Laboratory 4
Database design and writing SQL queries

Goal

The objective of this laboratory activity is the creation of a relational database, starting from conceptual design to the population of tables and manipulation of the entered data.

Exercise 1: Conceptual Design

You are requested to design the database for managing reservations for a hotel chain. Describe the Entity-Relationship diagram addressing the following specifications using DESIGNER.

The database must contain a list of rooms available for reservation. Each room is identified by a unique number, and are characterized by the floor, the surface area in square meters, and the list of amenities available (minibar, jacuzzi, balcony, etc.). The rooms can be single, double, triple, or suite. Among the different rooms available, for the suites is known the list of available spaces (bedroom, dining room, living room, etc.).

The database must contain a list of travel agencies, identified by an alphanumeric code and characterized by their address (street, number, ZIP code, city and state), telephone number and website (if available). You want to keep track of all the bookings stipulated by the various travel agencies for each room.

Different reservations may have been made for the same room, with the same travel agency or with different travel agencies. A reservation is characterized by a start date and an end date, a daily price. A room can only have one reservation in the same period of time. Each reservation is associated with a single room and a single agency.

Exercise 2: creation of the database

Starting from the conceptual scheme created on DESIGNER, carry out the restructuring of the database until the generation of the script necessary to create the tables. DESIGNER in the current version supports the following standard data types: TEXT, INTEGER, VARCHAR, REAL, NUMERIC BLOB. The script can be further edited as needed. After editing the script, load and run the code on ORACLE APEX (https://apex.oracle.com/en/) and verify that the database has been created correctly.

Exercise 3: population of the database

Populate the database with elements that reflect the following descriptions:

1. An AGENCY with code 1 located in Via Stretta 12 in Milan, with ZIP code 1234, telephone number 070-123456 and whose website is www.ag1.it.

2. An AGENCY with code 2 located in Via Corta 24 in Rome, with ZIP code 2345, telephone number 070-234567 and whose website is www.ag2.it.

3. An AGENCY with code 3 located in Via Lunga 12 in Naples, with ZIP code 3456, telephone number 070-345678.

4. A single ROOM on the first floor of 20sqm with code 1.

5. A double ROOM on the second floor of 30sqm with code 2.

6. A SUITE on the third floor of 40sqm with code 3.

7. A RESERVATION for the room with code 1 made by the agency with code 1, starting from January 1, 2023 until January 10, 2023, at a cost of € 100.

8. A RESERVATION for the room with code 2 made by the agency with code 2, starting from the first January 2023 until January 10, 2023, at a cost of € 200.

9. A RESERVATION for the room with code 2 made by the agency with code 2, starting from 12 January 2023 until 17 January 2023, at a cost of € 110.

10. A RESERVATION for the room with code 3 made by the agency with code 2, starting from 13 January 2023 until 17 January 2023, at a cost of € 170.

11. A RESERVATION for the room with code 3 made by the agency with code 3, starting from February 1, 2023 until February 5, 2023, at a cost of € 200.

12. A RESERVATION for the room with code 3 made by the agency with code 3, starting from 6 February 2023 until 7 February 2023, at a cost of € 50.

In addition, the rooms have the following features:

- The room with code 1 has a balcony. 1
- The room with code 2 has a balcony, a minibar and a jacuzzi. 2 3
- The suite with code 3 is divided into bedroom, bathroom, kitchen, and dining room and has a minibar. 1 2 3 4

Exercise 4: data manipulation

After populating the database, write SQL commands to make the following changes to the inserted elements.

1. Update the phone number of the agency with code 1 to "0987654321".

2. The room with code 1 has become a double room of 30sqm.

3. Update the reservation for the room with code 1, changing the start and end date of the reservation to 10 January 2023 until 20 January 2023, and the cost to € 400.

4. The reservation from 12 January 2023 until 17 January 2023 for room 2 has been cancelled.

5. All bookings with a start date after 12 January 2023 and whose duration is less than 5 days have been cancelled.

Exercise 4: SQL queries

Write the following queries in SQL language:

1. Show the number of reservations for each room.
2. Show the number of rooms, per type, for which no reservations have ever been made.
3. Show for each month the code, floor, surface, and type of the room with the highest average monthly cost.