Introduction to Databases
Homework n. 3 - ER

A company that owns cruise ships wants to design a database for managing scheduled trips and related services offered by its ships.

- The cruise ships of the company are identified by ship code and characterized by name, capacity (number of passengers who can be accomodated), and sizes (height, width, and depth). Every cruise ship offers on-board commercial services, which are available to passengers to spend their free time. Every commercial service is characterized by name, category of sold items, and identification number.
- Each cruise ship offers to passengers the chance to make daily visits in the docking cities. The docking cities, identified by alphanumeric code, are characterized by name, geographical coordinates, and number of citizens. Visits are identified by a code unique for each cruise ship and are characterized by the visited docking city, date, arrival and leaving times at the harbor, and a list of available touristic attractions.
- Passengers are characterized by social security number, name, surname, age, gender, phone number (whether available), and email address. Passengers can be either customers or staff members. For the customers, it is known whether they own a fidelity card, while each staff member is characterized by the enrolment date.
- Roles are assigned to some staff members. Each role, identified by a code, is characterized by a description. For each staff member, it is required to keep track of the periods (described by starting and ending dates) in which each role has been assigned. Assume that to each member multiple roles can be assigned in the same period or the same role can be assigned in different periods.
- Customer stays on board of a cruise ship are characterized by starting and ending dates, by leaving and arrival cities (docking cities of the cruise ships owned by the company), and by the overall price. Notice that a customer can make multiple stays on the same cruise ship or on different ships, but in different periods.

1. Describe the conceptual schema of a database for the above application by means of an ER diagram.
2. Derive a normalized relational logical schema for the same database.
3. Define referential integrity constraints for 3 relations of your choice among those defined in the conceptual schema.