

[KAU covid-19 vaccination center]

DB Design

Group No: 4

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PART I: Analysis

1 Problem Definition and Data Requirements

1. Problem Description

2020 was heavily defined by the COVID-19 pandemic, which led to global social and economic disruption, mass cancellations and postponements of events, worldwide lockdowns. Coronavirus (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus.

Vaccines save millions of lives each year. COVID-19 vaccines help our bodies develop immunity to the virus that causes COVID-19 without getting the illness. Different types of vaccines work in different ways to offer protection.

The main aim of our project is to make a database management system to manage all the relevant areas and features, for COVID'19 vaccines, and provide an easy way of storing information of the center, employees, vaccines, reservations and room.

1.2 Data Requirements

1.Center requirements:

Each center has:

- Unique name
- Unique address(city-district-road)
- number of rooms

2.Room requirements:

Each room has:

- Unique ID (the room number is the room ID)
- Room occupation (occupied, not occupied)
- Room capacity

3.Employee requirements:

Each employee has:

- Address
- name (first name-middle name-last name)
- Gender
- Salary
- Job
- unique national ID

4.Dependent requirements:

Each dependent has:

- Name (first name-middle name-last name)
- gender
- Birth date
- Relationship
- unique national ID

5.Vaccine requirements:

Each vaccine has:

- Factory
- Type (batch_no ,name, serial_no, Manufacture date)

6. Visitor requirements:

Each visitor has:

- Name (first name-middle name-last name)
- Unique ID
- Age is derived from the Birth date
- Gender
- Birth date

7.Reservation requirements :

Each reservation has:

- Reservation date
- State
- Medical condition

8. Storage requirements :

Each storage has:

- Vaccine type (AstraZeneca, Moderna, Fizer)
- Medical supplies (like vaccines, cotton, Panadol...)
- Number of supplies is the number of supplies in the stock. which is derived from the medical supplies.

9. Covid test Requirements:

Each covid test has:

- Test number
- Date taken
- Result
- Result date

10. Application Requirements:

Each Application has:

- location
- password
- Last update on dosage date
- Number of doses
- phone number

1.1.Business Rules

Center:

There are several centers, and every center has a location, manager, number of employees, and a storage place.

Reservation:

A visitor can reserve an appointment between 9 am and 9 pm via the application at any desired center.

Room:

When the reception takes the visitor reservation, the visitor will be assigned to a room. A room must have one visitor and one medical employee.

Employee:

An employee gets assigned to a room to give the visitors the vaccine. An employee may have dependents.

Visitor:

When someone makes an appointment, they must submit their personal information, full name, Id, age, gender, and the number of doses taken. The visitor must be older than five years old.

Vaccine:

There are three types of vaccines (Pfizer, AstraZeneca, Moderna). Each vaccine has a serial number and manufacture date.

Application:

The reservations are via the application, with all the previous covid tests (if any).

1.4 Intended Output of the system

Output and Queries

- Display visitor information
- Search for visitor by ID
- Display dose information for every visitor
- Assign each visitor a room to get vaccinated in
- Display room status (available/busy)

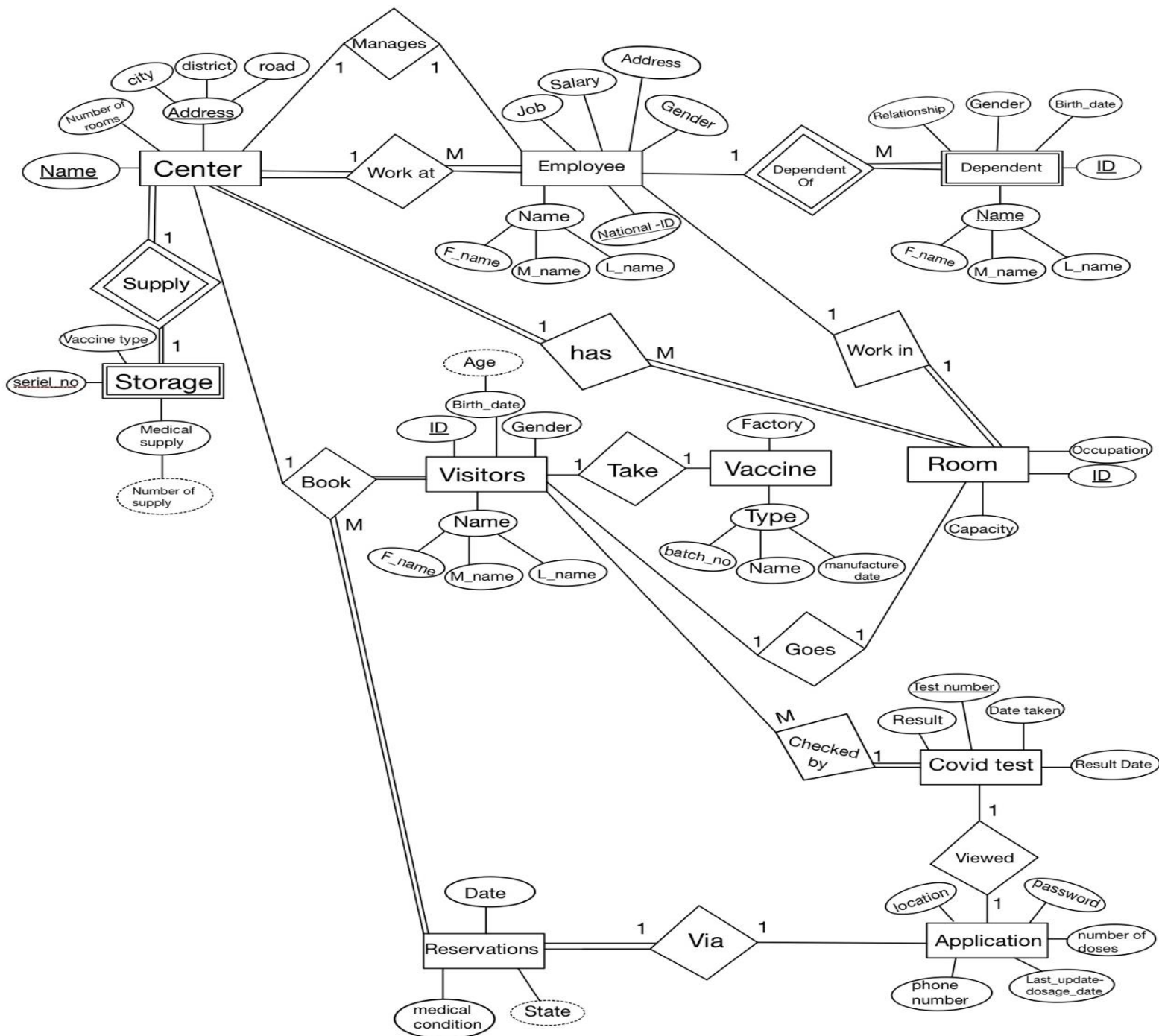
Transaction

- Add new visitors
- Update dose information for each visitor
- Update room status (available/busy)
- Sign up/in window for workers
- Update visitor information

PART I I: DB DESIGN

2 ER Diagram Design

2.1 ER Diagram



2.2 Design of Business Rules

Business Rules	Design decisions	Justification (if any)

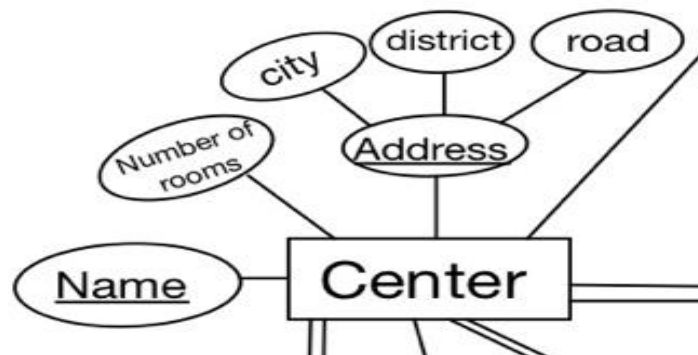
Each center has many rooms	1: N Binary relationship between center and room	A center has many rooms for vaccination
Each center has a storage	1:1 weak binary relationship between center and storage	A center must have a storage for the essential supplies
Each center has employees, and an employee belong to one center	1:1 Binary relationship between center and employee	-
Each room has one visitor	1:1 Binary relationship between room and visitor	Each room has one visitor at a time for safety precautions
Each room has one medical employee	1:1 Binary relationship between room and employee	Only one medical employee needed in a room to give the vaccine
A visitor can take one vaccine at a time	1:M Binary relationship between visitor and vaccine	-
Each visitor can have one reservation	1:1 Binary relationship between visitor and reservation	a person can have on reservation at a particular time, and a reservation belong to one person
A visitor has a covid test	1:M Binary relationship between visitor and covid test	-
An employee can have dependents	1:N Weak binary relationship between employee and dependent	An employee has dependents, but a dependent does not exist without a provider
A visitor age must be above five years old	-	This rule will be applied in SQL implementation

3 ER-to-logical Schema Mapping

3.1 Mapping of Regular Entity Types

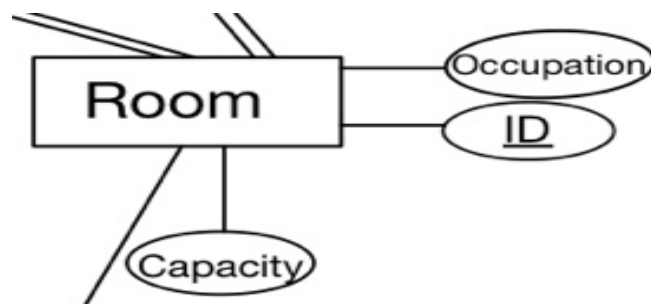
Center

<u>name</u>	number of rooms	city	district	road
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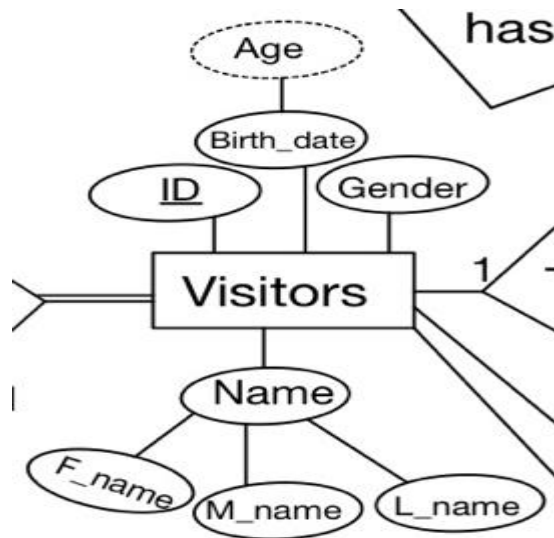
Room

<u>ID</u>	capacity	occupation
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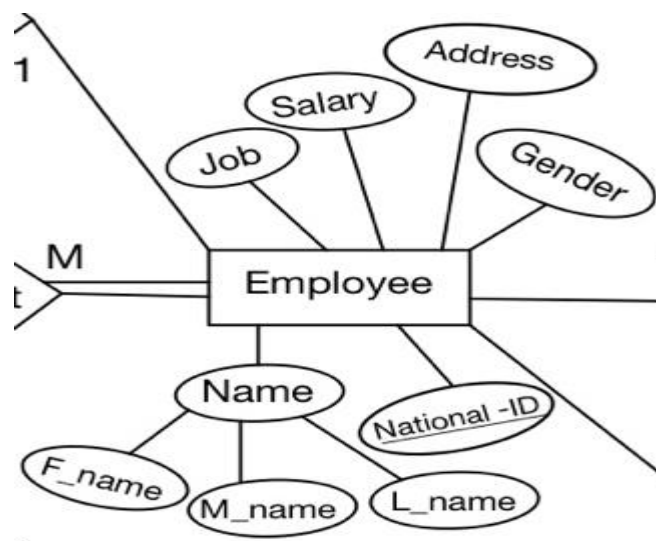
Visitors

<u>ID</u>	F_name	M_name	L_name	gender	birth date	age
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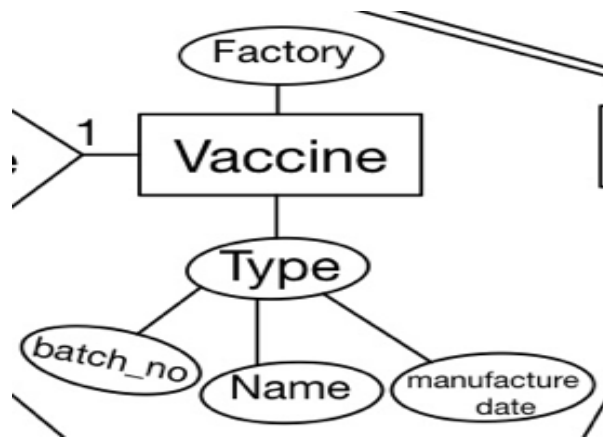
Employee

<u>national ID</u>	F_name	M_name	L_name	gender	job	salary	address
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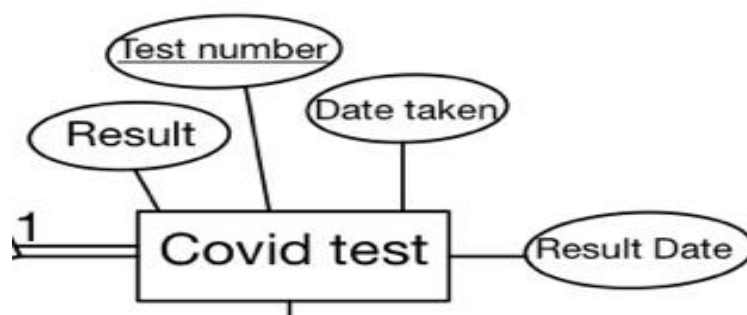
Vaccine

name	batch_no.	Manufacture date	factory
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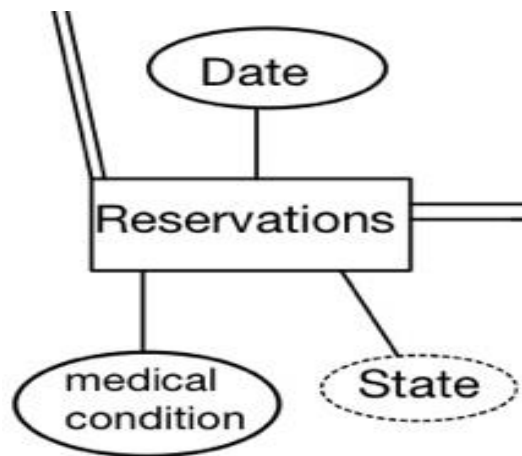
Covid test

<u>test number</u>	date taken	result	result date
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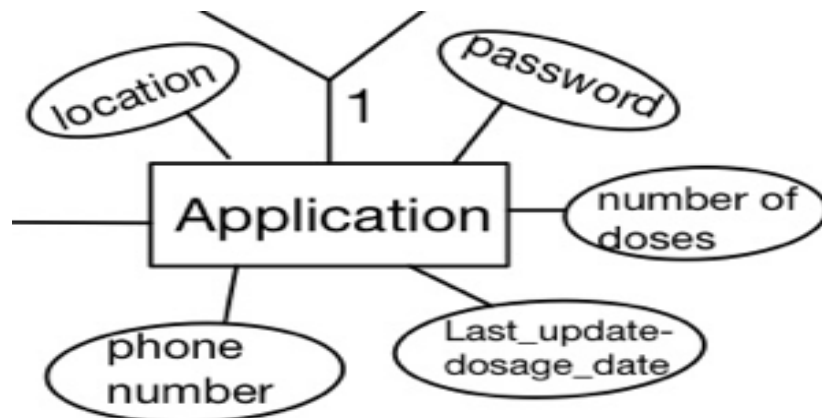
Reservations

medical condition	date	state
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Application

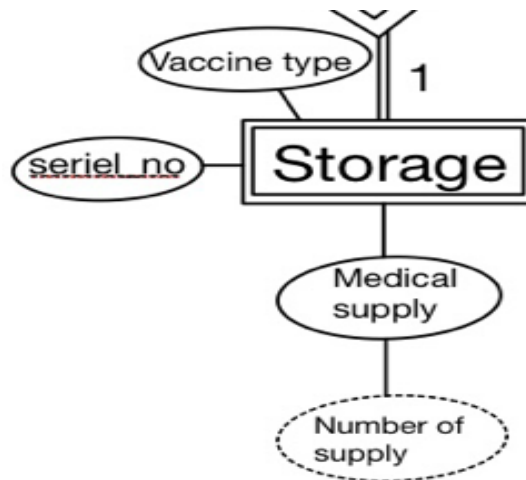
password	location	phone number	Number of doses	Last update dosage date
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3.2 Mapping of Weak Entity Types

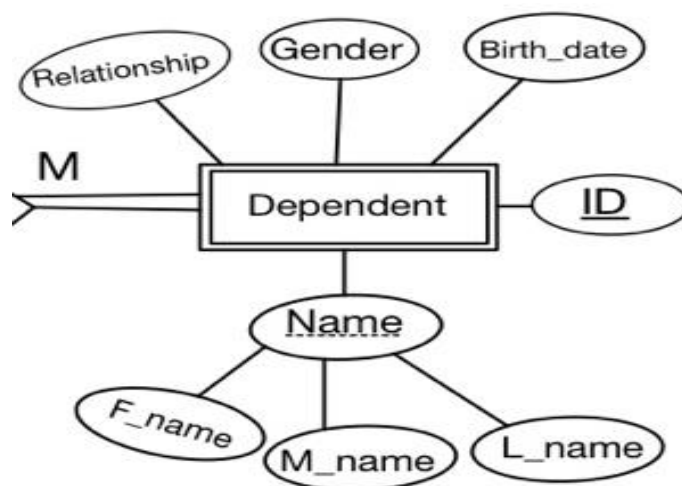
Storage

<u>serial_no</u>	medical supply	number of supply	vaccine type
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Dependent

<u>ID</u>	F_name	M_name	L_name	relationship	gender	birth_date
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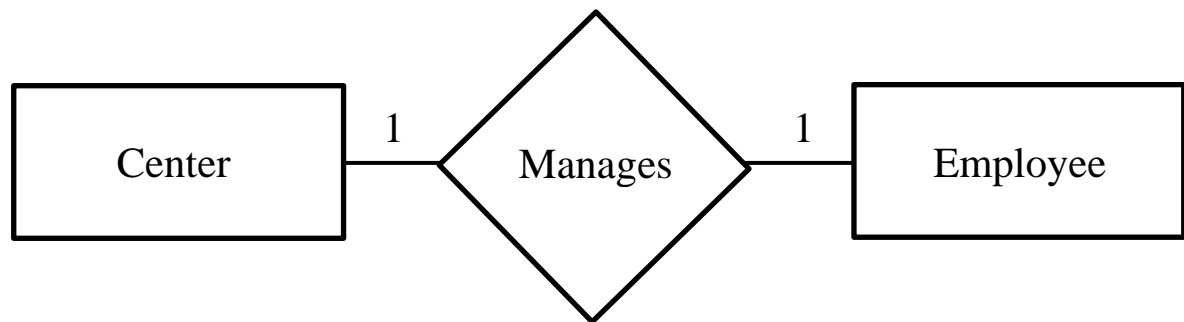
3.3 Mapping of Binary 1-1 Relationship Types

Center

<u>name</u>	number of rooms	city	district	road
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Employee

<u>national_ID</u>	F_name	M_name	L_name	gender	job	salary	address
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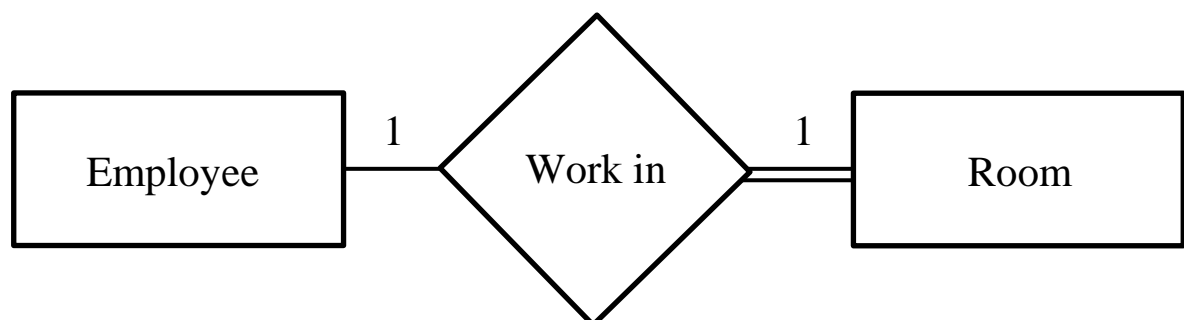


Employee

<u>national_ID</u>	F_name	M_name	L_name	gender	job	salary	address
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Room

<u>ID</u>	capacity	occupation
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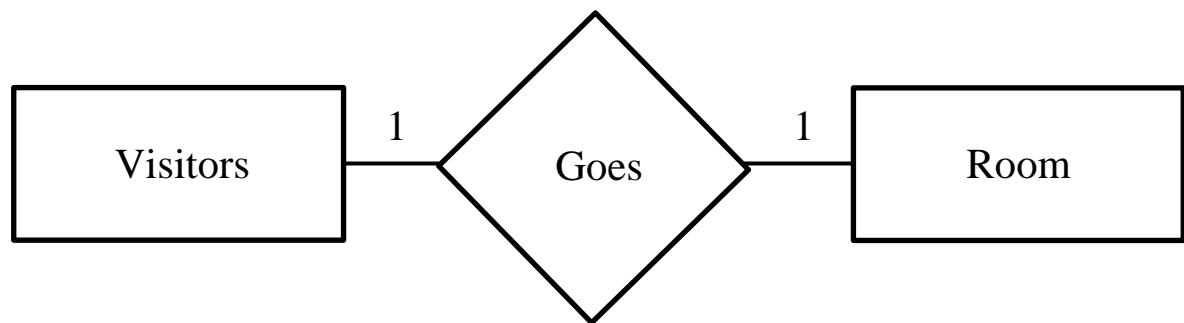


Visitors

<u>ID</u>	F_name	M_name	L_name	gender	birth date	age
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Room

<u>ID</u>	capacity	occupation
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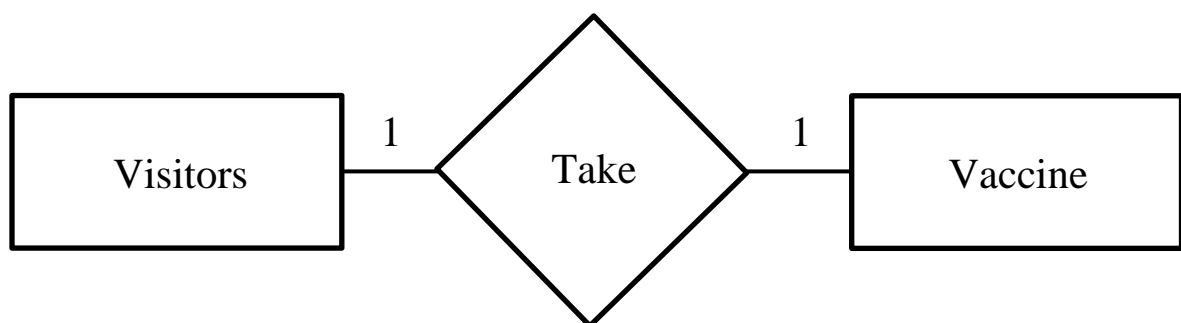


Visitors

<u>ID</u>	F_name	M_name	L_name	gender	birth date	age
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Vaccine

name	batch_no.	Manufacture date	factory
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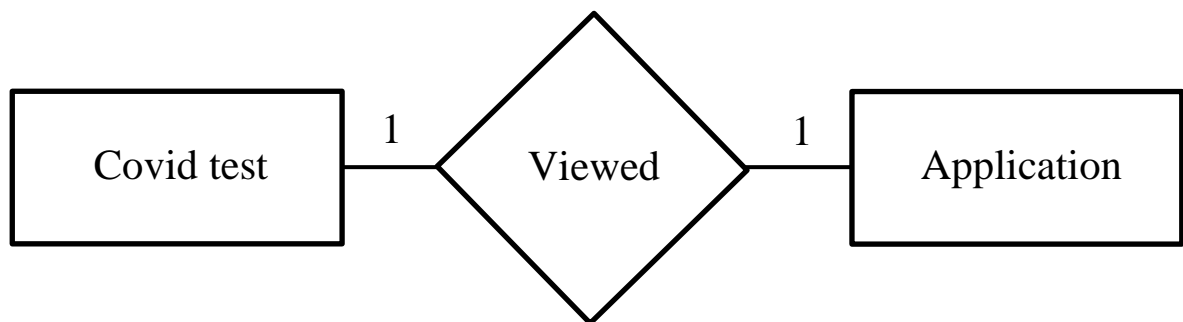


Covid test

<u>test number</u>	date taken	result	result date
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Application

password	location	phone number	Number of doses	Last update dosage date
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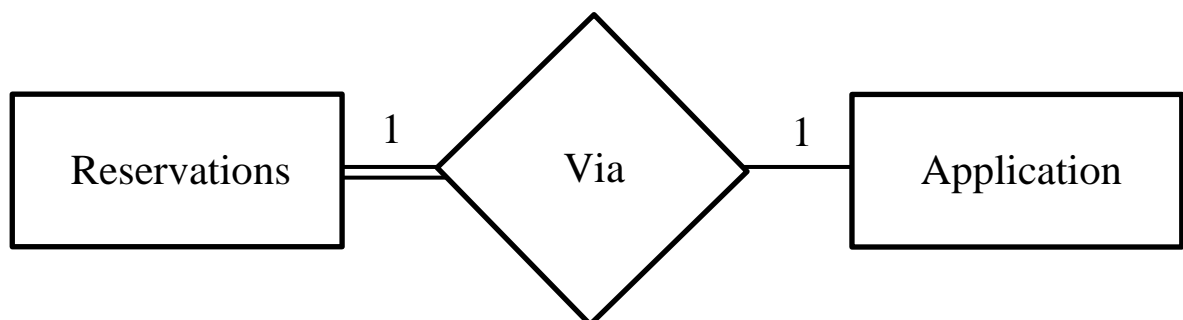


Reservations

medical condition	date	state
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Application

password	location	phone number	Number of doses	Last update dosage date
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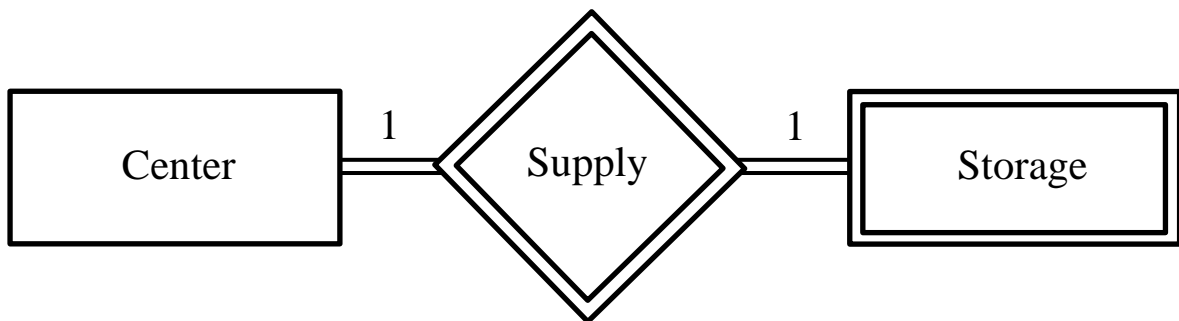


Center

<u>name</u>	number of rooms	city	district	road
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Storage

<u>serial_no</u>	medical supply	number of supply	vaccine type
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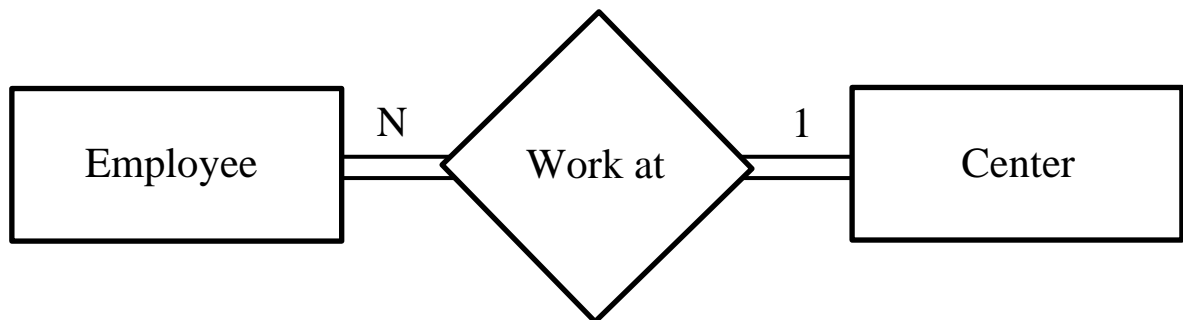
3.4 Mapping of Binary 1-N Relationship Types

Center

<u>name</u>	number of rooms	city	district	road
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Employee

<u>national_ID</u>	Center name	F_name	M_name	L_name	gender	job	salary	address
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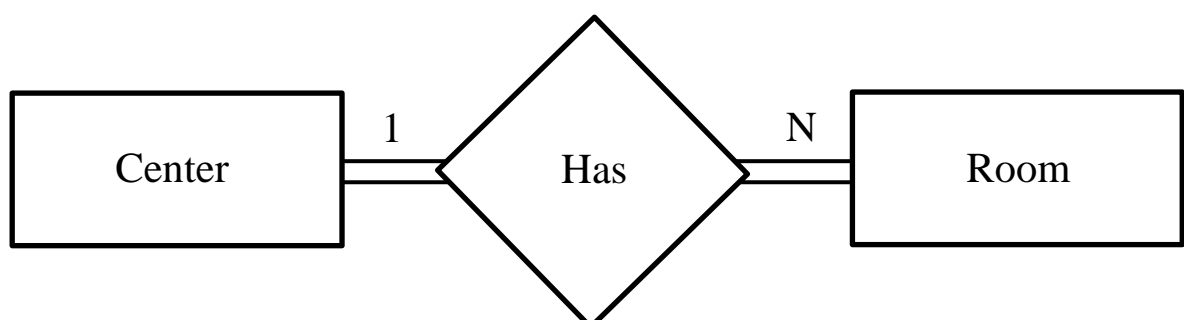


Center

<u>name</u>	number of rooms	city	district	road
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Room

<u>ID</u>	Center name	capacity	occupation
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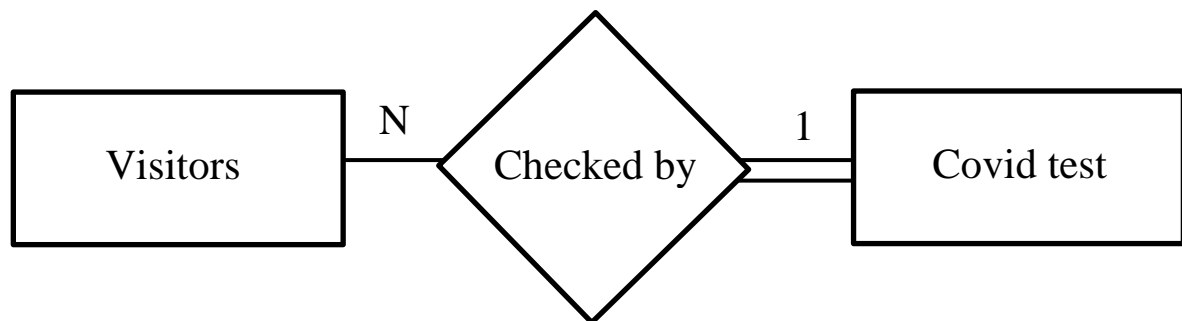


Visitors

<u>ID</u>	Covid test number	F_name	M_name	L_name	gender	birth date	age
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Covid test

<u>test number</u>	date taken	result	result date
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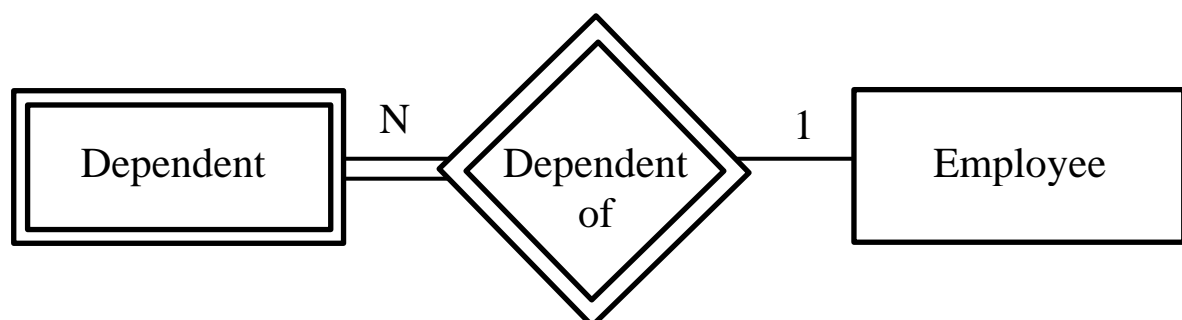


Employee

<u>national ID</u>	F_name	M_name	L_name	gender	job	salary	address
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Dependent

<u>ID</u>	Employee ID	F_name	M_name	L_name	relationship	gender	birth_date
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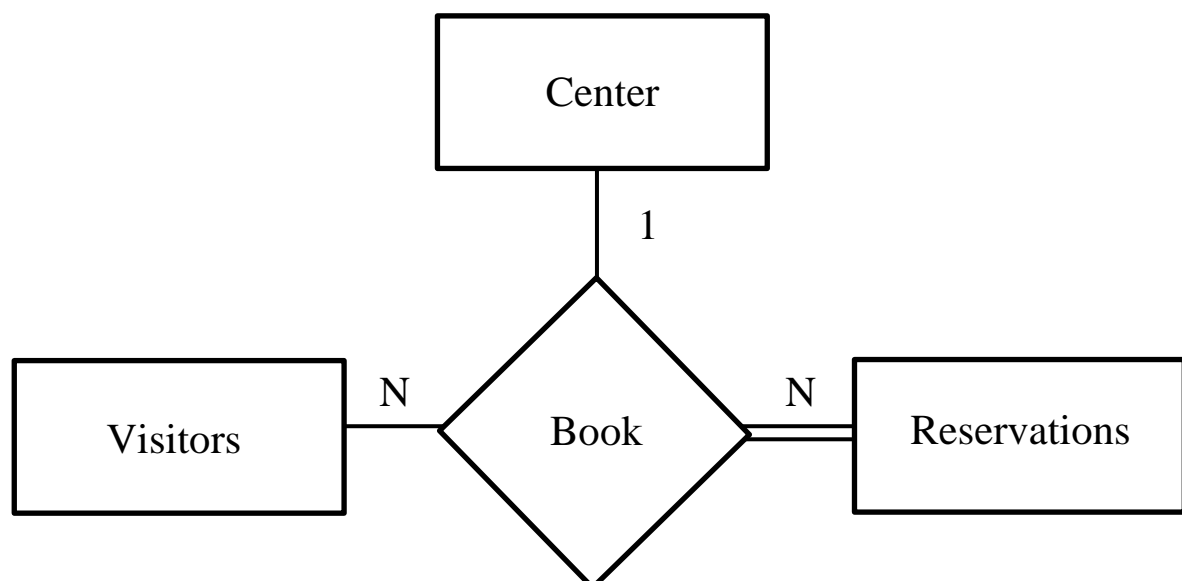
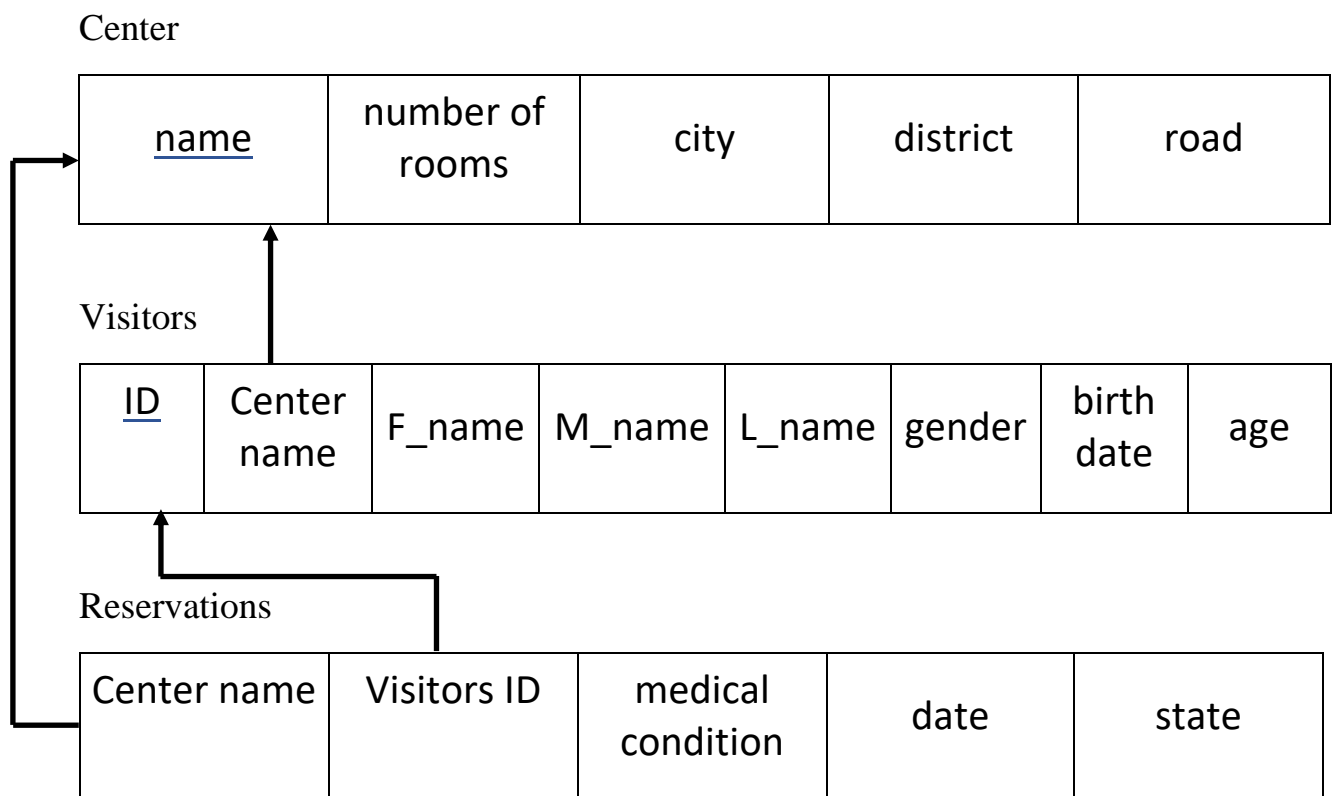
3.5 Mapping of Binary M-N Relationship Types

none

3.6 Mapping of Multivalued Attributes

none

3.7 Mapping of N-ary Relationship Types



3.9 Schema Diagram

