Transportation Management System (BTMS)

Given the problem description below, define a domain model using a class diagram for the concepts of the proposed Bus Transportation Management System and their relationships.

Problem Description

A city is using the Bus Transportation Management System (BTMS) to simplify the day-to-day activities related to the city’s public bus system.

The BTMS keeps track of a driver’s name and automatically assigns a unique ID to each driver. A bus route is identified by a unique number that is determined by city staff, while a bus is identified by its unique licence plate. The highest possible number for a bus route is 9999, while a licence plate number may be up to 10 characters long, inclusive. For up to a year in advance, city staff assigns buses to routes. Several buses may be assigned to a route per day. Each bus serves at the most one route per day but may be assigned to different routes on different days. Similarly, for up to a year in advance, city staff posts the schedule for its bus drivers. For each route, there is a morning shift, an afternoon shift, and a night shift. A driver is assigned by city staff to a shift for a particular bus on a particular day. The BTMS offers city staff great flexibility, i.e., there are no restrictions in terms of how many shifts a bus driver has per day. It is even possible to assign a bus driver to two shifts at the same time.

The current version of BTMS does not support the information of bus drivers or buses to be updated – only adding and deleting is supported. However, BTMS does support indicating whether a bus driver is on sick leave and whether a bus is in the repair shop. If that is the case, the driver cannot be scheduled or the bus cannot be assigned to a route. For a given day, an overview shows – for each route number – the licence plate number of each assigned bus, the entered shifts and the IDs and names of the assigned drivers. If a driver is currently sick or a bus is in the repair shop, the driver or bus, respectively, is highlighted in the overview.

