Department of Computer Science
2nd year Professional Bachelor's degree
Networks and Web Technologies

Advanced Database

- *February 21st, 2025*

Database Modeling With UML

Exercise

The owner of a hotel chain wants to set up a reservation website for booking rooms in its hotels. Each hotel is categorized by the number of stars, has a specific number of rooms, and an address. The hotels offer three room categories: economy, comfort, and premium comfort, each with corresponding rates. Each room has a unique number and a specific capacity for accommodating a certain number of people (x). A room cannot accommodate more people than its capacity, except for one child under 2 years old per room.

A person wishing to book a room in a hotel must provide the check-in and check-out dates, the desired room category, and the expected number of occupants for the room (including whether a child under 2 years old will be present). A reservation must cover at least one night. The price of the reservation is calculated by multiplying the rate of the selected room category by the number of nights. To finalize the reservation, the person must provide the name and email address. Once all the required information is submitted, the reservation is recorded and assigned a unique number. It is then marked as pending validation by the hotel manager.

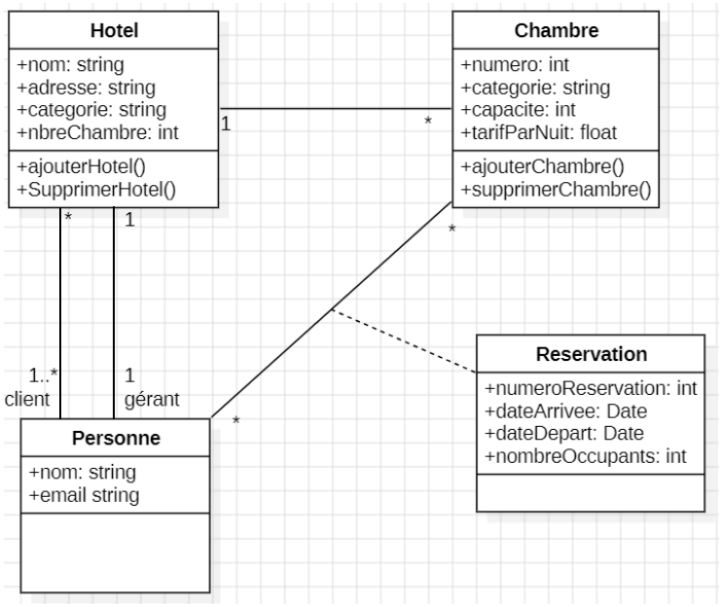
An email is sent to the client summarizing his reservation and including a link to its reservations history (in other words, all reservations associated with this email address). A reservation applies to only one room at a time. To book multiple rooms, the client must make separate reservations. Using the link provided in the reservation confirmation email, a client can cancel a reservation up until the day before the check-in date (inclusive). After this deadline, the reservation can no longer be canceled.

The manager of each hotel personally oversees room assignments for its clients and reviews new reservation requests daily. For each pending reservation, the manager decides whether to accept or reject it. A reservation is accepted by assigning it to a specific room within the requested category, provided that a room is available for the desired dates and has sufficient capacity. If no room in the requested category is available, the manager rejects the reservation. Regardless of whether the request is accepted or rejected, the client is notified of the manager's decision via email.

The client pays for his reservation upon arriving at the hotel to collect the keys to his reserved room. The manager records reservation payments in the system as clients arrive. The owner supervises the managers and the various hotels in the chain. A hotel manager cannot make a reservation as a client. Additionally, anyone interacting with the site must authenticate themselves before accessing its various functionalities.

Questions:

1. A first modeling is provided by the following class diagram:



- Identify and correct the modeling errors in this class diagram.
- Is it possible to provide a second modeling of the association class? If yes, explain your answer?
- Is it possible to add two classes, Client and Manager, as subclasses inheriting from Person? Justify your answer.