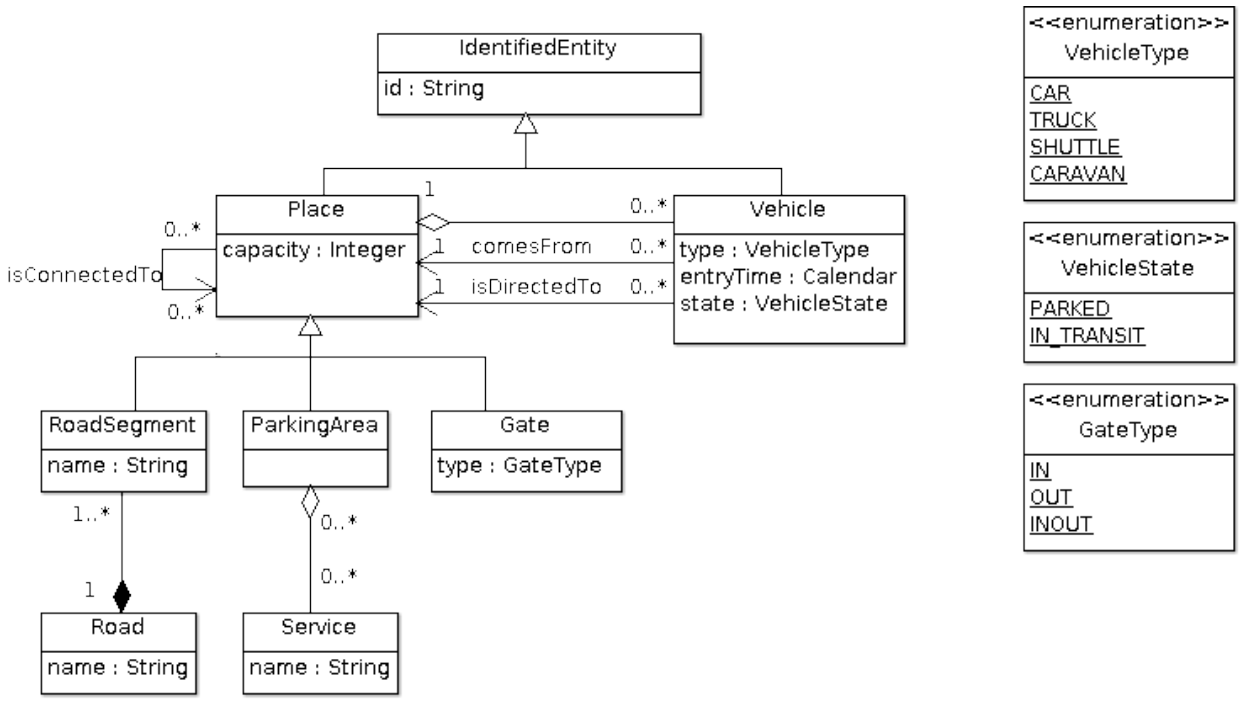
DP2 – INTRODUCTION TO THE TOPIC OF THE ASSIGNMENTS – A.Y. 2018-19

The DP2 RNS System

The DP2-RNS system is a (simplified) distributed system that provides *Road Navigation Services* for vehicles within a physical road system it manages. For example, the system can track the position of vehicles in the road system, compute travel times of vehicles, and more. No limit is set a priori about the extension of the road system, the amount of vehicles, and about the physical locations of the nodes of the distributed system (i.e. the system should scale up to world size).

The object model used to represent the state of the system is shown in the following class diagram.



The road system is represented by a number of connected places that can have vehicles inside. Both places and vehicles are uniquely identified in the system by means of a unique identifier (there cannot be two Identified entities with the same id). The identity of a vehicle is interpreted as its plate id.

A place can be a road segment, a parking area or a gate. Through gates vehicles can enter into or exit from the system. The type of a gate specifies if the gate is for entering only (IN), for exiting only (OUT) or for both (INOUT). A road segment is characterized by a name and belongs to a road, which is also characterized by a name. The road name uniquely identifies a road in the system, i.e. there cannot be two roads with the same name, while a road segment name is unique within a road, i.e. a road cannot have two segments with the same name. Note that a road segment is also an identified entity, so it also has a unique id, in addition to its name. A parking area can have any number of services, each one characterized only by a name, which uniquely identifies it (there cannot be two services with the same name).

A vehicle is characterized by a type, by the time instant when it entered the system and by a state. At any time, each vehicle is in one place, while each place can contain several vehicles. The capacity of a place

specifies the maximum number of vehicles that the place could contain at the same time. Each vehicle in the system comes from a place and is directed to another place.

The Java Interfaces for reading information about a state of the RNS system

The state of the RNS system can be accessed in read-only mode by a set of Java interfaces whose class diagram is shown below.