Hotel and accommodation booking management platform for travel in Ukraine

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Abstract – **A platform for hotel and accommodation booking management is proposed. The platform is built on a monolithic architecture using MVC and Client-Server patterns. The server side is implemented in the PHP programming language using the Symfony framework, and the client side is implemented using the React JavaScript library. The platform uses MySQL as the primary database, supplemented by MongoDB. The developed platform meets modern requirements and has the following features: modern and adaptive design, user-friendly interface with the ability to create a personal account, support for logging in via Google**

Keywords – **web platform; booking; accommodation; Symfony; React**

I. INTRODUCTION

Today's life is impossible to imagine without traveling, where the key to a comfortable vacation or business trip is to book accommodation in advance. Unfortunately, the current realities of our country have temporarily pushed traveling to the back burner. But everyone deserves a vacation, has the right to temporarily change their place of residence and get away from everyday worries. At the same time, many people travel not only to relax. There can be various reasons for this: study, work, business meeting, etc. The question arises - how to book accommodation?

The solution to this problem is a platform that will allow booking accommodation that meets the client's needs, as well as posting their places for accommodation to owners. It will allow users to find the right accommodation, compare prices, and view reviews, making their search easier and faster.

Such a platform will not only save time, but will also provide an opportunity to choose from a wide range of options, which will allow you to find housing that best meets the user's requirements.

II. REVIEW AND ANALYSIS OF SOFTWARE ANALOGUES

There are a sufficient number of analogues of the software product on the market. In order to formulate the requirements for the developed platform, we analyzed popular products and identified their advantages and disadvantages.

One such application is Hotels24.ua (https://hotels24.ua/), a free accommodation booking service in Ukraine that offers a wide range of hotels and convenient tools for searching, filtering and sorting offers. However, the site has an outdated design, no Google login, and does not support user accounts.

GoHotels (https://gohotels.com.ua/) is also a free online accommodation booking service in Ukraine that offers an interactive map, a personal account, and a page of announcements and events. However, like the previous product, the website has an outdated design and does not support responsiveness, and there is no Google login.

HOTELS-OF-UKRAINE (https://www.hotels-of-ukraine.com/) is a website with a pleasant and responsive design that offers a large number of options for booking accommodation and an interactive map with nearby attractions and restaurants. Among the disadvantages is the lack of authorization on the site, and therefore the possibility of cooperation (in particular, creating an account of the owner of the place of residence).

Table 1 shows the comparative characteristics of existing analogs of the proposed platform.

Based on the review and analysis, the hotel and accommodation booking management system should have a modern and responsive design, a user-friendly interface with the ability to create a personal account, and support Google login. Important functions include a search, filtering, and sorting system, an image gallery, an interactive map with the location of accommodation, and the ability to cooperate with accommodation owners.

TABLE I. COMPARATIVE CHARACTERISTICS OF ANALOGUES

Name	Hotels24.ua	GoHotels	HOTELS-OF-UKRAINE
Attractive and user-friendly interface	-	+-	+
Search, filter, sort	+	+	+
Image gallery	+	+	+
Feedback system	+	+	+
Map with the location of the housing	+	+	+
Personal account	-	+	-
Opportunity to cooperate with the owners of places of residence	+	+	-
Ability to log in via Google	-	-	-
Responsive design	+-	-	-

III. PURPOSE OF THE WORK

The purpose of the work is to research the development of a web platform that allows you to easily and quickly find the right place to stay, taking into account the wishes and requirements for it, and eventually make a reservation. The system includes different roles, each of which has its own functionality and participates in different processes. Within the system, clients can perform certain actions related to accommodation (view, book, leave feedback, etc.), owners can post new places to stay, add rooms to them, and monitor bookings.

In general, the software product simplifies the entire process of searching for and booking accommodation and provides the necessary business tools for accommodation owners, which allows them to improve service and optimize management.

IV. PLATFORM CONSTRUCTION AND DESIGN

One of the most important and crucial stages in the design of any software product is the selection of an appropriate architecture that determines performance, scalability, and usability during development. A monolithic architecture turned out to be the most suitable. We used such architectural patterns as MVC and Client-Server.

MVC is a pattern that allows you to divide an application into logical components and efficiently manage data, output, and system logic, while facilitating development, testing, and support.

Client-Server is an architectural pattern that divides a system into two main parts: client and server. The client is responsible for user interaction, request processing, and data display, while the server implements business logic, data storage, and processing.

Communication between the server and the client is carried out via HTTP requests using the RESTful API.

The PHP programming language was chosen to develop the server side.

PHP has a fairly large number of frameworks that greatly simplify and speed up development. One of them is Symfony [1]. Its modular component system is flexible enough to perform standard tasks without writing long code. At the same time, it provides a high level of software security and stability.

To optimize the processing of requests, we chose the API Platform framework, which provides a full set of tools for efficient and fast work with APIs in accordance with modern standards.

To implement the client side, the most popular JavaScript library - React [2] was chosen. It is used to quickly and efficiently create interactive user interfaces and web applications using much less code than with conventional JavaScript.

Nginx was chosen as the web server. It is characterized by high performance, the ability to efficiently handle a large number of simultaneous connections, and reliability.

To deploy the application, we use Docker [3], which allows us to present system components in the form of containers, easily manage and scale them. One of the key advantages is the isolation of these components and their dependencies, which guarantees stable operation of the system. Using Docker has significantly increased the efficiency and speed of software development.

The proposed platform uses the MySQL database management system [4]. It is user-friendly, easy to understand, and quite popular, so you can easily find the necessary documentation. MySQL is known worldwide as the most secure and reliable database management system used in various web applications.

In addition, the system also uses the MongoDB database [5]. It is the best choice for storing temporary or large data. MongoDB is known for its flexibility and scalability, which makes it possible to efficiently process large amounts of information and quickly perform write and read operations. This makes it an ideal complement to the main MySQL relational database in the proposed system.

As a result, a database was designed to ensure the storage and efficient management of information about hotels, accommodation types, rooms, amenities, reservations, etc. The database contains 18 tables, the main ones being:

- The "**user**" table contains data on system users (email, first name, last name, password, role, availability, two-factor authentication status, etc.)

- The "**property**" table describes the entity of the places to stay that users will book (name, description, locality, latitude, longitude, rating, verification status, etc.)

- The "**room**" table describes the entity of the rooms that are located in the places of accommodation (room type, number of guests, price per night, etc.).

- The "**booking**" table contains information about the reservation (data about the person for whom the reservation was made, status, date of arrival, date of departure, etc.).

- The "**transaction**" table contains data on transactions created during booking (amount of the transaction, its status, date of payment, etc.).

In turn, MongoDB is used to store logs and create a temporary user entity at the time of registration. It consists of 2 collections.

Figures 1-4 show the interface of the main functionality of the developed platform.
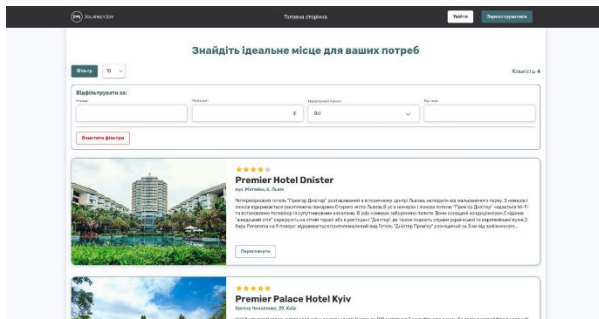

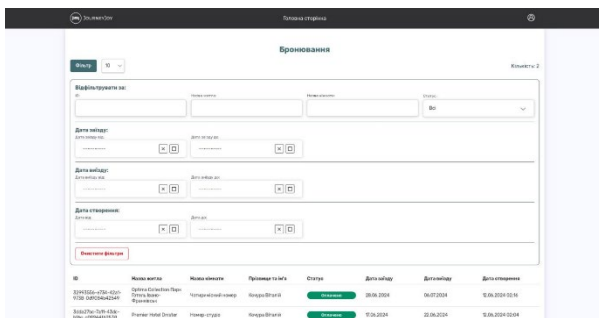Figure 1.   Home page with residence search

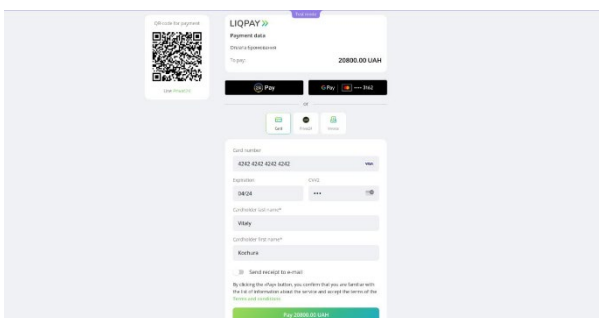Figure 2.   User account. List of bookings

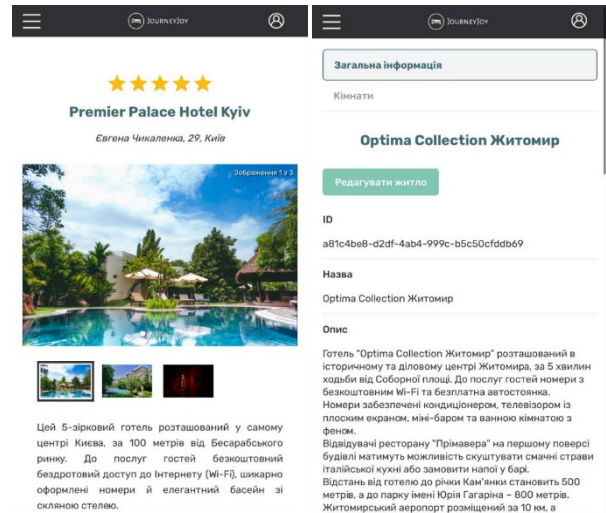Figure 3.   LiqPay payment form

Figure 4.   Application adaptability

During the development of the software product, special attention was paid to testing and error handling, which significantly improved the reliability and security of the system. Thanks to thorough validation of forms, the use of loaders for buttons and filters, and the blocking of inaccessible actions, the application is intuitive and stable. This comprehensive approach to handling errors and preventing unwanted user actions improved the overall user experience and minimized the possibility of errors in the process of interacting with the system.

V. Conslusions

As a result of the development, a finished software product was obtained that meets the formulated requirements and expectations of users. The implementation of such a platform for managing hotel and accommodation bookings for travelers in Ukraine will provide a convenient booking process, improve customer service and simplify the process of managing accommodation.

References

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