Cairo University **SEM - Team 14**

Faculty of Engineering

Computer Engineering Department

Introduction to Database Systems

Train Station DBMS

ER Diagram Report

CMP 2020

Team Number:

#14

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Problem Definition

A windows application for a train station DBMS. A train station DBMS that imitates a real transportation system. It is made to overcome manual errors of booking and make it into a computerized system.

The train station manager can easily manage the station through the system, manage employees and schedule trips.

It has all the schedules of the trains available. From which passengers, who wish to travel, can go to the booking employee to book a ticket or book it through the application.

Passengers can also view, cancel or upgrade their ticket, address complaints...etc.

The database system helps to maintain all the records of different train trips, available seats and passengers in an easy way.

System Users & Functionalities

1- Admin

Functionalities:

- Add another admin.
- Remove other admins.
- Block users (that make problems).
- All other functionalities of any user to manage the whole database system.
- Plan, control and direct anything in the database.

2- Managers

Functionalities:

- Fire/hire employees.
- Manage salaries.
- Edit employee's shift.
- Edit price of tickets.
- Schedule trips.
- View the employees’ and passengers’ data.
- Give rate to employees

3- Employees

Functionalities:

- View available seats.
- Book a ticket (from passenger).
- Cancel a ticket(from passenger).
- Upgrade a ticket.
- View avaliable trips (for passengers).

- View ticket details.
- View passenger’s data.
- Update their data.
- Check train’s status (needs maintenance or not)

4- Passenger

Functionalities:

- Address complaints.
- Book a ticket.
- Cancel a ticket.
- Upgrade a ticket.
- View avaliable trips.
- View available seats.
- View ticket details.
- Update their profile. (i.e change phone number, address,change password..etc).
- Update their data.

Entities

1. User Login

   This entity holds the values of all employees' and passengers' emails, user ID's passwords, type if he is employee or passenger.

2. Employee

   This entity includes employees who work in the train station like (drivers - booking clerk - admins - manager - supervisor - supervisee - cleaners - Security officers ..etc).

3. Department

   It identifies departments of the station (Drivers department, Human resources department, Financial department…etc).

4. Train

   It connects the trip ↔ ticket ↔ passenger.

   For example → Passenger with ticket no. 123456 whose trip is no. 458 will board train no. 578645 (plate number).

5. Ticket

   For each trip it has a number of tickets available to be booked. Where the ticket has a serial number, class, price and date.

6. Station

   It includes all other stations we deal with, their locations and number of terminals...etc.

7. Blacklist

It includes the passengers who are banned from travelling, maybe for some legal reasons for a period of time.

8. Passenger

This entity holds information of the passenger, their name, age, contacts, their covid vaccination...etc.

9. Complaints

It includes all complaints which passengers make and their reason.

10. Trip

This entity includes the timetable (arrival time - leave time) of the train and the trip number.

11. Corona vaccination

This entity includes corona vaccination of passengers and employees, the authorization which gave them the vaccine, serial number and date of getting vaccinated.

Relationships

1. Manages: Employee ↔ Department

   Relationship to identify who is manager (also an employee) of a certain department.

2. Works For: Employee ↔ Department

   Relationship to know each employee is working for which department.

3. Supervises: Employee ↔ Employee

   Relationship to identify which employee supervises which employees.

4. Takes: Employee ↔ Covid Vaccination

   Relationship to know if an employee is vaccinated or not.

5. Takes: Passenger ↔ Covid Vaccination

   Relationship to know if a passenger is vaccinated or not.

6. Drives: Employee ↔ Train

   Relationship to know which employee drives which train.

7. Books: Employee ↔ Ticket

   Relationship to check tickets are booked by which employee.

8. Books: Passenger ↔ Ticket

   Relationship that lets a specific passenger book a specific ticket.

9. Includes: Blacklist ↔ Passenger

   Relationship that specifies if a passenger is on the blacklist. (can't board the train)

10. Has: Trip ↔ Train

    Relationship that specifies which train is on a certain trip.

11. Has: Trip ↔ Ticket

    Relationship that associates tickets with a specific trip.

12. Has: User_Login ↔ Passenger

    Relationship where each passenger has a user login info (account) to enter the program.

13. Has: User_Login ↔ Employee

    Relationship where each employee has a user login info (account) to enter the program.

14. Goes To: Train ↔ Station

    Relationship that identifies the destination of the train, which is going to be a certain station.

15. Comes From: Train ↔ Station

    Relationship that identifies the Source of the train, which is going to be a certain station.

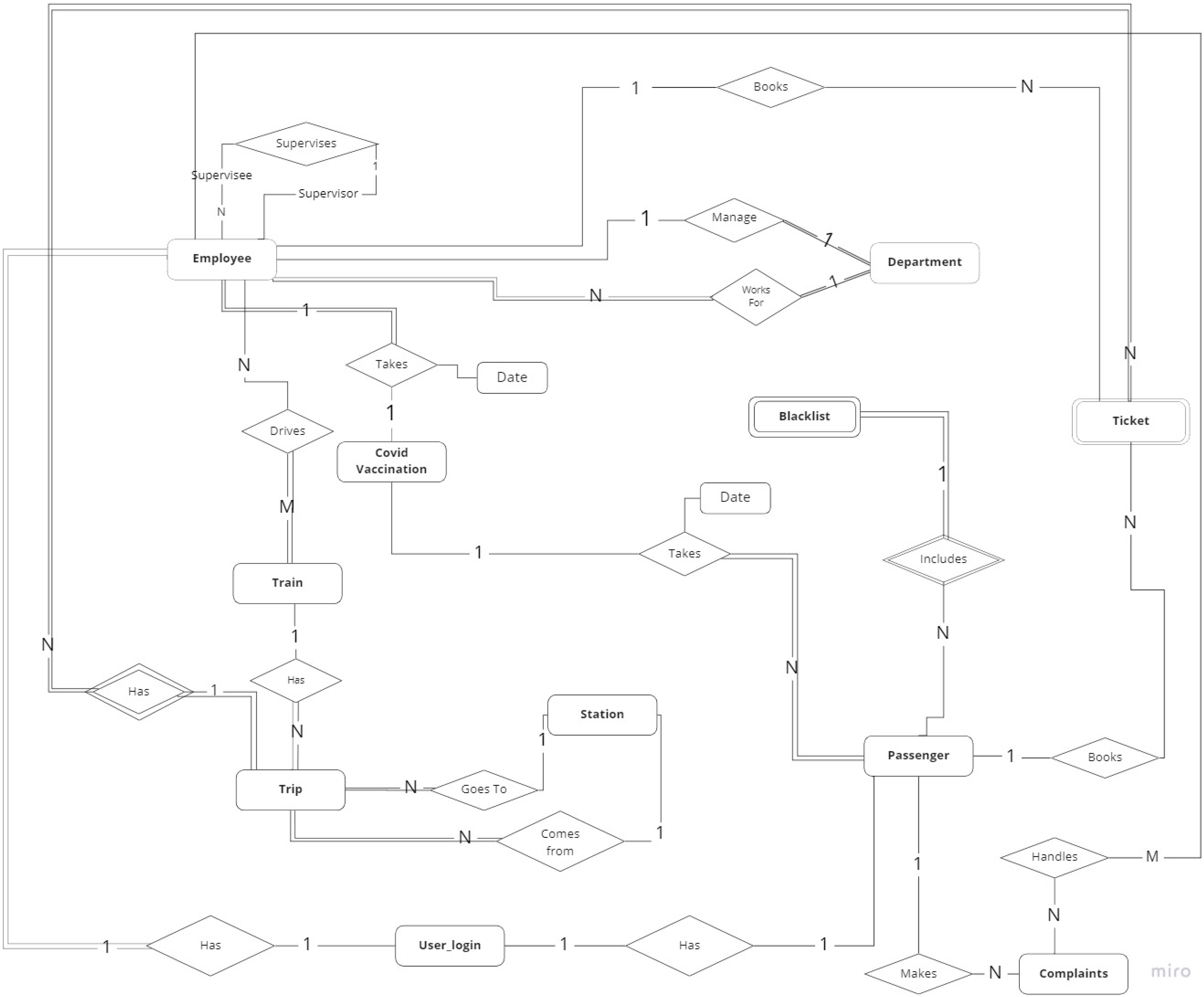
16. Makes: Passenger ↔ Complaints

    Relationship that identifies a certain complaint made by which passenger.

17. Handles: Employee ↔ Complaints

    Relationship that identifies which employee handled which complaints.

ER Diagram



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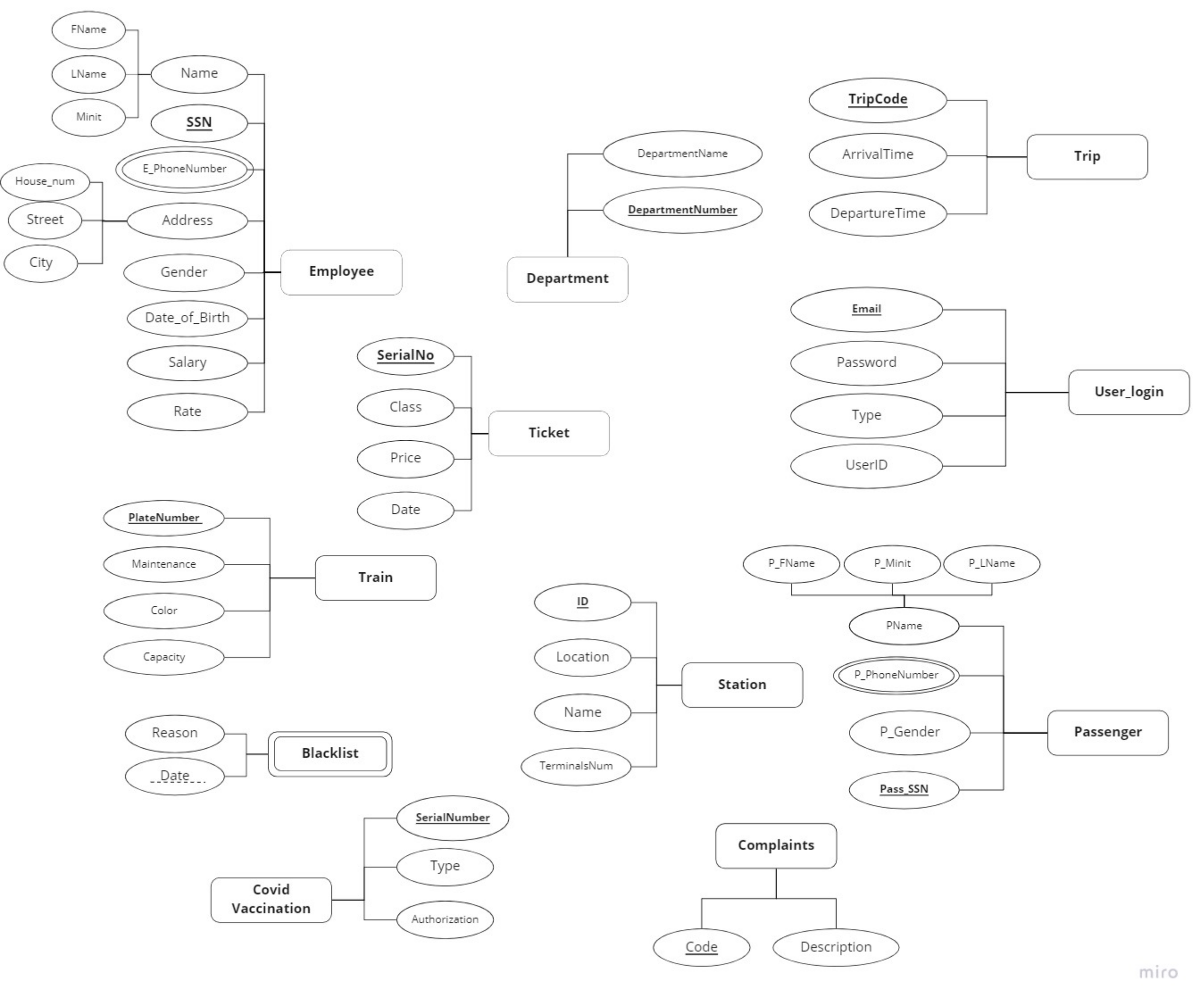
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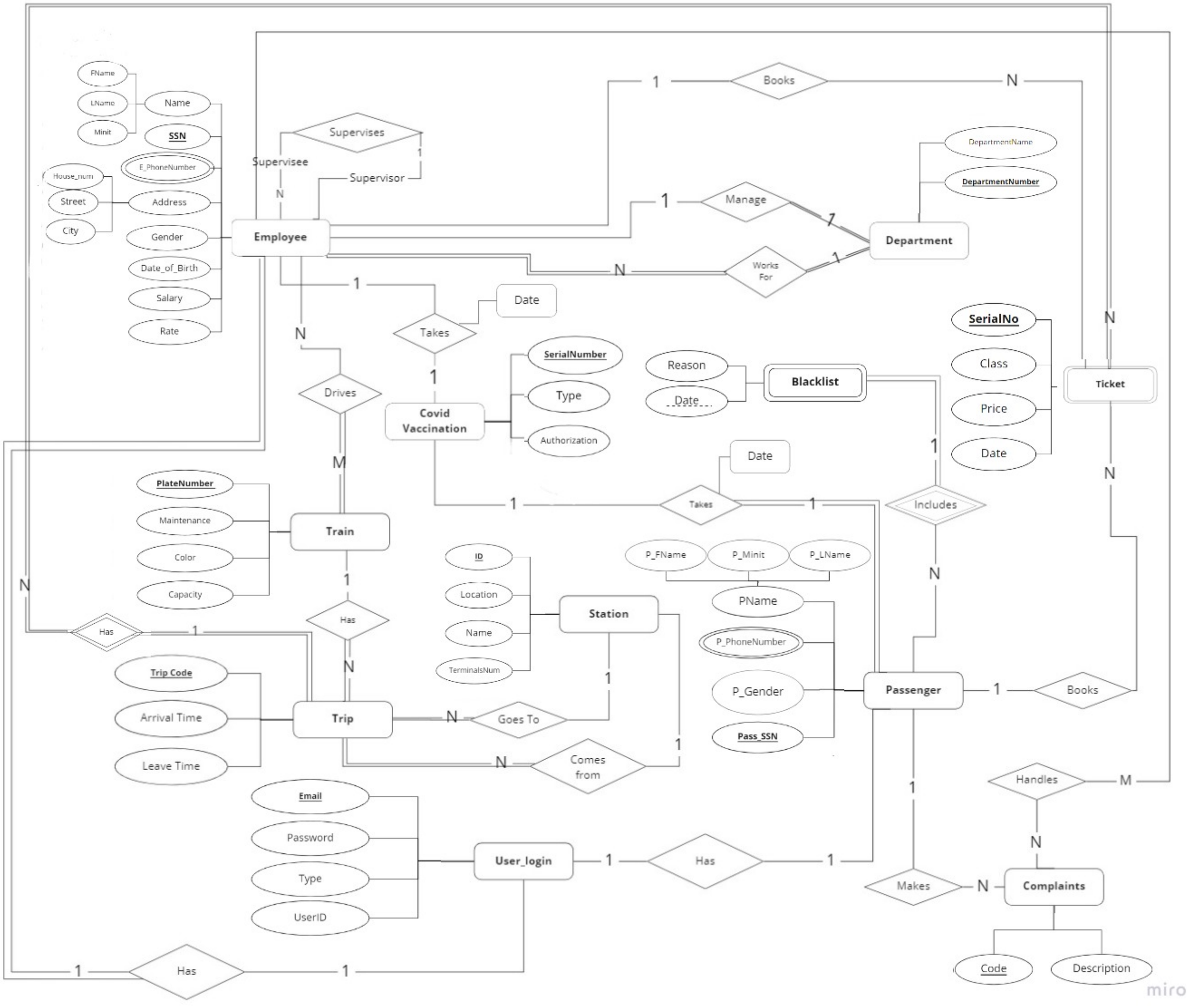
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