit your homework in a single PDF file to TronClass by 12/20/2023 11:59pm.