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.
   (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".
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.

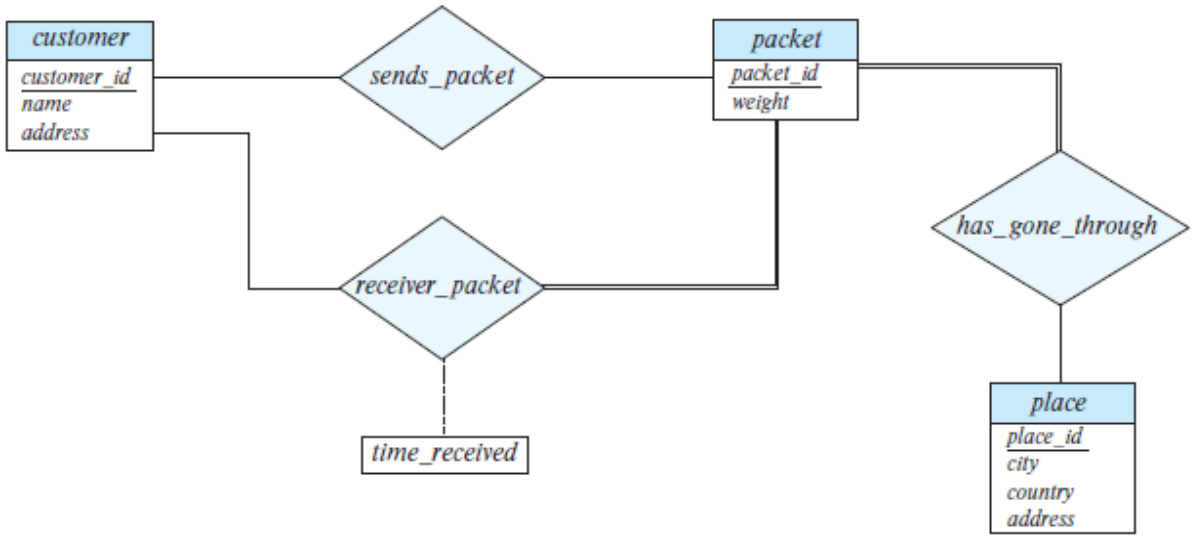

Figure 2

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

5. (20%) Consider the schema R = (A, B, C, D, E, G) and the set F of functional dependencies as follows:
   $\{AB \rightarrow CD, B \rightarrow D, DE \rightarrow B, DEG \rightarrow AB, AC \rightarrow DE\}$.
   (1) Prove that AB is not a superkey.
   (2) Prove that DEG is a superkey.

Note: Please submit your homework in a single PDF file to TronClass by 12/14/2025 11:59pm.