Introduction

VictoryRide Transport Services (VTS), a private company, specialises in providing  
transportation services to various events. Recently, it has been sub-contracted by the  
Commonwealth Games Federation to transport officials during the Commonwealth Games  
in 2022. The company now realises that it needs a modern computerised system for efficient  
and reliable management and documentation of its services. VTS needs to design and develop a database system which can meet specific requirements as described below.

Business Rules

• VTS owns a fleet of vehicles, which vary from sedans to pick up vans and box  
trucks. For each vehicle VTS records its vehicle identification number (VIN,  
composed of 17 characters containing digits and capital letters only), registration  
number, make, model, colour, current odometer.

• VTS has a need to distinguish between passenger vehicles and those which haul  
cargo – and that some vehicles are licensed to do both. For a cargo, it records its  
capacity both in cubic feet and tons, and for a passenger vehicle it stores seat  
capacity. Trucks are primarily used for carrying sports and other related items.

• Vehicles require regular maintenance and repair. When a vehicle is maintained or  
repaired the vehicle's odometer reading, the date when the maintenance or repair is  
started, the final cost, and a brief description of the action is recorded. VTS also  
records the nature of the action as Maintenance (M) or Repair (R).

• VTS maintains the list of countries participating in the Games and the major  
languages spoken in those countries. A country may have several spoken languages.  
Countries are identified by the ISO3166-1 [1] two-character codes. Similarly, VTS  
uses ISO639-1 [2] two-character codes for languages. For example, the codes for  
the country Australia and language English (EN) are AU and EN, respectively.

• Games officials from all participating countries use VTS's services. VTS records the  
name of the country that an official is representing, the official's Commonwealth ID  
(8 characters), his/her name, role at the Games (e. g. head-coach, judge, physician  
etc.) and the official's preferred languages. An official may use VTS's services  
multiple times (even during a single day); the only limiting factor is whether a  
suitable vehicle is available at the time they wish to travel.

• If an official speaks in multiple languages, VTS wants to record official's preference  
to languages, for example, 1 being the highest preferred language.

• VTS Vehicles are driven by the company's drivers. The driver's name, licence  
number (18 characters in length) and the level of clearance granted to the driver are  
recorded. The clearance levels are digits from 1 to 4 representing the security  
clearance of the driver (4 is the highest level of clearance).

• In addition, VTS records (using ISO639-1 language codes) the languages that a driver  
speaks and the driver’s proficiency in each language – some drivers speak several  
languages. The employee organising a booking will try to match the language of an  
official with that of the driver and always puts priority first to match with the highest  
preferred language of the official. If two or more drivers are matched with this  
preference, then the driver with the highest language proficiency is given priority. If  
a driver is not available with any preferred languages of the official, it is up to the  
official if he/she still wants to travel with the available driver at the time.

• Before using a vehicle, it must be booked. This booking will take place via a  
computer program to be created; you are not concerned with this program.  
However, the back-end database needs to support such an activity. Transport  
bookings require the assignment of a suitable driver to a suitable vehicle matching  
the needs of the official. The intended start date and time and projected end date  
and time are recorded when a booking is first placed. The pickup location and drop  
off location are also recorded.

• Locations are specified using its address (street number, street name, suburb, state  
and post code) and type (Hotel, Airport, and Aquatic Centre, etc.).

• After the completion of a trip, the booking reference number, the actual start date  
and time and actual end date and time are recorded. VTS also records the start  
odometer reading and the end odometer reading.

• To assist vehicle assignment, VTS requires that the new system be capable of  
indicating whether a vehicle is currently available. The vehicles that are out on a  
trip or out of service due to maintenance or repair should be flagged as not  
available.