### ****CASE ELECTRIC VEHICLE CHARGING STATION****

The city is introducing smart Electric Vehicle (EV) charging stations to allow users to charge their cars while parked. You must write a software application to manage these charging stations.

An electric vehicle has a **unique license plate number**, which consists of letters and numbers. Additionally, each EV has a **current battery charge in kWh (kilowatt-hours)**. This value is provided in the constructor. The EV also has a **maximum battery capacity in kWh**, which varies between different vehicles and is also provided in the constructor. The battery percentage can be calculated based on these values.

A charging station consists of multiple charging slots. A **charging slot** can either be **empty or occupied** by an EV. Each charging slot has a **unique slot number**.

A **charging hub** consists of multiple charging stations. The number of stations within a hub is not fixed; more stations can always be added.

### ****ASSIGNMENT 1****

Create the class diagram based on the text above and the assignments below.

### ****ASSIGNMENT 2.1****

Based on your created class diagram, implement the software and work out the following assignments.

### ****ASSIGNMENT 2.2****

Create a method in the charging hub to park an EV into a charging slot. The slot will be selected based on its slot number. Be aware! Only one EV fits within a charging slot.

### ****ASSIGNMENT 2.3****

Create a method that returns a list of all **available charging slots** within a charging hub (so don’t print to screen!).

### ****ASSIGNMENT 2.4****

Create a method in the charging hub that returns the **first available charging slot**. Keep the following in mind:

* A slot is available if it is **empty** and should be returned immediately.
* If all slots are occupied, the following conditions apply:
  + The EV with the **highest battery percentage** will be removed first.
  + If there are two EVs with the same battery percentage, the EV with the **most remaining kWh** will be removed first.

### ****ASSIGNMENT 2.5****

Each charging hub has a **fixed power supply of 22 kW**. Create a method that returns how many **hours** it will take to fully charge all the EVs currently parked. Keep in mind that some EVs are already **partially charged**. Use the following calculation:

H = T / C​

Where:

* **H** = Total number of hours to fully charge all EVs
* **T** = Total remaining **kWh** required for a full charge
* **C** = **Charging power of the hub (22 kW)**