

## **MBTA Revenue Generation (P2)**

### **List of entities:**

- Department
- Employee
- Train Station
- Pass Generator
- Transaction (Associative Entity)
- Scanner
- Expense
- Electricity
- Fuel And Energy
- Salary
- Vehicle
- Bus
- Subway
- Pass

### **Business Problems Discussed:**

- Keeping a track of the income generated through the transactions made via the tickets or Charlie Cards.
- Maintaining the possible expense records (Salaries, Fuel & Energy Costs, Electricity Bills) for the smooth operation of the MBTA System.
- Comparing the revenue generated on the basis of quarters (fall, spring, summer, winter)
- Designing the database in a way a track can be kept on expenses so that revenue can be optimised.

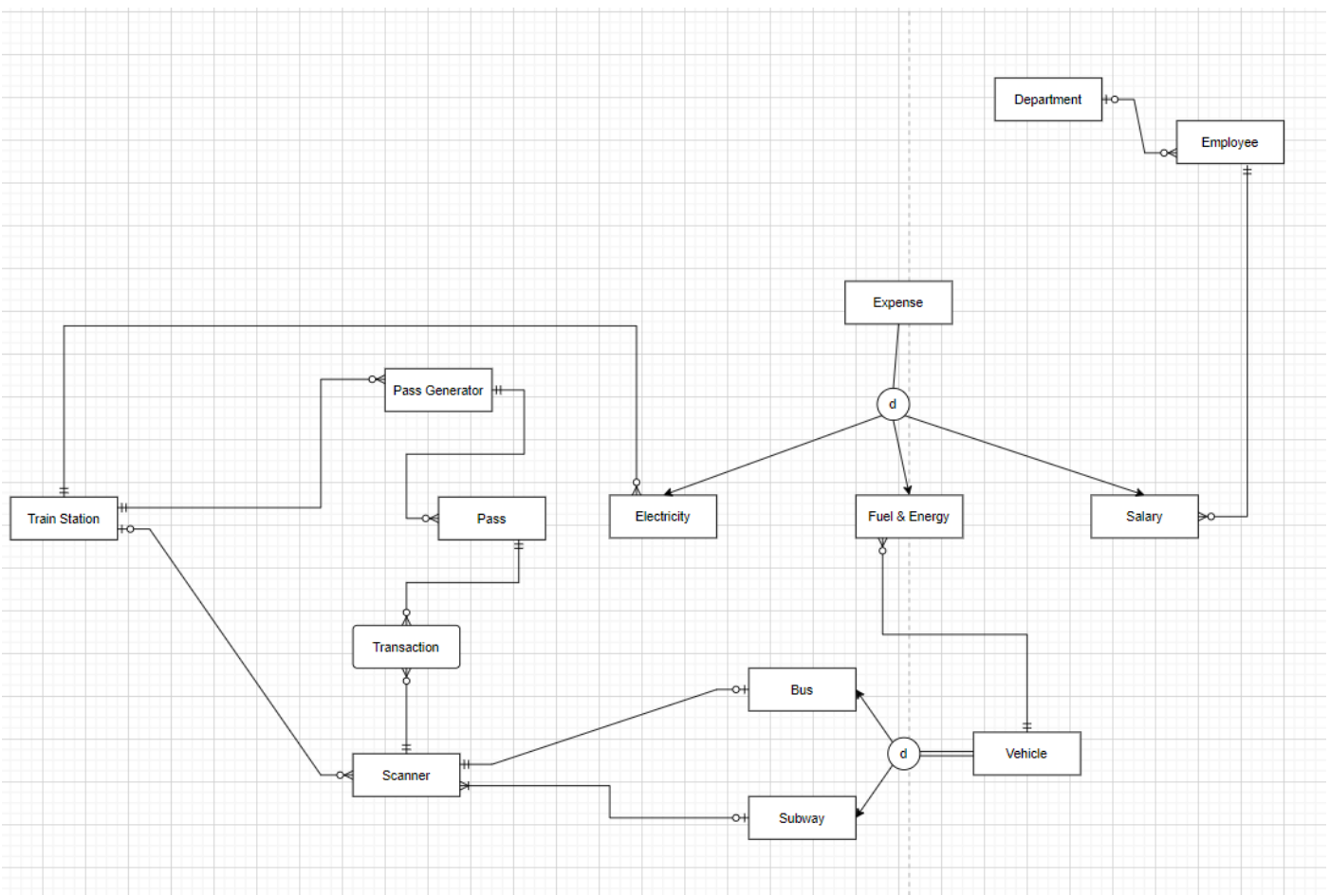
### **Relationship between Entities:**

- The expense of the MBTA can be subcategorised into Fuel and Energy Costs, Salaries of the employees, electricity bills and other miscellaneous charges.
- Vehicles have been subcategorised into Buses and Subway trains.
- Train Stations may have pass generators that used to generate the passes.
- Train stations also consists of scanners where the Passes are tapped to enter the train station.
- For the train stations that do not have Scanners on the station itself the scanners are present in the trains itself.
- Each bus has a scanner of its own.
- These scanners are used to keep the track of the transactions made.
- All the employees working for the MBTA are assigned to Specific departments according to their skill.
- Every bus has to have a scanner inside it.
- Trains have multiple scanners inside them.

## Key Descriptions:

- An employee must work for only one department. A department may consist of multiple employees.
- Multiple Salary statements can be generated for a single employee on the basis of the quarter or hours worked.
- An electricity bill generated must be specific to a particular station. A station could have multiple electricity bills. But no bill can be generated without pertaining it to a specific station.
- Pass generators are always present only on stations. There might be a few stations who do not have pass generator.
- A pass generator may be used to generate a pass. It is possible that a pass generator does not generate any passes at all.
- Not all train stations have scanners.
- When a transaction is made it must be made using one scanner. A transaction cannot exist without a scanner. A scanner on the other hand may not participate in any transaction.
- A transaction cannot be made without a pass too. Although a pass may not be used in any transactions at all.
- Fuel record cannot exist without linking them to a specific vehicle. A vehicle in-turn may not have any fuel record present.

## ERD



Link of the Initial ERD: [https://github.com/Rajvi-C/DMDD\\_Project/blob/main/P2\\_InitialERD\\_DMDD.drawio](https://github.com/Rajvi-C/DMDD_Project/blob/main/P2_InitialERD_DMDD.drawio)

Link of the Repository: [https://github.com/Rajvi-C/DMDD\\_Project](https://github.com/Rajvi-C/DMDD_Project)

Link of the Initial ERD Diagram: [https://github.com/Rajvi-C/DMDD\\_Project/blob/main/IntitialERD\\_P2.png](https://github.com/Rajvi-C/DMDD_Project/blob/main/IntitialERD_P2.png)