# Application Constraints

## Customers

|  |  |
| --- | --- |
| ü | Uniquely identified by email |
| ü | Have the required attributes address, dob, and phone |
| ü | Have the attribute name composed of the optional fsname and the required lsname   * Correctly composed of fsname and lsname |
| ü | Have the derived attribute age   * Derived attribute need not present |
| ü | May initiate 0 bookings |
| ü | May initiate more than 1 bookings |
| ü | May book more than 1 cars with the same car model for the same date, and from the same location |
| ü | Date of birth (dob) must be before today (*i.e.,* NOW())   * NOW() is a function in PostgreSQL |

## Locations

|  |  |
| --- | --- |
| ü | Uniquely identified by zip |
| ü | Uniquely identified by location name (lname) |
| ü | Have the required attribute laddr |
| ü | May be for at least 0 bookings |
| ü | May be for more than 1 bookings |
| ü | May have 0 employee working   * May be changed to “*Must have at least 1 employee working*” as long as the Schema is correct * Requires cyclic FK (*hence, why it is simplified in ER diagram*) |
| ü | May have more than employees working |
| ü | May have 0 car (*i.e., car details*) parked |
| ü | May have more than 1 cars (*i.e., car details*) parked |

## Employees

|  |  |
| --- | --- |
| ü | Uniquely identified by eid |
| ü | Have the required attribute ename (*i.e., employee name*) |
| ü | Have the required attribute ephone (*i.e., employee phone number*) |
| ü | May handover the key for at least 0 booking |
| ü | May handover the key for more than 1 booking |
| ü | May receive returned key for at least 0 booking |
| ü | May receive returned key for more than 1 booking |
| ü | Must work in at least 1 location |
| ü | Must work in at most 1 location |
| ü | May be a driver |

## Drivers

|  |  |
| --- | --- |
| ü | Uniquely identified by eid |
| ü | Uniquely identified by pdvl |
| ü | May be hired by at least 0 bookings |
| ü | May be hired by more than 1 bookings |
| û | Cannot be double-booked (*i.e., booked for two different bookings on overlapping date*) where overlapping date is computed from fromdate to todate (*of hires*)   * Use **trigger (Trigger 1)** |
| ü | Can only be hired for assigned bookings (*i.e., bookings with assigned car details*)   * Assigns as aggregate |
| ü | When hired, the attribute ccnum must be recorded   * In Hires, ccnum is declared with NOT NULL |

## CarModels

|  |  |
| --- | --- |
| ü | Uniquely identified by brand and model |
| ü | Have the required attributes capacity, deposit, and daily |
| ü | May be rented by at least 0 bookings |
| ü | May be rented by more than 1 bookings |
| ü | May have at least 0 car details |
| ü | May have more than 1 car details |

## CarDetails

|  |  |
| --- | --- |
| ü | Uniquely identified by plate (*i.e., license plate number*) |
| ü | Have the required attributes color and pyear (*i.e., production year*) |
| ü | Must be a detail for at least 1 car model |
| ü | Must be a detail for at most 1 car model |
| ü | Must be parked in at least 1 location (*i.e., when not being rented*) |
| ü | Must be parked in at most 1 location (*i.e., when not being rented*) |
| ü | May be assigned to at least 0 booking |
| ü | May be assigned to more than 1 bookings |
| û | Cannot be double-booked (*i.e., booked for two different bookings on overlapping date*) where overlapping date is computed from sdate to edate (*of bookings*)   * Use **trigger (Trigger 2)** |
| ü | Car details handover must be during or after the car is assigned (*i.e., no entry in handover before assigns*)   * Assigns as aggregate |
| ü | Car details return must be during or after the car is assigned (*i.e., no entry in returned before assigns*)   * Assigns as aggregate |
| ü | Car details return must be during or after the car handover (*i.e., no entry in returned before handover*)   * Can be enforced by a foreign key from Returned to Handover |
| û | Car details handover must be by the same employee working in the same location as specified in bookings   * Use **trigger (Trigger 3)** |
| ü | The ccnum used to initiate booking may be different ccnum used to pay excess for return |
| û | The car (*i.e., car details*) assigned to the booking must be for the car models rented by the booking   * Use **trigger (Trigger 4)** |
| û | The car (*i.e., car details*) assigned to the booking must be park in the same location as the booking   * Use **trigger (Trigger 5)** |

## Bookings

|  |  |
| --- | --- |
| ü | Uniquely identified by bid |
| ü | Have the required attributes sdate and days |
| ü | Have the required attribute ccnum and bdate (*booking date*) when initiated by a customer |
| ü | Have the attribute ccnum and cost (*required*) when returned by a customer |
| ü | Have the derived attribute edate   * Derived attribute need not present |
| ü | Must be initiated by at least 1 customer |
| ü | Must be initiated by at most 1 customer |
| ü | Must rent at least 1 car model |
| ü | Must rent at most 1 car model |
| ü | Must be for least at 1 location |
| ü | Must be for most at 1 location |
| ü | May be handovered by at least 0 employee |
| ü | Must be handovered by at most 1 employee |
| ü | May be returned to at least 0 employee |
| ü | Must be returned to at most 1 employee |
| ü | May be assigned at least 0 car (*i.e., car details*) |
| ü | Must be assigned at most 1 car (*i.e., car details*) |
| ü | May hire at least 0 driver |
| ü | Must hire at most 1 driver |
| ü | ccnum is required in return if the cost is positive (*i.e., more than 0*)   * Not mentioned in P02.docx is that cost in Returned can be computed by ((daily days) – deposit) but this requires **triggers** * **Procedure 3** |
| û | The fromdate and todate for the hiring of driver (*if any*) must be within sdate and edate   * Use **trigger (Trigger 6)** |
| ü | The booking date (bdate) must be before sdate |