Healthcare Database Management System

Milestone Version	Date
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Prepared By: Syed Faiz, 921438645

GitHub ID: Faiz9

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Section 1: Project Summary

The goal of this project is to make a health care organization database like Sutter Healthcare and Quest Diagnostic etc. The project will help the healthcare organization to effectively manage clientele data, determine the services that are high in demand, and deliver faster service to increase profit and client satisfaction.

To achieve these goals, our project will track clientele demand such as services that are most used and generate the most profit so more resources are moved in that section to maximize profitability. For example, our healthcare organization provides drug screening test for new hires for company and if this service is in high demand, then more staff will be assigned to help with drug screening to meet the customer demand, deliver prompt service, and increase revenue.

Furthermore, the project will help the organization in two additional areas: premium service allowing customers to pay extra for expediated service and ability to enroll in installment plans to pay large bills in payment plan subject to credit check and qualification.

Section 2: Use Cases

Use Case: Premium Service.

Actors: Jose (Customer), Service.

Description: Jose wants to travel to Spain for urgent business trip. Due to the pandemic, travelers are required to provide proof of negative covid test result that was taken at least 36 hours before the flight. Since Jose is already running late and has less than 12 hours to catch his flight. He can use the premium service for which he will pay extra but will receive his test results immediately after taking the test. Jose is paying more convivence and faster service.

Use Case: Customer without health insurance.

Actors: Maria (Customer), Payment Plan (Product/Service), Payment Method (Service).

Description: Maria wants to visit the healthcare center for routine health check-up and treatment. However, Maria is concerned about the treatment price and is not able to afford to pay all at once. The healthcare center offers payment plan to customers without health insurance. Maria can apply to enroll in payment plan beforehand which is subject to credit qualification. Furthermore, the healthcare center will accept many different payment methods such as cash, personal cheques, debit/credit card payments, and phone wallet.

Use Case: Employer Account.

Actors: Employer (Customer), Account (Service).

Description: The employer can create online account on healthcare center website. With this account, the employer will be able to book drug screen for new hires and existing employees at

lower pricing. For example, an employer with less than 50 employees will be charged $125 per employee for drug screening. But employer with 50 or more employees will be charged $110 per employee. Only the employer's human resource department personnel will have access this account. One account per client but multiple users can use and have their own login credentials.

Use Case: Customer Account.

Actors: Syed (Customer), Account (Service).

Description: Syed wants to book a doctor visit for a routine check-up. The healthcare center does accept walk-in customers, but they are served on first come first serve basis. Appointments are recommended for faster service. Syed can use his online account on website to schedule appointment and see doctor. This helps him spend less time waiting in line to see the doctor. The account will send reminders about healthcare appointments and provide summary of visits to the customer as well as track of past visits and transaction.

Use Case: Demand and Supply.

Actors: Yesenia (Owner), Demand, Services.

Description: Yesenia the owner of the healthcare center can use our database to see which services are used the most and which ones are most profitable so she can allocate appropriate resources to support them. For example, during the spring season many graduates will apply for jobs. There will be high demand for drug screening appointments during spring and the healthcare center has appropriate resources in place such as sufficient staff and lab equipment to meet the demand.

Use Case: Healthcare Organization Employee Account.

Actors: John (Employee), Account (Product/Service), Andrea (Customer).

Description: John who works at the front desk in healthcare organization and has access to employee account. Andrea is a new customer at our healthcare center and wants to see a doctor. With employee account, John can collect information from Andrea such as name, date of birth, address, and social security etc. and schedule her a doctor's appointment. John can also modify customers information such as name and address etc.

Use Case: Medical Supplies

Actors: Lauren (Office Manager), Medical Supplies (Product).

Description: Lauren works as an office manager at our healthcare center. One of her responsibilities is to make sure our medical center is stocked with all necessary supplies such as gloves, masks, band aids, and proper sanitization. During COVID-19 pandemic, medical supplies were limited, and it is important that our medical center is well stocked with these supplies, so all employees have access to masks and gloves for safety and prevention of contagious disease.

Database Requirements

Healthcare Organization

1.1 The healthcare organization shall have only one or more owners.
1.2 The healthcare organization shall have zero or more employees.
1.3 The healthcare organization shall have zero or more customers.
1.4 The healthcare organization shall have at least one product.
1.5 The healthcare organization shall have multiple locations.

2 Owner

2.1 An owner shall own zero or many locations.
2.2 An owner shall track the profit.
2.3 An owner shall track the loss.
2.4 An owner shall move zero or many employees.

3 Service

3.1 A service shall be purchased by many customers.
3.2 A service shall be provided by zero or more employees.

4 Employee

4.1 An Employee shall be create zero or many accounts.
4.2 An Employee shall be a Doctor.
4.3 An Employee shall be a Nurse.
4.4 An Employee shall be a Lab Assistant.
4.5 An Employee shall be an office manager.
4.6 An Employee shall be an accountant.
4.7 An Employee shall be receptionist.

5 Customer

5.1 A customer shall buy many services.
5.2 A customer shall be able to create one online account.
5.3 A customer shall be able to make many payments.
5.4 A customer shall receive a receipt.
5.5 A customer shall receive medical records.
5.6 A customer shall visit zero or many locations.
5.7 A customer shall make zero or many appointments.

6 Payment

6.1 A Payment shall be made with one Bank Account.
6.2 A Payment shall be made with One Credit Card.
6.3 A Payment shall be made by one Customer.

6.4 A Payment shall be made using Installment Plan.

7 Bank Account

7.1 A Bank Account shall be One mode of Payment.

8 Credit Card.

8.1 A Credit Card shall be One mode of Payment.

9 Installment Plan

9.1 An Installment Plan shall be one mode of Payment

10 Credit Check

10.1 A Credit Check shall be done on one customer.

10.2 A Credit Check shall be done when using Installment Plan.

10.3 A Credit Check shall be done only once.

11 Locations

11.1 Multiple locations shall have multiple healthcare centers.

11.2 Multiple location shall have multiple employees.

12 Appointment

12.1 A customer shall make one or many appointments.

12.2 A receptionist shall make one or many appointments.

13 Doctor

13.1 A Doctor shall perform one or many services.

14 Nurse

14.1 A Nurse shall help doctor perform one or many services.

15 Lab Technician

15.1 A Lab Technician shall help perform one or many services.

16 Office Manager

16.1 An Office Manager shall track the inventory/supplies.

17 Accountant

17.1 An Accountant shall collect many payments.

18 Receptionist

18.1 A Reception shall book zero or many appointments.

19 Customer Account

19.1 A customer shall have only one Account.

20 Employer Account

20.1 An Employer shall have only one Account.

21 Supplies

21.1 An healthcare center shall have many supplies.

22 Expediated Service

22.1 A customer shall expediate drug screening.

22.2 An expediated service shall be purchased by many customers.

Section 4: Detailed List of Main Entities, Attributes, and Keys

1. Customer (Strong):

⇒ User_id: key, numeric.

⇒ Name: composite, alphanumeric.

⇒ Dob: multivalue, timestamp.

⇒ Address: composite, alphanumeric.

⇒ Social: Numeric.

⇒ Last Visit: multivalue, timestamp.

⇒ Phone: multivalue.

⇒ Email: multivalue

⇒ Gender: alphanumeric

2. Employee (Strong):

⇒ Employee_id: Key, numeric.

⇒ Employee Name: composite, alphanumeric.

⇒ Employee Dob: multivalue, timestamp.

⇒ Date of Hire: multivalue, timestamp.

⇒ Employee Address: composite, alphanumeric.

⇒ Employee Social: composite, numeric.

⇒ Salary: composite, numeric.

3. Role (Strong):

⇒ Role_id: Key, numeric.

⇒ Title: alphabetic.

4. Hospital (Strong):

⇒ Hospital_id: Key, numeric.

⇒ Hospital Name: composite, alphanumeric.

⇒ Location: composite, alphanumeric.

5. Employee Account (Weak):

⇒ Account_id: key, numeric.

⇒ Username: alphanumeric.

6. Employer Account (Weak):

⇒ Account_id: key, numeric.

⇒ Username: alphanumeric.

7. Employer Account (Weak):

⇒ Account_id: key, numeric.

⇒ Username: alphanumeric.

8. Payment (Strong):

⇒ Amount: composite, numeric.

⇒ Date: composite, multivalue

⇒ Customer_id: weak key, numeric.

9. Bank Account (Weak):

⇒ Bank_id: key, numeric.

10. Credit Card (Weak):

⇒ Credit_id: key, numeric.

11. Installment Plan (Weak):

⇒ Installment_id: key, numeric.

12. Credit Check (Weak):

⇒ Applicant Name: composite, alphanumeric.

⇒ Social Security Number: composite, numeric.

⇒ Address: composite, alphanumeric.

⇒ Employer: composite, alphabetic.

⇒ Gross Income: numeric.

13. Appointment (Strong):

⇒ Appointment_ID: key, numeric.

⇒ Date: composite, multivalue.

⇒ Type: alphabetic.

⇒ Quantity: numeric.

14. Service (Strong):

⇒ Service type: alphabetic.

⇒ Service_quantity: numeric.

⇒ Service_price: numeric.

⇒ Service_ID: key, numeric.

⇒ Expediated: alphabetic.

15. Owner (Strong):

⇒ Owner_ID: Key, numeric.

⇒ Name: composite, alphanumeric.

⇒ Owner_Title: alphabetic.

⇒ Phone: multivalue

16. Supplies (Strong):

⇒ Item_Type: alphabetic.

⇒ Item_Id: key, numeric.

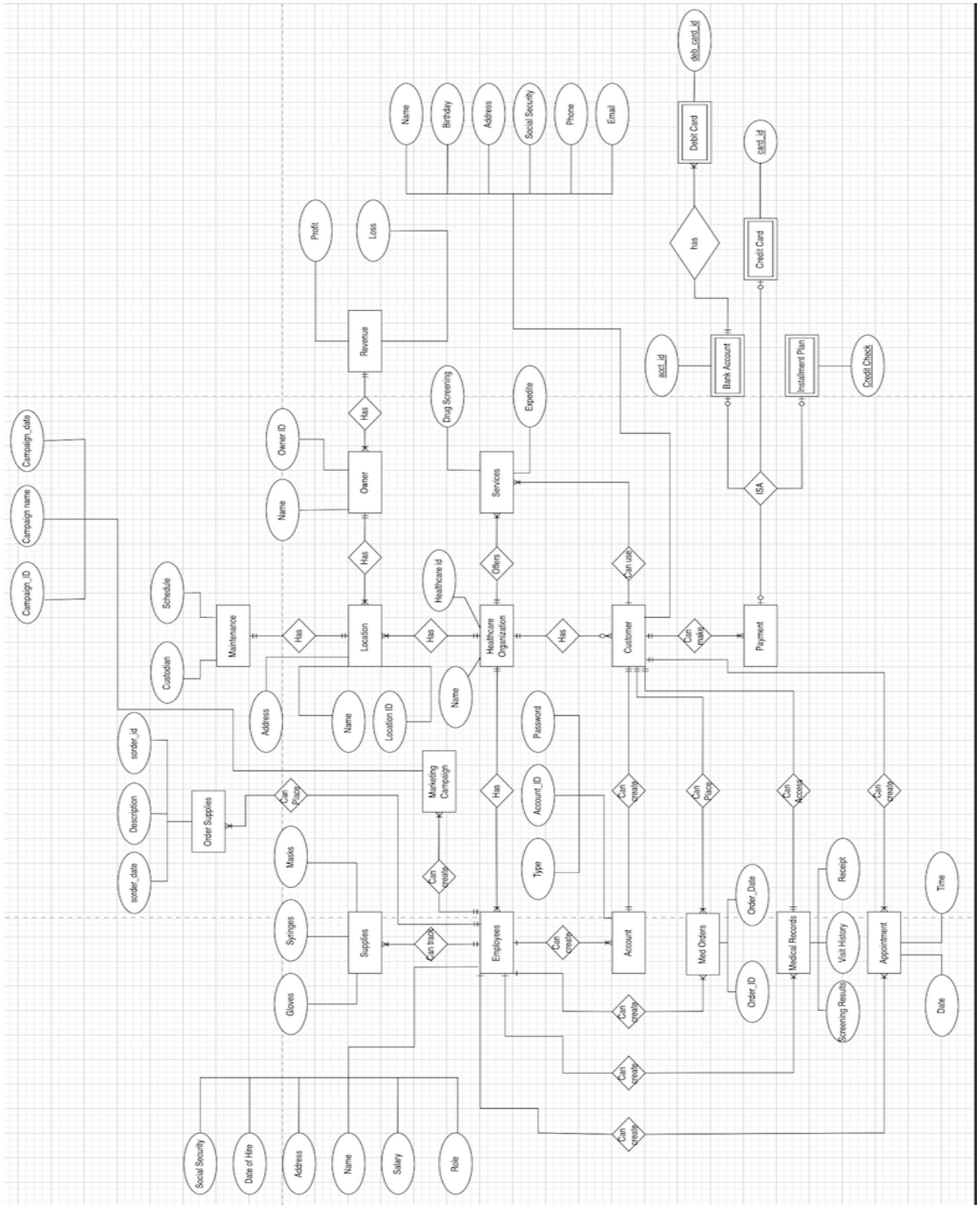
⇒ Quantity Available: numeric.

17. Track (Weak):

⇒ Profit: composite, numeric.

⇒ Loss: composite, numeric.

Section 5: Entity Relationship Diagram



Section 6: Entity Relationship Diagram

Rule	Entity A	Relationship	Entity B	Cardinality	Pass/Fail	Error Explained
1	Employee	Creates	Customer Account	0-to-many	Pass	
2	Customer	Creates	Customer Account	1-to-1	Pass	
3	Payment	Linked To	Account	0-to-1	Fail	Account Not Linked to Payment
4	Account	Linked To	Service	0-to-many	Fail	Account Not Linked to Service
5	Employee	Track	Supplies	Many-to Many	Fail	Employee Not linked to track
6	Employer	Create	Employer Account	One-to-One	Fail	Only customer or employee can create account

Section 7: Database Model/EER

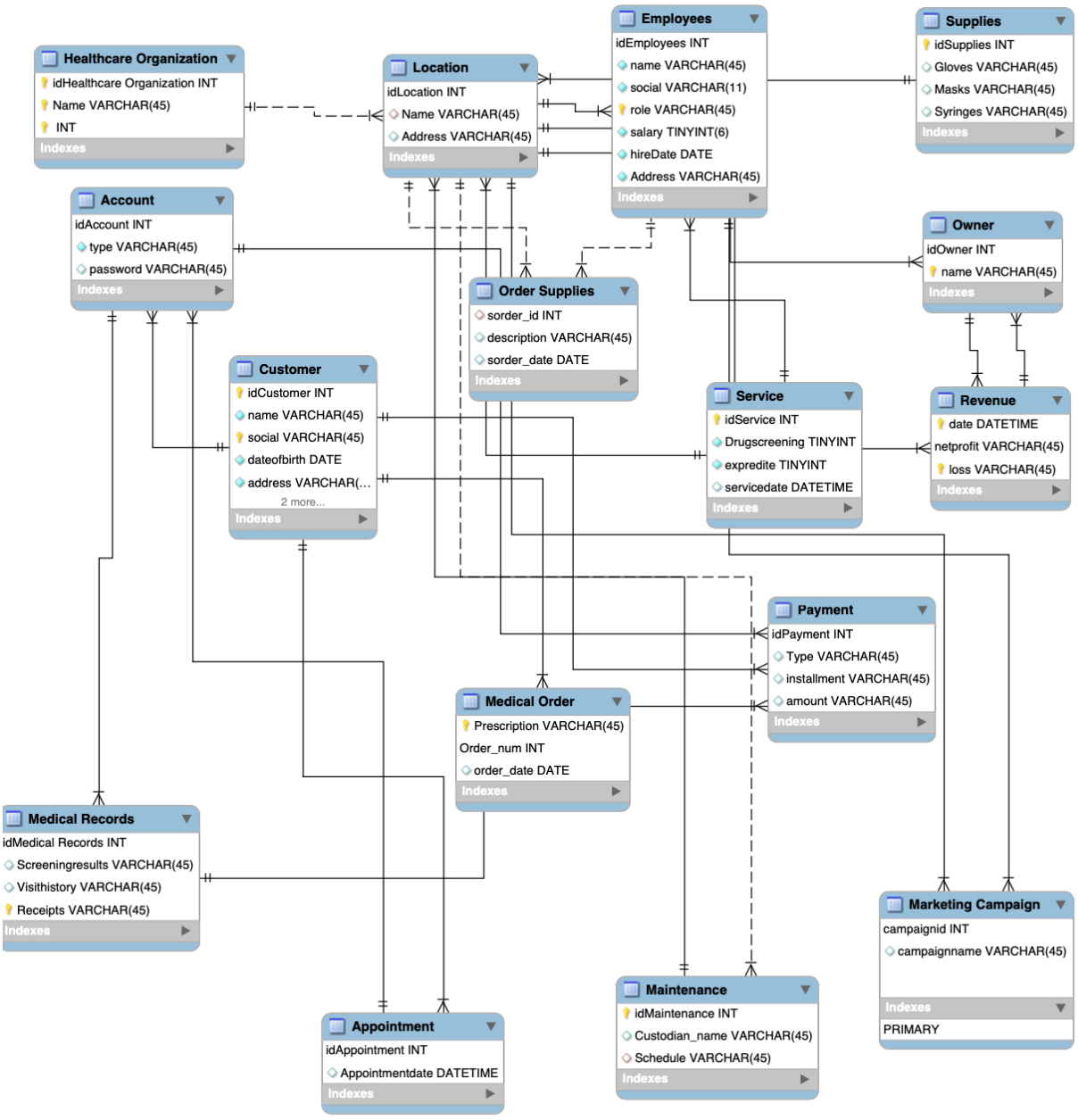


Table	FK	ON DELETE	ON UPDATE	COMMENT
Account	User	On cascade	oN cascade	If employee deletes user Then account is also deleted.
Employee	Role	Not Null	Not Null	Must have a role in the organization always.
Account	Type	Not null	Not Null	Must either be customer account or employee.
Customer	Account_id	Not Null	Unique/ Not Null	Customer should be able access all info using this account such as orders, records, visits, appointments and payments.
Employee	Location_id	On cacasde	On cascade	Employee record should be deleted if the employee leaves the organization.
Supplies	Location_id	Not null	Not Null	Employee can check to see the supplies available at the location.
Owner	revenue_id	Not null	Not null	Owner can use this to track locations profit and loss.
Employee	Sorderid	Not null	Not null	Employee can order supplies for the healthcare center.
Employee	Customer_id	Not null	Not null	Employee can use customer_id to create a customer account which can be used by the customer.
Owner	Maintenance_id	Not null	Not null	Owner can check to see the maintenance schedule.

Section 8: Testing Table

Entity	SQL Query	Pass/Fail	Error Description	Solution
User	Update	Fail	Trigger Error	
Employee	Create	Fail	Trigger Error	
Appointment	Update	Fail	Referenced PK does not exist.	
Employee	Update	Passed		
User	Delete	Fail	Trigger Error	
Supplies Order	Create	Passed		
Maintenance	Update	Passed		