Databases Project

NFC-enabled access to hotel rooms and services

A large hotel facility, the ASDF Palace, provides hospitality services managing rooms and restaurants, bars, gyms, meeting rooms, etc. H The company is already making successful steps in the digital transformation of its operations. Under the threat of the COVID-19 pandemic, the company is implementing all protocols for the safety of staff and visitors and at the same time the management wishes to take additional measures to minimize risks and health impacts to employees and visitors, as well as in taking timely measures by the company in the event of an outbreak. The goal is to minimize customer contact with shared switches and handles, doors and lifts, and to avoid transactions (by credit card, credit card, etc.). or cash) for the use of hotel services. In the event that any of guest is found to be positive, immediately trace the movements of the guest and his/her contacts so that the most probable problems can be dealt with in a timely manner. cases of virus spreading.

Specifically, upon arrival at the reception and at check-in:

α. The customer's card is created, which includes the name, surname, date of birth, identification document number (passport or identity card) and issuing authority, date and time of arrival, room, and the customer registers for the services he/she wishes to use and which are provided by the hotel. Among the types of services provided by the hotel the hotel does not require registration for the services 'bar service', 'restaurant service' and 'hairdressing services', while the services 'use of the fitness centre', 'use of the sauna' and 'use of the meeting room' do not require registration for the service.

During the client's stay, the client's tab is updated with any additional services or changes to the services for which he/she has registered, as well as with the charging of services provided.

β. An NFC-enabled bracelet is delivered to the customer, which corresponds the user with a unique identity and which will act as a key to all areas, rooms and rooms rooms and services enjoyed by the customer.

The bracelet is now the unique way for each customer to enter and exit the room they are staying in as well as to access every area of the hotel such as lifts, corridors, restaurants, leisure areas, bars, work or meeting rooms, gyms, saunas and hairdressing salons as well as to use the services provided in these areas. The footprint of each customer entering and leaving a hotel room shall be recorded in an information system. At the same time, each time a customer uses the services, the bracelet is read by a reader and the corresponding charges are made directly to the customer's card.

As an example, consider that the hotel has 400 rooms spread over 5 floors of rooms, accessed by 4 different corridors per floor (north, east, south and west) and served by 5 elevators. On the ground floor, now the reception area, there are also 6 bars, 4 restaurants, 10 meeting rooms, 4 gyms, 10 saunas and 1 hairdressing salon. Through the bracelet, the entry and exit of customers from all these areas is recorded.

In addition, the bracelet, for each customer, provides access according to the room they are staying in and the services they have subscribed to. For example, a client staying in a 2nd floor room located on the east corridor and registered for the "sauna use" service, will only

have access to that floor and corridor, as well as to all sauna areas, but will not be able to use the gym or meeting room. Similarly, if the customer has subscribes to the "use of the gym" service, he/she is granted access to all the hotel's gyms. Access to the reception area, bars, restaurants, restaurants, etc.

and the hairdressing salon are unobstructed and simply recorded.

Based on the above information you are asked to implement a storage system, management and analysis of the information gathered and the related application. More specifically you need to:

1. Draw the ER diagram resulting from the above description. The diagram will be delivered independently and ahead of the rest of the project.

2. Draw the relational diagram corresponding to the ER diagram that is to be delivered in advance of the project delivered or to be delivered after the deadline for delivery of your ER diagram.

3. Develop the DB that the application will use based on the choice you have made for the ER diagram between your own and the proposed solution. Define all the necessary constraints to ensure the correctness of the DB. These are integrity constraints, keys, referential integrity, value field integrity and user-defined constraints. SQL updates. Data insert, update and delete should be allowed for tables in the DB based on the referential integrity constraints defined in the previous step.

4. Enter information into the DB for each of the entities. In the DB you should There should be sufficient data to ensure that all queries are successfully executed and return the appropriate information.

5. Define at least three appropriate indexes for the tables in the DB and justify your choice based on their usefulness for the queries in the which they are used.

6. Development of a suitable User Interface. The User Interface should be user friendly, no SQL or database knowledge should be required from the user and all requests should be given by appropriate forms within the application. Where necessary, appropriate elements such as drop-down lists, radio buttons and others should be used. Through which a user will be able to viewthe following queries. (For this question, the connection between the database and the interface will be evaluated, not the quality of the interface).

7. All services available and all visits made by customers based on multiple criteria, to select the service of interest and see visits made there. These criteria should be the date of interest, the type of service and the cost of the service. These criteria should be aindependent, not all of them should be required and the list that the user sees should be updated with each variation in the selection.

8. The user should still be able to see two views (views of the relational model), one with sales by service category and one with customer data.

9. Given that a particular bracelet holder tested positive for COVID-19, which areas did he use and at what times during his stay at the hotel.

10. Which other hotel guests are likely to have been infected based on the fact that they were with the affected guest in a particular area at the same time or a little later (e.g., up to an hour) than the time he was found.

11. In addition it is useful to be able to answer for health reasons by age group (20-40, 41-60, 61+), last year and last month:

-Which are the busiest places.

-What are the most frequently used services.

-What are the services used by the most customers?