Assignment 1 - CIS4301, Fall 2019

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- **Due Date:** Wednesday, September 18, 2019 at the beginning of class
- **Submit in Class**
  –You don't need to upload anything for this assignment.
- **What to include:**
  –Your ER model.
  –Typeset relational model and constraints.

1. Problem Description

You work for the software company Database Solutions. A hotel chain, Five Star Hotels, has hired your company to develop its new hotel management software. You've been tasked with developing a database schema for the database that will drive the software's backend. As an experienced developer you know a good ER diagram is helpful when making a schema. So you set about drawing up a diagram based on your client's specifications.

- Each guest has a name, address, zip code, phone number, and ID number.
- Each guest has one credit card and each credit card is associated with 1 guest. A credit card consists of a card number, security code, and expiration date.
- The hotel has multiple locations. Each location has an address, zip code, phone number, and hotel ID number. A guest may reserve a room if the room is available at the requested date and time. A room is identified by its room number. A room has a type: single, double, twin, or suite.
- Each guest has a reservation. A reservation consists of a check-in date and time, a check-out date and time, and an ID. A guest must have at least one reservation. A reservation is connected to 0 or more rooms. Guest's visits don't always go as planned. Guests may over-stay or under-stay their reservation. Closely related to a reservation is a stay. A stay includes the guest's reservation ID, the initial reservation dates as well as the actual date and time the guest checks-in and checks-out of the hotel, and a fee. Each stay is also connected with one or more rooms, but not necessarily the same rooms as the reservation.
- The hotel charges for amenities. Amenities include room service, wake-ups, in-room movies, and in-room snacks. Amenities are associated with a room. An amenity includes the amenity's name, date and time, fee, and ID.

- A room may have maintenance issues. Each room's issue is identified by a unique ID. The date and time the issue was discovered, the date and time the issue was repaired, and the estimated fee are also recorded. If a room is found to be damaged after a guest checks out, the estimated fee is added to the guest's bill.
- At checkout an itemized bill is generated for each guest. A bill includes the date and time, invoice number, and total.

2. Task I (50%)

Draw an ER diagram that meets your client's specifications. You can draw the diagram on paper or computer. Make sure you capture all relevant constraints.

3. Task II (50%)

(40%) Convert your ER diagram to an equivalent instance of the relational model. The correctness of this part will be based on its faithfulness to your original ER diagram. Simply list all of the resulting relations one at a time. Each relation should be of the form:

RELATION_NAME (att1, att2, att3 (fk: references REL2.att6), att4, att5)

Be sure to combine relations from ONE-MANY and ONE-ONE relationships with an appropriate entity. Indicate the conversion method used for any IS-A entities shown in the ER diagram. Be sure to underline key attributes and clearly indicate all foreign keys.

(10%) Include a list of 3 semantic integrity constraints, specified in English. You only need to list the semantic integrity constraints that are directly specified by the ER model, but are not enforced by the keys and foreign keys given along with the relations.