DBMS Auto Repair and Service Management System Project

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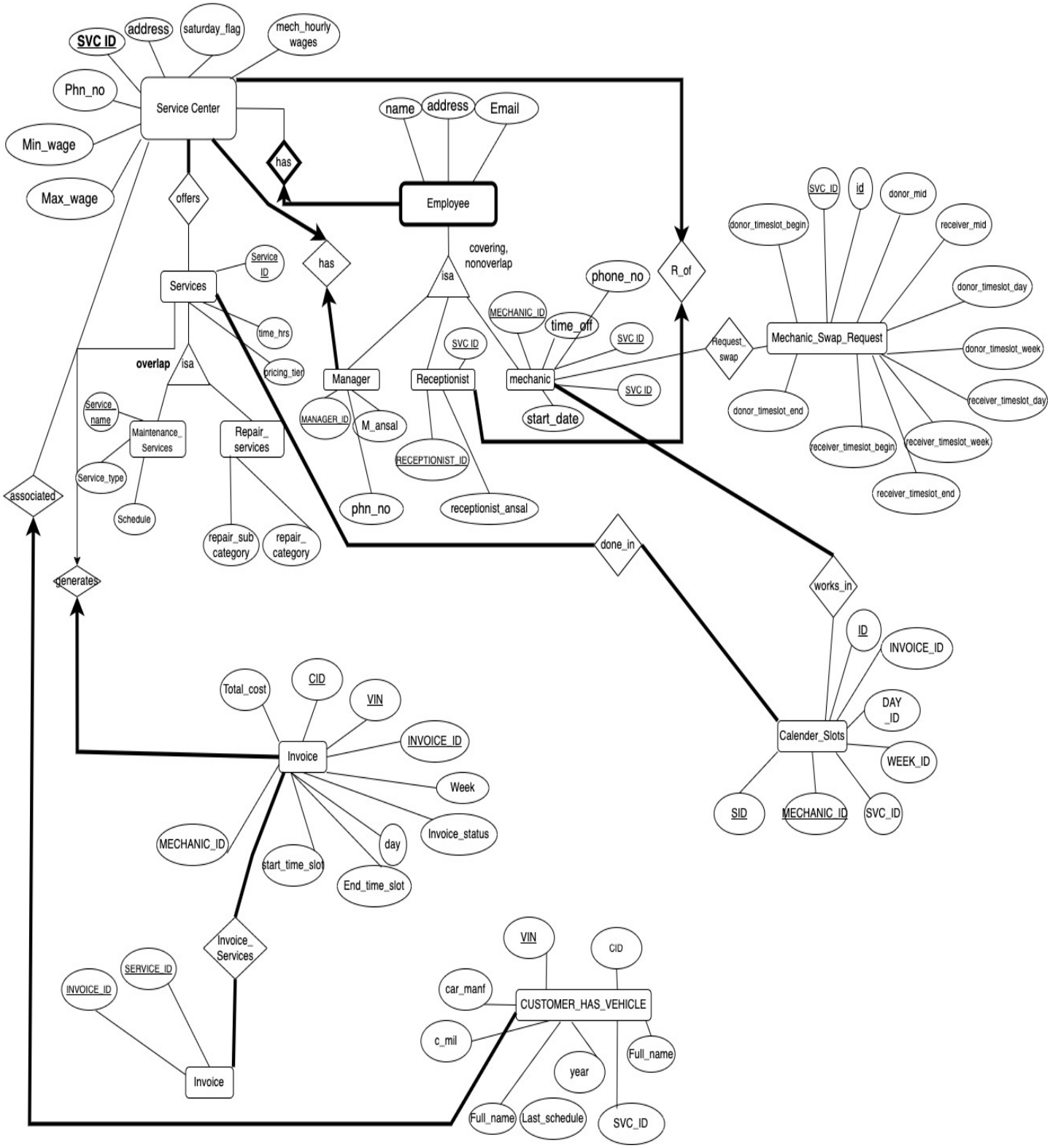
This report consists of the following:
(i) Final ER Diagram
(ii)Constraints Description
(iii)Description of the features implemented in the database.
(iv)Brief explanation of functional dependencies.
(v)Explanation of the assumptions we made regarding the project.

The two requested SQL files are in the zip file submitted, with the names "db_creation.sql" and "db_populate.sql" where "db_creation.sql" consists of tables, triggers, constraints and procedures, whereas "db_populate.sql" populates the sample data.

The README file in the provided zip file contains the additional instructions (and commands) on how to run the provided java jar files.

FINAL-ER DIAGRAM:



CONSTRAINTS DESCRIPTION:

- **FOREIGN KEY CONSTRAINTS** : Foreign key constraints are fundamental to our project and are applied appropriately across columns in every table to stop illegal actions from happening, such as:
    - Creating service centers without managers
    - Creating customer details without service center
    - Creating Receptionist without service center
    - Creating Mechanic without service center
    - Entering car repair service prices without service center/ service center id

- **AUTO INCREMENT ID ON INSERT TO CALENDAR SLOTS TRIGGER**:
    - When a customer requests a service, we assign mechanics for the service requested by the customer and after a mechanic is assigned, the mechanic schedule is created and it's inserted as the new row in the calendar slots by automatically increasing the one of the primary key ID.

- **MECHANIC_SWAP_REQUEST CHECK CONSTRAINT**
    - We defined check constraint for mechanic swap request, so whenever a record gets created in mechanic swap requests table, the following check constraints are triggered:
        - Donor time slot day should be between 1 and 6
        - Donor time slot week should be in (1,2,3,4)
        - Donor time slot begin should be between 1 and 11
        - Donor time slot end should be between 1 and 11
        - Receiver time slot day should be between 1 and 6
        - Receiver time slot week should be in (1,2,3,4)

        - Receiver time slot begin should be between 1 and 11
        - Receiver time slot end should be between 1 and 11
        - State should be in (0,1,2)
        - NOTE::::::::0-Pending, 1-Accepted, 2-Rejected

- **CHECK CONSTRAINTS:**
    - Other check constraints:
        - Salary of the employee should fall between minimum and maximum wage in service center
        - There should only be one receptionist in a service center
        - There should only be one manager in a service center
        - Price should be a positive value
        - Number of working hours for mechanics in a week should not be greater than 50.
        - A mechanic should be assigned work on Saturdays only if that service center is operational on saturdays.
        - Car year model should be less than or equal to current year.

FUNCTIONAL DEPENDENCIES:

Most of the functional dependencies have been captured in the primary key. Some of them are:

SVC_ID in table (SERVICE_CENTER)
(SVC_ID, RECEPTIONIST_ID) -> RECEPTIONIST //determines all the columns of Receptionist
(SVC_ID, MECHANIC_ID)-> MECHANIC //Determines all the columns of Mechanic table
SVC_ID, MODEL, Pricing_tier -> CAR_PRICING // Determines car service price
SERVICE_ID in table (REPAIR_SERVICES),
SERVICE_ID in table (MAINTENANCE_SERVICES),
VIN -> last_schedule

SID in table (SLOTS)

INVOICE_ID -> total_cost

PROJECT ASSUMPTIONS:

- Each employee is associated with only one service center. Each employee can only play one role at a time
- Maintenance services are usually done in a rotational manner i.e. after a Schedule A maintenance service, the next maintenance will be Schedule B, then Schedule C. After Schedule C, it restarts at Schedule A.
- A customer is associated with at least one vehicle which is identified by globally unique *vin number*
- The general employee structure in each center has a *manager* who manages all employees, a *receptionist,* and several *mechanics*.
- Every *customer* is associated with *one specific service store.*
- Each center operates 5 days a week (M-F) from 8 AM to 8 PM. *Some (not all)* are also open on *Saturdays* from 9am - 1pm.
- For each service event, an invoice with a unique invoice id.
- Each center has its own hourly rate for mechanics.