Normalization Exercise DSA 8660 Spring 2025 Meredith Sliger

Identify attributes:

1. RouteID
2. RouteStartPoint
3. RouteEndPoint
4. RouteStandardDrivingTime
5. ScheduleDate
6. ScheduledDepTime
7. ScheduledArrTime
8. DriverID
9. DriverFName
10. DriverLName
11. DateDriverJoinedCompany
12. DriverDOB
13. VehicleID
14. VehicleMake
15. VehicleModel
16. VehiclePassengerCapacity
17. DriverCertStartDate
18. DriverCertEndDate
19. ScheduleID

Identify functional dependencies between attributes:

1. Route Dependencies
   1. RouteID -> RouteStartPoint, RouteEndPoint, RouteStandardDrivingTime

(Each RouteID uniquely determines its start point, end point and standard driving time)

1. Schedule Dependencies
   1. RouteID, ScheduleDate, ScheduledDepTime -> ScheduledArrTime

(A unique combination of RouteID, ScheduleDate and Scheduled Departure Time determines the Scheduled Arrival Time)

1. Driver Dependencies
   1. DriverID -> DriverFName, DriverLName, DateDriverJoinedCompany, DriverDOB

(Each DriverID uniquely determines the driver’s personal details)

1. Vehicle Dependencies
   1. VehicleID -> VehicleMake, VehicleModel, VehiclePassengerCapacity

(Each VehicleID uniquely determines the vehicle make, model and passenger capacity)

1. Driver Certification Dependencies
   1. DriverID, VehicleID -> DriverCertStartDate, DriverCertEndDate

(A driver is certified for a specific vehicle and the certification period is associated with this pair)

1. BusSchedule Dependencies
   1. ScheduleID, RouteID, ScheduleDate, ScheduledDepTime, ScheduledArrTime-> DriverID, VehicleID

(A specific scheduled route at a given date and time is assigned to a driver and a vehicle)

A screenshot of a diagram

Description automatically generated

Organize the attributes into a set of 3NF relations (primary key underlined, foreign key italics)

1. ROUTE table-stores information about bus routes
   1. RouteID (Primary Key)
   2. RouteStartPoint
   3. RouteEndPoint
   4. RouteStandardDrivingTime
2. DRIVER table-stores information about driver details
   1. DriverID (Primary Key)
   2. DriverFName
   3. DriverLName
   4. DateDriverJoinedCompany
   5. DriverDOB
3. VEHICLE table-stores information about vehicle details
   1. VehicleID (Primary Key)
   2. VehicleMake
   3. VehicleModel
   4. VehiclePassengerCapacity
4. BUSSCHEDULE table-stores schedule details for bus departures and their assigned drivers and vehicles
   1. ScheduleID (Primary Key)
   2. *RouteID* (Foreign Key from Route table)
   3. ScheduleDate (Primary Key)
   4. ScheduledDepTime (Primary Key)
   5. ScheduledArrTime
   6. *DriverID* (Foreign Key from Driver Table)
   7. *VehicleID* (Foreign Key from Vehicle Table)
5. DRIVER CERTIFICATION table-stores information about driver certifications on specific vehicles for specific time periods
   1. *DriverID* (Primary Key; Foreign Key from Driver table)
   2. *VehicleID* (Primary Key; Foreign Key from Vehicle table)
   3. DriverCertStateDate(Primary Key)
   4. DriverCertEndDate