# ER Diagram Description

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**Prologue:**

*The ER diagram is more about the **inner side of the system and the data** stored in it compared to the context and use-case diagrams that show the **correlation** of the system with **other actors**. That is why our diagram does not contain such entities like **a Bank, a GPS service** and **an Administration team**. Previously, these objects played roles of actors in our diagrams but they were external to the system, so we do **not** need them in the ER diagram any more. Nevertheless, all the relationships where these actors were engaged are illustrated here, just perhaps with some other entity sets. Another point, you may say that at least we could add **entity 'Administrator'** in the ER diagram. However, even if we would add it, it wouldn't have any **relationships** with other entities or it would have a relationship with the **whole system** as a relationship set (aggregation), which might be an **irrelevant** idea here.*

1. Customers have a unique cid, a name, a username, an address with a street/house/apartment line, a phone number, an email, a bank account and current GPS location. There might be situations when several people have the same address (suppose that there might be customers from the same family). *(1)*
2. Each address consists of a country, a city and a zip code.
3. Cars have a unique registration number, a car model, a rent price, a specification information and need one specific plug.
4. Each customer can rent at most one car and each car should be rented by at most one customer at some specific time. Each such act of renting should be stored in the history of records containing a unique id, a "from" and "to" dates.
5. Charging stations have a unique sid, a GPS location, a price per some amount of charge, a number of available sockets and one-to-many plugs in some amounts.
6. Plugs have a unique model, a shape, a size and a charging speed.
7. Each customer can get the nearest charging station with a distance to it. Each charging station can be the nearest for several customers. *(2)*
8. Customers can pay for charging to several charging stations, the same, each charging station can get payments from several customers. Each payment record should be stored in history with a unique number of transaction, a date/time and a price.
9. Each charging station can charge several cars, each car might get a charge in several stations. All acts of charging should be stored in the history of records with a unique id, the amount of charge and a date/time of the charge. (The history of charges could be used for reports)
10. Workshops have a unique wid, a location, an available timing and may have several car parts available.
11. Each workshop repairs several cars and each car could have been repaired in several workshops. Each act of repairing should be stored in the history of records with a unique id and a date/time of repair.

12. Providers have a unique pid, a name, an address, a phone number and a bank account.
13. Car parts have a trade name, a type, a car model for which it is used and a price. Each car part is provided by some (one) provider and is uniquely identified among provider's car parts by the trade name. If a provider is deleted from the system, its car parts won't be tracked anymore.
14. System tracks all deposits it has. Each deposit is represented by one unique bank account which is engaged in payments communications (see further).
15. Each customer can pay for renting cars to several deposits and each deposit could get payment from several customers. Each such payment should be stored in the history of records with a unique number of transaction, a date/time and a price.
16. Each workshop can place several orders to buy car parts. Each order is created by one workshop and contains a unique id, a date of ordering and a non-empty list of car parts with amounts to buy.
17. Each order is paid by one deposit of the system to one provider and only once. Each deposit can pay to several providers and each provider could get payments from several deposits. Each such payment should be stored with its transaction number, a price and a date. *(3)*

**Comments:**

1. In the previous diagrams, we had a relationship with the 'Customer' actor called 'register'. But in the ER diagram we do not have it because we suppose that, if the customer is registered, his/her personal data is already stored in the entity 'Customer'.
2. According to the prologue, we do not need here the implementation of an entity 'GPS Service' since it is an external actor. Moreover, according to the 'Keep It Simple and Straightforward' principle (KISS), the additional entity wouldn't bring any structural benefit and could create confusion.
3. As it is said in the prologue, despite the fact that we don't add an entity 'Bank' in the diagram, its relationships are illustrated using other entity sets, not involving a Bank actor.