



Design and Creation of a Mobile Application for Hotel Reservation

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DOI: <https://doi.org/10.55248/gengpi.4.1223.123433>

Summary

This work is summarized as consisting of developing a mobile application under the ANDROID operating system, the coding was done using the Java programming language, the modeling using UML. The creation and management of the database using PHP and SQL.

The application allows the customer to reserve a room in a hotel online and facilitate the work of agencies

Keyword: Hotel management, Application, Database, UML, SQL

GENERAL INTRODUCTION

Recent years have seen considerable progress in the use of smartphones thanks to mobile applications. The mobile application sector is growing and has not yet reached its full potential. Our project is setting up a mobile application for online hotel reservations made in Android for customers and a website for travel agencies.

The app should be easy to use and meet conventional standards for mobile apps. We used Android development tools, “UML” as a modeling method and “MySQL” as a database management system.

I: RESEARCH CONTEXT

This chapter is an introduction to the hotel reservation platform among the best known by consumers and the operation of online reservation centers, and the basic theoretical notions surrounding the term tourism.

1.1. Computer reservation system

Computer reservations systems (CRS) make it possible to reserve a resource or service over time for a person or a group. These systems are integrated into the areas of real estate (room, conference room, tennis court, conference room), transportation (car, train, boat, plane), tools (saw, crane) under form of provision (rental, loan) from a specific time slot with, depending on the case, as an option, the use of the services of one or more people. These management systems used internally in the form of software can, depending on the field, be directly accessible to non-professionals thanks to the development of web servers accessible from a browser. These systems manage the movement of people or objects according to a common schedule unlike a diary.

1.2. Hotel reservation platforms

A customer who wishes to reserve a hotel room today has several reservation channels available to him. He can obviously call the establishment directly. This is the traditional way. It is also possible, in just a few clicks, to make your reservation directly on an online reservation platform. It's the future.

These platforms are generally websites that allow customers to search for an establishment by name, region, style or price range, for example, and make a reservation there. They therefore act as intermediaries for the hotel or restaurant and receive a commission for this service.

1.3. Some PLATFORMS among the best known by consumers:

Above all, it is important to distinguish between two types of site, namely reservation systems and referencing sites. Here is a short list that should help you see things clearly:

1.3.1. SEO sites

The consumer can do a search using different criteria and make their choice based on the comments that other Internet users have left or the rating given to the establishment by the site. Some of them use widgets to direct the customer who wants to reserve a room to the reservation system.

Examples in the hotel industry: Trivago, TripAdvisor, mygo, youcefbooking



1.3.2. Reservation systems

These are applications that allow, on the one hand, establishments to manage their room availability online and, on the other hand, consumers to book through a computer or smart mobile device at the time that suits them. They can also make changes to their reservation later, depending on the site. An automatic confirmation is sent to them as well as a reminder before the event.

Examples in the hotel industry: Hotels.com, Expedia.ca, Agoda, booking.com, bonjourquebec.com.

1.3.3. How online reservation centers work

There are central online reservation operating models:

The Merchant model: The online agency buys bed rest from the hotel, i.e. a number of rooms, at a net price. To this net price, the agency adds its own margin. The customer who books through this agency will therefore pay for their entire stay upon reservation. Some agencies send the hotel a credit card to be charged upon departure. Others pay the hotel 30, 45 or 60 days after the customer's departure. Some give a guarantee to the hotel, others do not. Example: Hotels.com (Expedia)

The commission model without online payment: The agency publishes on the Internet the price that the hotel indicates on its extranet. The customer who reserves online provides a credit card as guarantee of the reservation. The agency transmits this financial data to the hotel at the same time as the reservation data. The customer pays directly to the hotel. At the end of the month following the client's departure, the agency sends the hotel a summary commission invoice³⁴ which the hotel must pay quickly. Example: Booking.com

(Price line).

Internet the price that the hotel indicated on its extranet. The customer who books online pays a deposit, corresponding to the amount of the agency's commission. The agency transmits the customer's credit card details to the hotel at the same time as the reservation data. The customer pays the balance of their stay directly to the hotel. At the end of the month following the client's departure, the agency sends the hotel an invoice paying the commission. Example :

Venere.com (Expedia) We have just taken an overview of the power plants of online booking. We can now focus on the relationships between customers, hoteliers and these reservation centers.

Nowadays, traveling or moving around has become a daily routine for the majority, so for it to be possible to take advantage of good deals and promotions, you must above all look for agencies, consult several, and compare their prices, all this is done in move around which is sometimes unnecessary and a huge waste of time. How do you make a reservation when you're remote?

II: ANALYSIS AND DESIGN OF THE APPLICATION

Before starting to code the application part, we are interested in the specification phase to clearly define and clarify the main functionalities of our application. This chapter consists of giving a precise definition of the functional and non-functional needs as well as the objectives sought for the mobile application and the website.

II.1. A MODELING PROCESS WITH UML

The UP process is based on UML as a modeling language.

2.1.1. UML (Unified Modeling Language)

UML is defined as a graphical and textual modeling language intended to understand and describe needs, specify and document systems, sketch software architectures, design solutions and communicate points of view.

2.1.2 Different types of UML diagrams

UML is now built around 13 different diagrams, including four new diagrams introduced by UML 2.0. Each of them is dedicated to the representation of a software system from a particular point of view. Furthermore, UML models the system according to two modes of representation: one concerns the structure of the system taken "at rest", the other concerns its operating dynamics. The two representations are necessary and complementary to schematize how the system is composed and how its components work together.

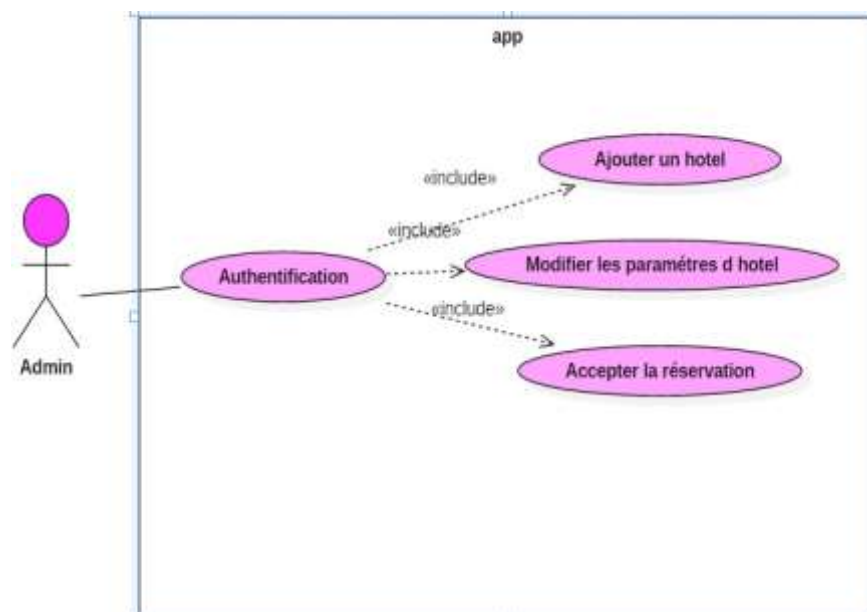
2.1.3 Types of UML diagrams

In our project we will only use the following diagrams:

2.1.3.1 Use case diagram:

The Use Case Diagram represents the structure of functionality needed by system users. It is used in both stages of capturing functional and technical requirements.

Administrator" use case diagram:

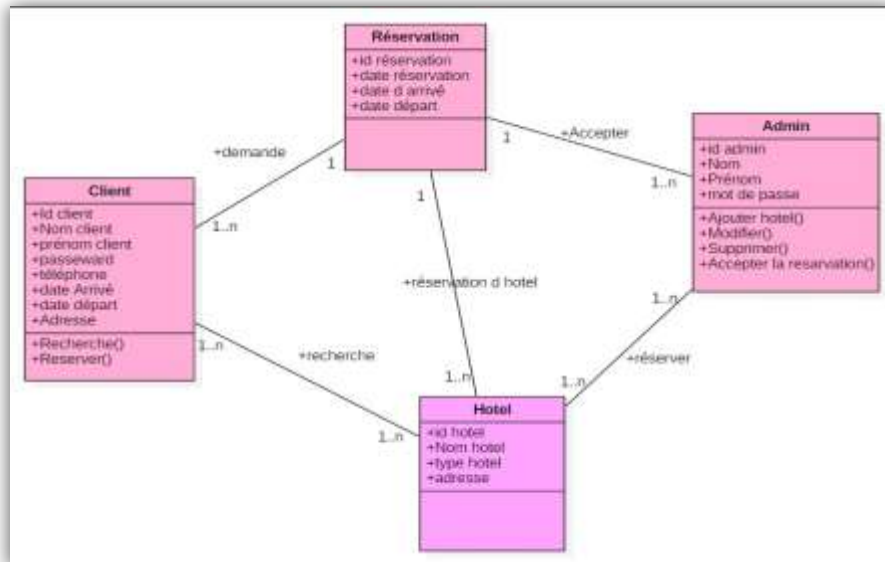


Customer" use case diagram

Authentication is an essential task in order to limit access and secure our application. The different interactions are represented by the sequence diagram

2.1.3.2 Class diagram:

Class diagram has always been the most important in all object oriented methods. It is also the one which contains the greatest range of notations and variants centralizes the organization of design classes, it is the one which is most easily transformed into code.



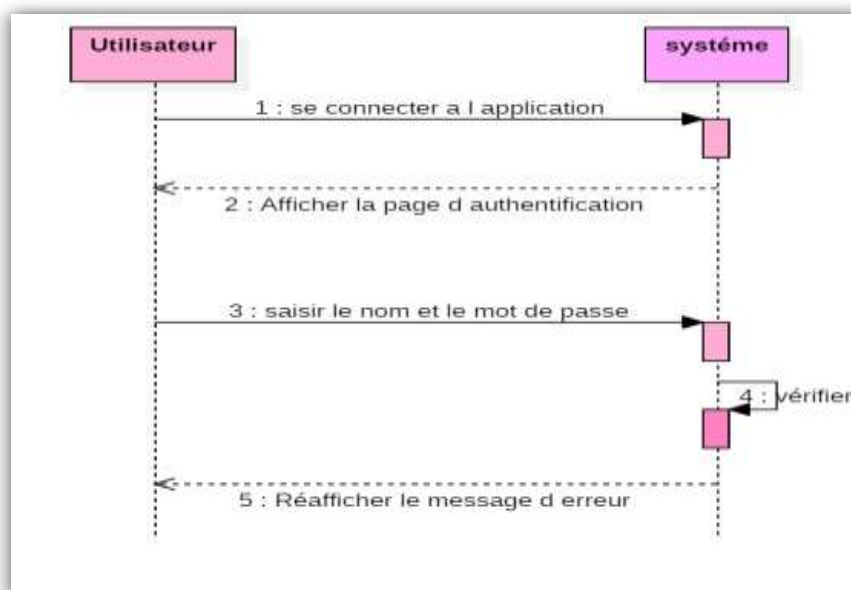
Authentication is an essential task in order to limit access and secure our application.

The different interactions are represented by the sequence diagram

2.3.3 Sequence diagram:

Sequence diagram is an interaction diagram, it represents the exchange of messages between objects, within the framework of a particular operation of the system. They are then used to develop analysis of the system use scenarios.

Authentication" sequence diagram



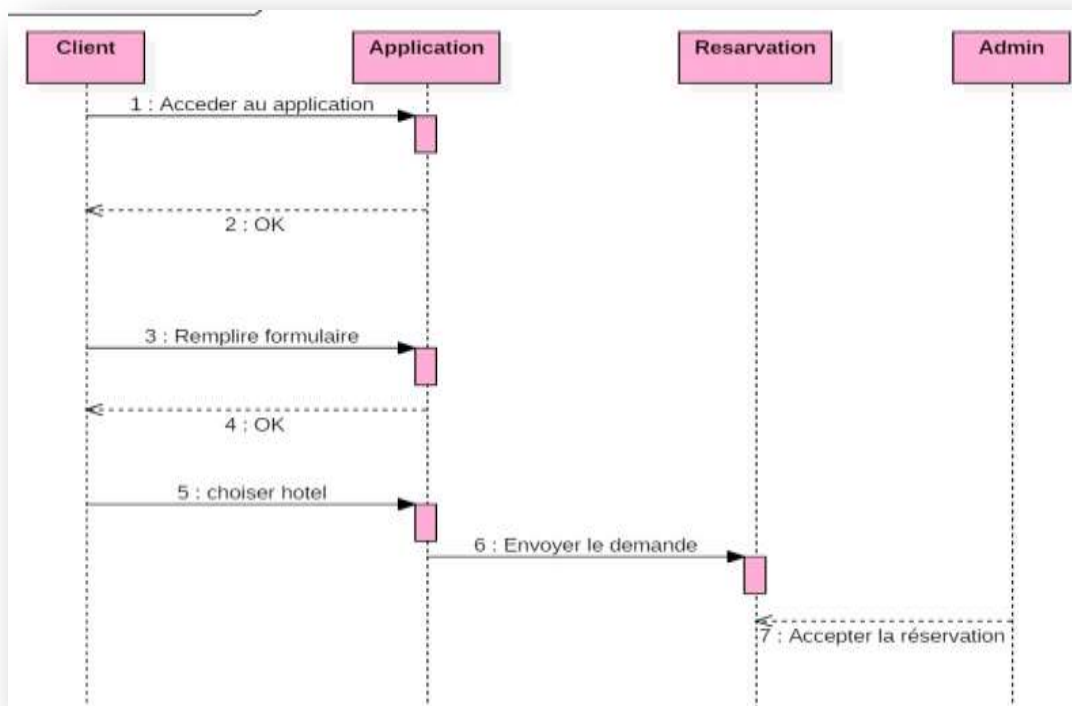
Complete sequence diagram

The diagram below presents the different stages of the application process. First, to make the reservation, the customer must launch the application. The first step is access to the application through their email address and password. After that, a window is displayed to fill out the reservation form, such as hotel city, departure and arrival date, etc. Then he sent the request.

The next step is between the system and the administrator; after the reservation request, the administrator must confirm or cancel it.

3. THE DATABASE

After analyzing and designing our application, we were able to create the different tables in the database. For this creation we used the SQL language under the XAMPP SERVER environment.



3.1SQL:

SQL (Structured Query Language) is a structured query language that allows you to define and manipulate data. This language is the most used in database management because:

- It works with relational databases.
- Compatible with most programming languages and tools.

3.2 Creation of the database:

As we have already mentioned, we used "XAMPP SERVER" to build the database tables, each of these tables has its own attributes. Here is an example of creating the „user“ table on „XAMPP SERVER“:

III: REALIZATION AND IMPLEMENTATION

In this chapter we arrive at the description of the practical aspect of our work. In the description of our project which follows, we will focus on the visual side (the interfaces) in order to show its ease of use which was a main objective for us. Indeed, we have tried to design an intuitive and practical interface. We also describe in this chapter all the technological means used in the development of our project for the mobile application and the website.

3.1. THE MACHINE ENVIRONMENT:

“OPPO F5 YOUTH” SMARTPHONE

- System type: Android 7.1.1 • RAM: 3 GB.
- Storage: 32.0 GB

– “CONDOR M1” SMARTPHONE

- System type: Android 7.0 • RAM: 3GB.
- Storage: 32.0 GB

–HP ELITEBOOK

- System type: Windows10 64bits • Hard disk: 500GB.
- RAM: 4GB.
- Processor: I5

3. 2. THE SOFTWARE ENVIRONMENT

While developing this app, we used the following software tools. XAMPP Server, Android Studio. We will present these different software in the following section:

3.2.1 XAMPP

XAMPP is free open source software developed by friends

Apache. The XAMPP software package contains Apache distributions for Apache server, MariaDB, PHP and Perl. And it's basically a local host or a local server. This local server runs on your own desktop or laptop computer. You can simply install this software on your laptop or desktop computer and test the clients or your website before uploading it to the remote web server or computer. This XAMPP server software provides you with a suitable environment to test MYSQL, PHP, Apache and Perl projects on the local computer. The full form of XAMPP is X stands for cross-platform, (A) Apache server, (M) MariaDB, (P) PHP and (P) Perl. Cross-platform generally means that it can run on any computer with any operating system. MariaDB is the most famous database server developed by the MYSQL team.



3.2.2 MAIN TOOLS OF XAMPP

XAMPP contains tools such as Apache, MYSQL, PHP and Perl. We will see about these tools.

1. APACHE

Apache Server is free open source software which is initially developed by a group of software developers and now it is maintained by Apache Software Foundation. Apache HTTP is a remote server (computer) if someone requests files, images or documents using their browser, it will serve those files to clients using HTTP servers. Mainly hosting companies use this application to create VPS server and shared hosting for their clients.

2 MYSQL

MYSQL is open source software. It is actually a relational database management system (RDBMS). This SQL stands for structured query language. It is the most popular and best used RDBMS for developing a variety of web-based software applications. With the help of MYSQL, it is possible to organize information, manage, retrieve and update data whenever you want.



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3.2 ANDROID STUDIO

Android Studio is a new fully integrated development and programming environment that was recently launched by Google for Android systems, it was designed to provide a development environment and an alternative to Eclipse which is the most widely used IDE. Android Studio allows you to see each of the visual changes you make on your application and in real time, you will also be able to see its effect on different Android devices.

Android Studio also has other things:

- A robust development environment.
- A simple way to test performance on other device types.
- Wizards and templates for common items found on all Android programmers.
- A complete editor with a range of tools to accelerate the development of your application.



4. THE ENVIRONMENT PROGRAMMING LANGUAGES USED

4.1 STRUCTURING LANGUAGE OF WEB PAGES

➤ HTML

HTML and its stricter variant XHTML are markup languages for web pages. Not so long ago, HTML was used to define both the structure of pages and their visual presentation. Today, these two aspects must be very distinct and X/HTML is intended only to represent the structure of a page: titles, subtitles, paragraphs, images, input forms, hypertext links, etc. It is the basis of a web page, sometimes the only one considered and used by the software that visits that page, such as search engines or text browsers. We qualify as "static" pages whose X/HTML code is not modified by JavaScript or PHP before or after display in the browser.



4.2 PRESENTATION LANGUAGE OF WEB PAGES

CSS

The CSS code (Cascading Style Sheets) allows you to modify the presentation of X/HTML elements: color, size, font, but also position on the page, width, height, stacking, in short everything which affects the layout of an X/HTML document.

Thus, the same X/HTML document can change its appearance without changing its structure, thanks only to the modification of the CSS rules applied to it. The separation of structure and presentation thus facilitates the construction, but also the maintenance and evolution of web pages.



PHP

The full form of PHP is the hypertext preprocessor. It is a server-side scripting language that helps you create dynamic websites. This language is mainly used to build web-based software applications. It is open source software and works well with MySQL. What actually happens is that the PHP code will be executed on the server and the HTML code will be displayed on the browser side.



JAVASCRIPT

JavaScript is a scripting programming language, primarily used in interactive web pages. It is an object-oriented language with prototype, that is to say that the bases of the language and its main interfaces are provided by objects which are not instances of Classes, but which are equipped by the internet.



4.3 ANDROID PRESENTATION LANGUAGE

4.3.1 JAVA

It is an object-oriented programming language, developed by Sun Microsystems. It allows you to create software compatible with many operating systems (Windows, Linux, Macintosh, Solaris). Java also makes it possible to develop programs for mobile phones and personal assistants. Finally, this language can be used on the internet for small applications integrated into the web page (applet) or as a server language (JSP).



4.3.2 SDK

An SDK, for Software Development Kit, refers to a set of tools used by developers for the development of software intended for a specific platform (Linux, Windows, Android, etc.). It is translated into French as development kit.

5. PRESENTATION OF THE APPLICATION

In the following paragraphs, we will explain the different situations that the client and the administrator of our project may encounter.

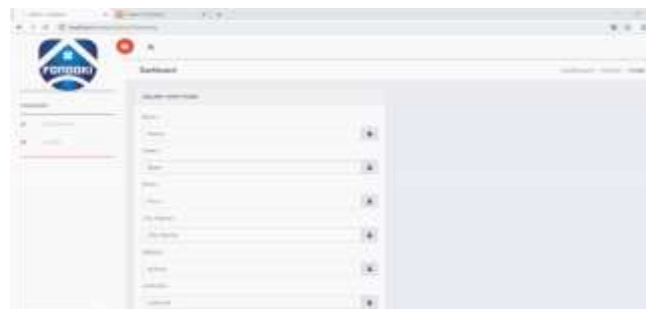
5.1. ADMINISTRATOR

- Authentication page:

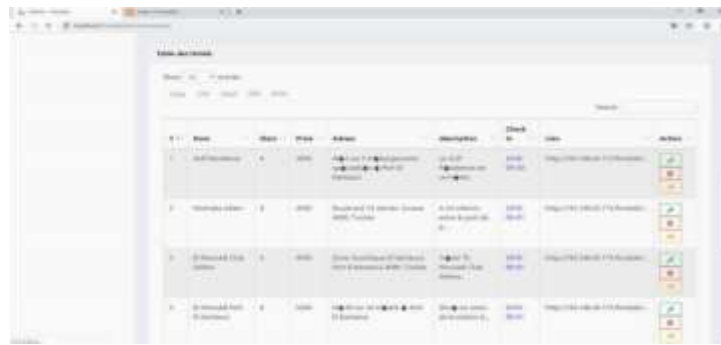
On this interface, the administrator must enter a user name and a password, then click on the sign in button to authenticate.



Updated hotels page: Admin can add hotel

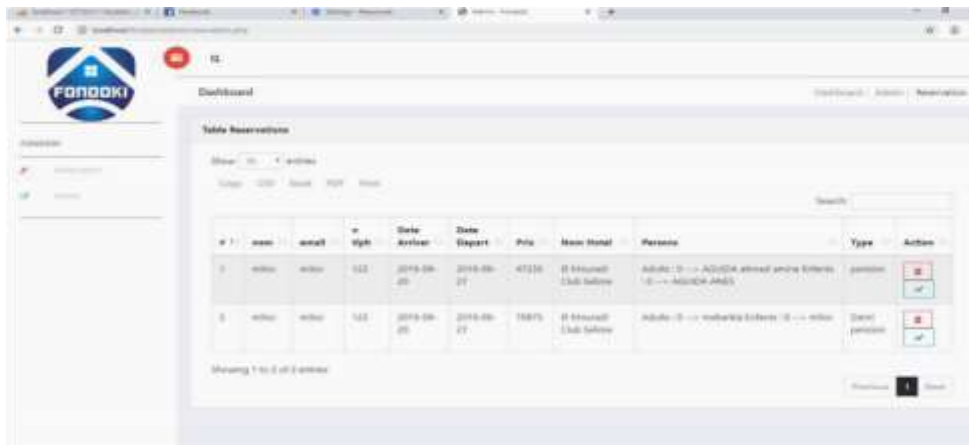


The administrator can also modify or delete a hotel



Reservations management page

The Manager can manipulate the customer's reservation, whether to accept or refuse it.



5.2. CUSTOMER

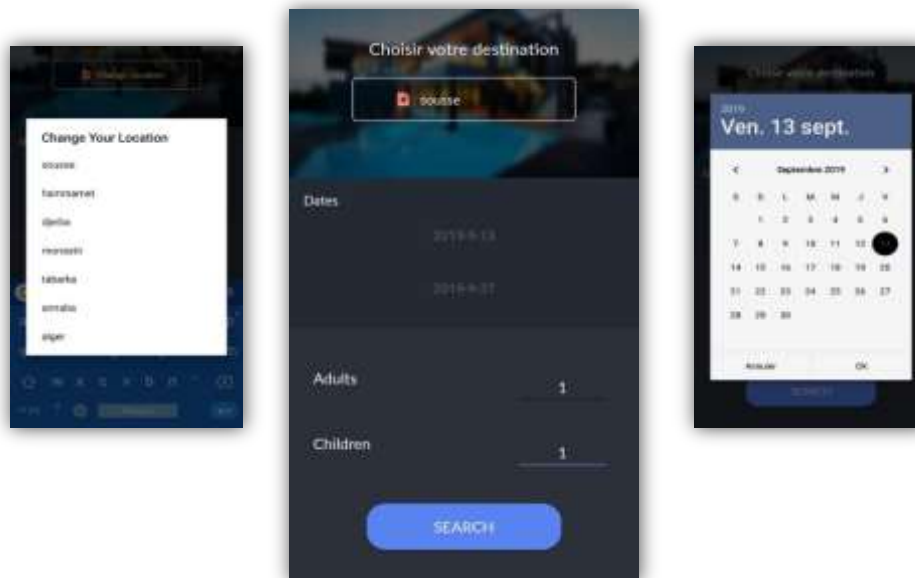
- Registration and authentication interface

The customer must complete the registration form;



“Home” interface

The following figure (Figure 16) presents the reservation conditions:



- Customer destination;
- Departure date, Router date;
- Number of people (adult, child). Figure 16: Reservation conditions interface

Conclusion

The work carried out in this dissertation aims to create an application for managing hotel reservations with the aim of facilitating the task of travel agencies by giving them the possibility of managing reservations.

We analyzed the problem and we managed to design an application that we hope will be an effective and beneficial solution for reservation management.

Then, we began the second chapter in which we described the modeling language for the design of our application which is the UML language. We also identified the actors who interact with the application, then we described the needs of each actor in the form of use cases. And also, for each use case, we established the sequence diagram whose objective is to represent the interactions between the objects of the system by indicating the chronology of the exchanges. Afterwards, the creation of a static model represented by the class diagram followed by the relational model associated with the latter by applying the passage rules which will allow us to have an overview of the database.

Finally, we took the time to complete our application while specifying the development tools as well as the programming languages used, followed by an overview of the interfaces that it includes.

This work allowed us to gain personal and professional experience. It was very beneficial to us because we had the chance to improve our knowledge in the field of design and this on a theoretical level but also to discover and acquire new knowledge in terms of programming and development of databases. data regarding practicality. We hope that this work can serve as a help and documentation tool for students in the future, and a working basis for the users concerned.

Regarding payment in the future we are offering other faster and easier methods by credit card and adding other destinations at international levels.

Webography

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