**BUS PASSENGER TRACKER DATABASE**

**(Revising…)**

Initially submitted

as partial fulfillment of the requirements for the subject

Database Systems

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**INTRODUCTION**

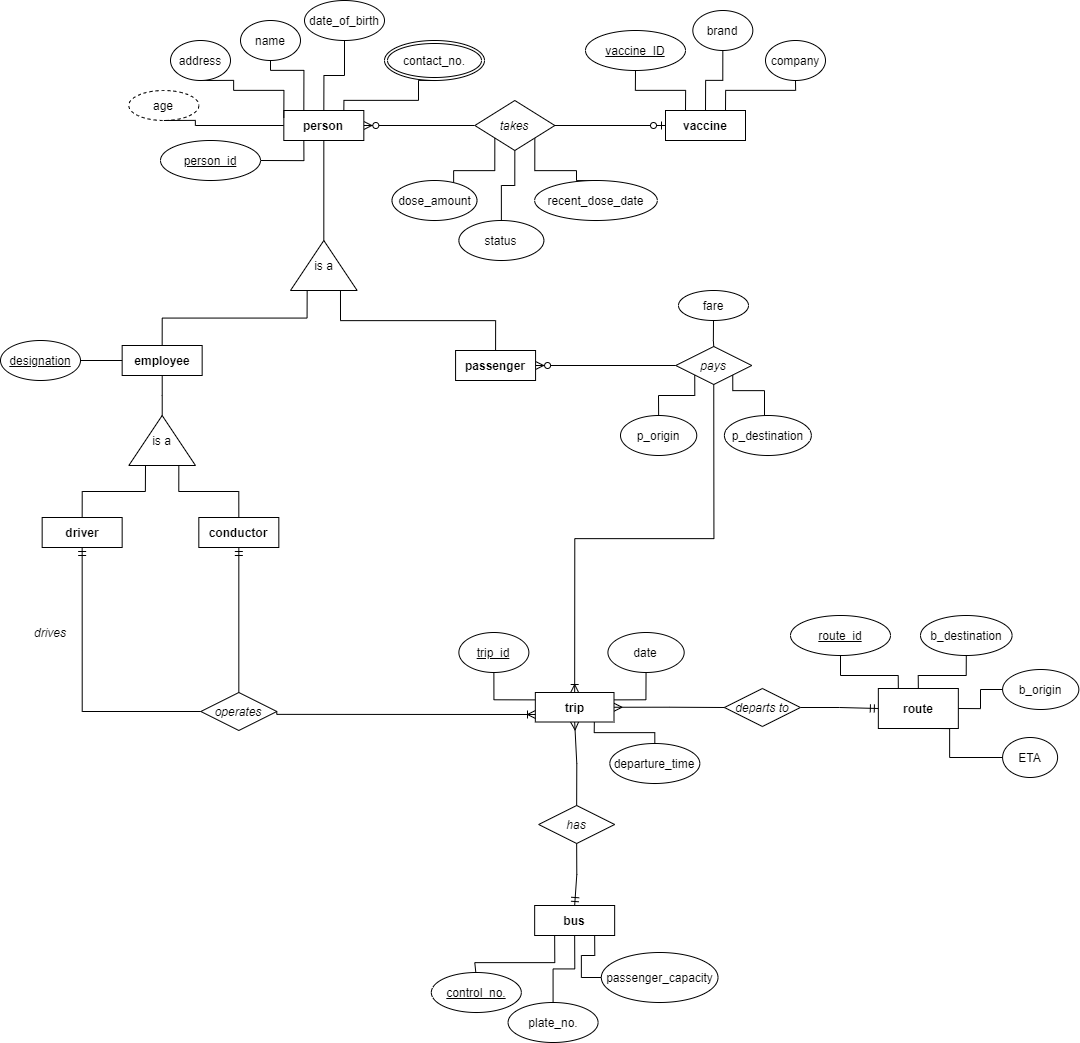
Buses are often the preferred mode of transportation among commuters especially in the provinces. But because of COVID-19 pandemic, bus stations needed to impose stricter transportation policies and monitor passengers as well as employees who may come into contact with passengers. When transportation restrictions slowly lifted, numerous terminals and bus operators slowly started to open. Yet with the threat of COVID-19 and possible transmission that could risk the lives of the commuters and their families, an efficient and easily accessible passenger tracker system can help.

Bus passenger tracker is a database system that aims to enable the contact tracers to efficiently access the needed information of passengers. In this way, It can minimize the surge of covid transmission.

**APPLICATION DOMAIN**

1. A person has a name, address, date of birth, age, multiple contact numbers, and a corresponding **id** to uniquely identify them.
2. A person may or may not have taken a vaccine.
3. A vaccine can be taken by many persons or none at all.
4. For each person, their vaccination status must be indicated. If they are vaccinated, the amount of doses and the recent date which those doses have been taken should be indicated.
5. Each vaccine has a brand, a manufacturer, and a corresponding **id**.
6. A person can either be an employee or passenger, ~~but not both~~.
7. Each employee has a designation. An employee is either a driver or a conductor.
8. A driver and a conductor operate one or many trips.
9. Each trip is defined by the route taken, the date, departure time, arrival time, and a corresponding id.
10. A trip can only depart to one route, but a route can have many trips happening on it.
11. Each route is defined by its route\_id, origin and destination of the traveling bus,
12. A bus can take many trips but a trip can only be taken by one bus.
13. Each bus has a control number, plate number, and passenger capacity.
14. A passenger may pay for one or more trips and a trip can have many passengers. In a trip, each passenger has their own origin and destination, the due fare, and corresponding id.

**EER DIAGRAM**



**NORMALIZATION**

**1NF**

*persons*

| **Person\_ID** | First\_Name | Middle\_Name | Last\_Name | Address | Date\_of\_birth |
| --- | --- | --- | --- | --- | --- |
| **1** | Maria | Fernando | Jena | Santa Anna | 2003-10-12 |
| **5** | San | Fernando | Pedro | New City | 1999-12-25 |
| **6** | Jane | Bustos | Marikit | Uptown road | 1976-01-09 |

*vaccination*

| **Person\_ID** | Vaccine\_ID | status | Dose\_Amount | Recent\_Dose\_Date |
| --- | --- | --- | --- | --- |
| **1** | 2021100 | 1 | 2 | 2021-11-09 |
| **5** | 2021900 | 0 | NULL | NULL |
| **6** | 2021870 | 1 | 1 | 2021-07-18 |

*vaccines*

| **Vaccine\_ID** | Brand | Company |
| --- | --- | --- |
| **2021100** | Pfizer | Pfizer |
| **2021900** | Oxford-AstraZeneca | Astrazeneca |
| **2021870** | Sinovac | Sinovac BioTech |

*employees*

| **Person\_ID** | Designation |
| --- | --- |
| **15** | Driver |
| **11** | Conductor |
| **10** | Driver |

*contact*\_no

| **Person\_ID** | phone\_no |
| --- | --- |
| **1** | 02799397562 |
| **5** | 02799397565 |
| **6** | 02799337562 |

*trips\_payment*

| **Passenger\_ID** | **Trip\_ID** | P\_Origin | P\_Destination | Date | Fare |
| --- | --- | --- | --- | --- | --- |
| **1** | **134** | Terminal 3 | Jaro | 2020-01-06 | 145.50 |
| **5** | **135** | Terminal 5 | Terminal 7 | 2020-01-06 | 160.00 |
| **6** | **142** | Terminal 1 | CityMall B | 2020-01-06 | 125.00 |

*trips*

| **Trip\_ID** | Departure\_Time | Date | Control\_No. | Route\_ID | Driver\_ID | Conductor\_ID |
| --- | --- | --- | --- | --- | --- | --- |
| **134** | 5:30 | 2020-01-06 | C127 | 09 | 15 | 11 |
| **136** | 13:10 | 01-06-2020 | C126 | 08 | 10 | 21 |
| **145** | 2:45 | 01-06-2020 | C142 | 10 | 15 | 31 |

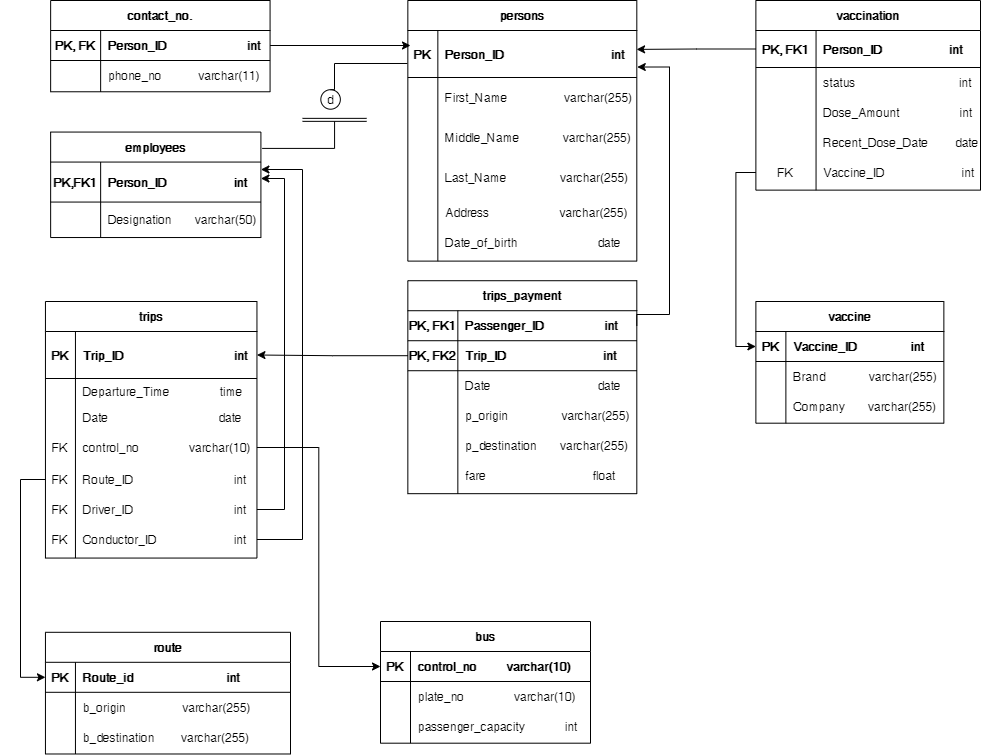
*bus*

| **Control\_no.** | Plate\_number | Passenger\_Capacity |
| --- | --- | --- |
| **C127** | HDH-140 | 30 |
| **C126** | CDO-555 | 30 |
| **C142** | AHA-616 | 30 |

*route*

| **Route\_ID** | B\_origin | B\_destination |
| --- | --- | --- |
| **09** | South terminal | New City |
| **08** | North terminal | Parker Terminal |
| **10** | West side | Old terminal |

**\*No dependencies found for 2NF and 3NF**

**RELATIONAL MODEL**

**SQL DDL**

1. Creating the database.

CREATE DATABASE passengerTracker;

CREATE TABLE persons (

Person\_ID int NOT NULL AUTO\_INCREMENT,

Last\_Name varchar(255),

Middle\_Name varchar(255),

First\_Name varchar(255),

Address varchar(255),

Date\_of\_birth date

PRIMARY KEY(Person\_ID)

);

1. CREATE VIEW persons\_view AS

SELECT \*, DATEDIFF(CURRENT\_DATE,Date\_of\_birth) DIV 365.2425 AS   
 age

FROM persons;

CREATE TABLE bus (

control\_no varchar(10) PRIMARY KEY,

plate\_no varchar(10),

passenger \_capacity int

);



CREATE TABLE route (

Route\_ID int PRIMARY KEY,

b\_origin varchar(255),

b\_destination varchar(255)

);



CREATE TABLE vaccine (

Vaccine\_ID int PRIMARY KEY,

Brand varchar(255),

Company varchar(255)

);



CREATE TABLE vaccination (

Person\_ID int PRIMARY KEY,

status int NOT NULL DEFAULT ‘0’,

Dose\_Amount int,

Recent\_Dose\_Date date,

Vaccine\_ID int,

FOREIGN KEY (Person\_ID) REFERENCES persons(Person\_ID) ON DELETE  
 CASCADE,

FOREIGN KEY (Vaccine\_ID) REFERENCES vaccine(Vaccine\_ID) ON DELETE  
 CASCADE

);

CREATE TABLE trips (

Trip\_id int PRIMARY KEY,

Departure\_Time time(),

Date date,

control\_no varchar(10)

int Primary Key,

Route\_ID int,

driver\_ID int,

conductor\_ID int,

FOREIGN KEY (driver\_ID) REFERENCES persons(Person\_ID) ON DELETE CASCADE,

FOREIGN KEY (conductor\_ID) REFERENCES persons(Person\_ID) ON DELETE CASCADE,

FOREIGN KEY (control\_no) REFERENCES bus (control\_no) ON DELETE  
 CASCADE,

FOREIGN KEY (Route\_ID) REFERENCES route (Route\_ID) ON DELETE  
 CASCADE

);

CREATE TABLE trips\_payment (

Passenger\_ID int NOT NULL,

Trip\_ID int NOT NULL,

p\_origin varchar(255),

p\_destination varchar(255),

fare float,

PRIMARY KEY(Passenger\_ID, Trip\_ID),

FOREIGN KEY (Trip\_ID) REFERENCES trips(Trip\_ID) ON DELETE CASCADE,

FOREIGN KEY (Passenger\_ID) REFERENCES persons(Person\_ID) ON DELETE  
 CASCADE

);



CREATE TABLE employees (

Person\_ID int PRIMARY KEY,

Designation varchar(50),

FOREIGN KEY (Person\_ID) REFERENCES persons(Person\_ID) ON DELETE  
 CASCADE

);



CREATE TABLE contacts (

Person\_ID int,

phone\_no varchar(11),

PRIMARY KEY(Person\_ID,phone\_no),

FOREIGN KEY (Person\_ID) REFERENCES persons(Person\_ID) ON DELETE  
 CASCADE

);

**SQL DML**

1. Insert employees’ details to the database.

INSERT INTO persons(Person\_ID, First\_Name, Middle\_Name, Last\_Name, Address, Date\_of\_Birth) VALUES (‘1’,‘Ricardo’, ‘Santos’, ‘Dalisay’, ‘Sampaloc’, ‘1984-09-28’), (‘2’,‘Dominador’, ‘Santos’, ‘Dalisay’, ‘Sampaloc’, ‘1984-09-28’);

INSERT INTO employees(Person\_ID, Designation) VALUES(‘1’,‘Conductor’),(‘2’,Driver);

1. Insert a passenger’s details to the database.

INSERT INTO persons (Person\_ID, First\_Name, Middle\_Name, Last\_Name, Address, Date\_of\_Birth)

VALUES (‘5’, ‘Maria’, ‘Fernando’, ‘Jena’, ‘Santa Anna’, ‘2003-10-12’);

1. Insert vaccine details to a database.

INSERT INTO vaccine (Vaccine\_ID, Brand, Company)

VALUES (‘2021100’, ‘Pfizer’, ‘Pfizer’);

1. Insert vaccination details of all persons.  
     
   INSERT INTO vaccination (Person\_ID) SELECT person\_ID from persons
2. Insert bus information into database

INSERT INTO bus (Control\_no, plate\_no, Passenger\_Capacity)

VALUES (‘C127’, ‘HDH-140’, ‘30’);

1. Insert a bus trip to the database.

INSERT INTO trips (Trip\_ID, Departure\_Time, Date, Control\_No., Route\_ID, Driver\_ID, Conductor\_ID)

VALUES (‘1’,‘05:30:00.0000000’, ‘2021-06-23’, ‘C127’, ‘09’, ‘1’, ‘2’);

1. Insert payment of passenger 3.

INSERT INTO trips\_payment (Passenger\_ID, Trip\_ID, p\_origin, p\_destination, Fare)

VALUES (‘3’, ‘1’, ‘Terminal 3’, ‘Jaro’, ‘145.0000’);

1. Insert route details into database

INSERT INTO route (Route\_ID, b\_origin, b\_destination)

VALUES (‘09’, ‘South Terminal’, ‘New City’)

1. Insert a person’s contact details into the database with multiple phone numbers.

INSERT INTO contacts (Person\_ID, phone\_no)

VALUES (‘1’, ‘02799397562’),(‘1’, ‘09595397562’)

1. Update an employee’s designation.

UPDATE employees

SET Designation = ‘Conductor’

WHERE Person\_ID = ‘1’;

1. Update a person’s details.

UPDATE persons

SET Address = “Makati City”

WHERE First\_Name = ‘Maria’ and Last\_Name = ‘Jena’;

1. Update vaccination status for a person 2.

UPDATE vaccination

SET status = ‘1’, Vaccine\_ID = ‘2021100’, Dose\_Amount = ‘2’, Recent\_Dose\_Date = ‘2021-06-11’

WHERE Person\_ID = 3;

1. Insert a new passenger and their vaccination details.

BEGIN;

INSERT INTO persons (First\_Name, Middle\_Name, Last\_Name, Address,  
 Date\_of\_Birth) VALUES (‘Crispin’, ‘Basilio’, ‘Ibarra’, ‘San Diego’, ‘2000-6-12’);

INSERT INTO trips\_payment(Passenger\_ID, Trip\_ID, p\_origin, p\_destination,fare)

VALUES(LAST\_INSERT\_ID(),'1','San Isidro','Miagao','1263.50');

INSERT INTO vaccination (person\_ID, status, Vaccine\_ID, Dose\_Amount,   
 Recent\_Dose\_Date ) VALUES (LAST\_INSERT\_ID(), ‘1’,‘2021100’, ’1’, ‘2021-06-20’);

COMMIT;

1. Delete all details of a person.

DELETE FROM persons

WHERE First\_Name = ‘Maria’ AND Middle\_Name = ‘Fernando’ And Last\_Name = ‘Jena’;

1. Delete a person’s contact number.

DELETE FROM contacts

WHERE Person\_ID = ‘1’ AND phone\_no = ‘02799397565’;

1. Delete a bus.

DELETE FROM bus

WHERE plate\_no = ‘HDH-140’;

1. Delete a route.

DELETE FROM route

WHERE b\_destination = ‘Old Terminal’;

**SAMPLE DATABASE QUERIES**

1. Names of the passengers and their end destination who took the bus with the control no. C127

SELECT CONCAT (p.First\_Name, “ “, p. Middle\_Name, “ “, p.Last\_Name) AS Passenger\_Name, tp.p\_destination AS Destination

FROM persons\_view AS p, trips\_payment AS tp, trips AS t

WHERE p.Person\_ID = tp.passenger\_ID AND tp.Trip\_id = t.Trip\_id AND t.control\_no = ‘C127’;

1. Names of the passengers, and their respective addresses who haven’t completed their vaccine shots.

SELECT CONCAT (First\_Name, “ “, Middle\_Name, “ “, Last\_Name) AS Name\_of\_Vaccinated\_Persons, Address

FROM persons\_view AS p, vaccination

WHERE p.Person\_ID = vaccination.Person\_ID AND vaccination.status =’0’;

1. The destination of all buses and their control number.

SELECT r.b\_destination, b.control\_no

FROM route AS r, bus AS b, trips AS t

WHERE b.control\_no = t.control\_no AND r.Route\_ID = t.Route\_ID;

1. Change Ricardo Dalisay’s designation to driver.

UPDATE employees, persons

SET employees.Designation = ‘Driver’

WHERE employees.Person\_ID = persons.Person\_ID AND persons.First\_Name = ‘Ricardo’ AND persons.Last\_Name = ‘Dalisay’;

1. Delete Maria Jena in the passenger list.

DELETE trips\_payment FROM trips\_payment INNER JOIN persons ON  
trips\_payment.Passenger\_ID = persons.Person\_ID AND persons.First\_Name = ‘Maria’  
AND persons.Last\_Name = ‘Jena’;

1. Find all passengers who have taken trips with Crispin Ibarra.

SELECT CONCAT(passengers.First\_Name, “ ”, passengers.Last\_Name) AS Name

FROM (SELECT \* FROM persons\_view   
 WHERE Person\_ID NOT IN (SELECT Person\_ID

FROM employees)) AS passengers INNER JOIN trips\_payment ON passengers.Person\_ID = Passenger\_ID

WHERE Trip\_ID IN (SELECT Trip\_ID FROM trips\_payment

WHERE Passenger\_ID IN (SELECT Person\_ID

FROM persons\_view   
WHERE First\_Name = ‘Crispin’ AND Last\_Name = ‘Ibarra’));

1. Give the complete names of employees who have not taken a vaccine shot.

SELECT CONCAT (p.First\_Name,“ ”, p. Middle\_Name,” “, p.Last\_Name) AS Employee\_Name

FROM persons\_view AS p, employees AS e, vaccination AS v

WHERE p.Person\_ID = e.Person\_ID AND v.Person\_ID = p.Person\_ID AND v.status=’0’;

1. Give the names of the passengers who are aged below 18.

SELECT CONCAT (First\_Name, “ ”, Middle\_Name, “ ”, Last\_Name) AS Name

FROM persons\_view

WHERE age<18;

1. Find the names of the employees who got vaccinated with either Pfizer or Sinovac.

SELECT CONCAT (First\_Name, “ ”, Middle\_Name, “ ”, Last\_Name) AS Name

FROM persons\_view AS p, vaccine AS v, vaccination AS pv

WHERE p.Person\_ID = pv.Person\_ID AND pv.Vaccine\_ID = v.Vaccine\_ID AND

v.Brand = ‘Pfizer’ OR v.Brand = ‘Sinovac’;

1. Change the bus capacity of Bus with plate number HDH-140 to 20.

UPDATE bus SET passenger\_capacity = 20 WHERE plate\_no = ‘HDH-140’;