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1. In not more than 500 words, write a summary explaining the requirements that could have led to the class diagram in Figure 1.

Robot Entrise is about to be listed on the Jamaica Stock Exchange as the leading robot taxi services company. They've made over 500 million dollars in revenue up to 2022. The enterprise, like any, consists on people, these people are called the users. The users can be either an administrator, driver, owner or customer, all of these are considered roles withing the Robot Enterprise. A person with the role of a driver, can drive up to many vehicles as they want, but can only driver 1 vehicle at a time physically. A vehicle being driven by a driver has a capacity that cannot be exceed, has a status (approved, denied, retired or suspended for driving), and has information whether they are active or not on the road. Each vehicle on the enterprise must have an owner where the owner must verify a vehicle driver, therefore, a driver and a owner cannot be the same person. The verification information for a vehicle driver states whether they are verified for driving, and also if they are working. A vehicle on the other hand, can go on more than one journeys, which are recorded chronologically for a specific date. However, a vehicle can only be on one journey at a time. And on each journey the customers are included with driver, as the number of persons are recorded.

List of requirements:

1. Manage vehicles: Each vehicle may be associated with several drivers or may not have a designated driver at all. There is at least one owner for every car. Users are able to modify robot vehicles that have been allocated to journeys thanks to this requirement.

2. Manage journey- Every journey is related to a single robot vehicle. Drivers and customers place orders for journeys. Each trip has a single customer and a single driver. Users are able to update the journey using this criterion, which includes cancelling it, changing the driver, or initiating a journey.

3. Manage Robot Enterprise- Creates journeys and oversees users, which can be customers or drivers.

4. Drive car—This feature enables users of the robot application to take the wheel of the robot vehicle and drive it during the journey.

5. Manage People- enables the management of owners, customers, administrators, and drivers.

2. Choose ten (10) static invariants that you consider to be important that are not already enforced by multiplicity constraints in Figure 1. Give an english description for each invariant, i.e., the requirement, and the OCL specification to enforce it. Add a table to your pdf file with the answer and also ensure that the constraints and their explanations are in your .use file.

Invariant name	Description
inv drivernotcust	A driver cannot be a customer for a journey Requirement: manage people
inv journeydatevalid	Date of the journey is valid Requirement: manage journey
inv ownernotcust	An owner cannot be a customer for a journey Requirement: manage people
inv mustbefinished	In order for a driver's journey to end the journey must have a journey status of finished Requirement: manage journey
inv driverage	A driver must be over the age of 17 Requirement: manage people
inv musthaveotrstatus	A driver on a journey must have a working status of on the road Requirement: Manage People, manage journey
inv numpassengerslessthancapacity	The number of passenger should not exceed capacity of the vehicle Requirement: Manage journey, manage vehicle, drive car
inv musthaveverifieddriver	A driver on a journey must have a verified status of verified Requirement: Manage People, manage journey
inv vechstatusapproved	The vehicle's status has to be approved before a journey can begin Requirement: Manage journey, manage vehicle, drive car
inv ownerage	The owner must be over the age of 17 Requirement: Manage people

3. Figure 2 gives an alternative requirements class diagram for the Robot application. Compare and contrast it with the class diagram in Figure 1 in terms of the:
 a) advantages or disadvantages of using the one or the other

For driver, vehicle, customer, owner, & robot enterprise are all sub classes of object with journey in fig 2. This means that there is an increase abstraction withing the system; all the aforementioned entities will be able to be interchangeable with each other, which is a violation because we don't want the entities change during runtime. While it enables reuse (boost in capability), it reduces the integrity.
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b) the functionality allowed or restricted by one or the other.

Figure 1 allows for journeys to be directly ordered by customers. It also allows for drivers to be directly related to ordered journeys, while Figure 2 restricts that by making the customer and driver roles be directly related to an object of the journey. The DateTime class in figure 2 allows more functionality compared to the use of the Date object in figure 1. The DateTime class offers a number of functions to work with DateTime objects, including the ability to convert DateTime objects to strings and strings to DateTime objects, get the weekday for a specific day of the week in a specific month and set the time in hours, minutes and seconds.