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Web-Based Reservation and Management System for Nature Spring Resort

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ABTRACT

The present paper describes the design, implementation, and evaluation of Nature Spring's Web-Based Reservation and Management System (RMS). The present manual processes for resort reservations result in delayed processes, hassled reservations, and the possibility of human error. The researchers presented the RMS as a non-contact and efficient method to overcome these issues. The system was designed and developed using agile methodology, including iterative and incremental development procedures. As a result, the developed system transforms and improves the resort's booking and management processes. This system provides a simple and user-friendly online interface for customers to book rooms and cottages effortlessly. Customers can also view the resort's available amenities and services. The developed system includes real-time availability updates, assuring accurate booking information while reducing the possibility of overbooking. Furthermore, the management feature allows Nature Spring Resort owners to handle reservations and monitor guest preferences easily. 3 According to the IT experts' evaluation results, which were based on the ISO 25010:2015 standards for quality software, the developed system has exceptional functionality, reliability, usability, efficiency, maintainability, portability, and compliance. This suggests that the management of the Nature Spring Resort, especially in the booking and reservation processes, can greatly benefit from the developed system. With these findings, the implementation of this developed system has come up with a solution to improve Nature Spring Resort's operational efficiency, customer satisfaction, and overall management effectiveness. Thus, we strongly recommend that this system facilitate the resort's business processing.

Keywords: *Web-Based Reservation System, Nature Spring Resort, Booking System, Management System*

INTRODUCTION

The Nature Spring Resort, established in 2017, was situated in Barangay Sta. Maria Gonzaga, Cagayan, has quickly become a popular destination for various events, including weddings, birthdays, seminars, and baptisms. They provide resort reservations for all these events. Despite its growing popularity and success, the resort faces challenges with its current manual reservation and management system. The current reservation process was done manually, which relies on log books, which are prone to human error and inaccuracies in the reservations.

The Web-Based Reservation and Management System was designed to handle resort reservations and services. Through this system, guests can now book online and check availability, making the reservation process more convenient and reliable.

The developed Web-Based Reservation and Management system enhances guests' experiences and improves operational efficiency and service accuracy.

Objectives of the Study

Generally, this study aimed to develop a Web-based reservation and management system for Nature Spring Resort. Specifically, it aimed to:

1. Determine the problems encountered using manual transactions;
2. Design and develop the core features of the system;
3. Evaluate the system using ISO 25010:2015 as to:
    - 3.1 Functional Sustainability
    - 3.2 Performance Efficiency
    - 3.3 Compatibility
    - 3.4 Usability
    - 3.5 Reliability
    - 3.6 Security
    - 3.7 Maintainability
    - 3.8 Portability
4. Implement the developed system for the intended user.

MATERIALS AND METHODS

Research Design

A web-based reservation and management system was developed using a descriptive and developmental research design. The descriptive research analyzed the systems' features, functionalities, and limitations. However, developmental research was used to design and create a better web-based reservation and management system. The researcher used descriptive and developmental methods to ensure a complete understanding of current systems and encourage innovation and improvement in the new system that will develop.

Research Instruments

The researchers gathered data through interviews, observations, and questionnaires. They interviewed the resort owner to understand the current processes, challenges, and suggestions for improvement. Potential customers were given questionnaires to provide feedback on their preferences, expectations, and any particular features they wanted to see in the system.

Observation techniques were also considered to understand the existing process and fully identify areas for development.

Data Gathering Procedure

To ensure accurate and comprehensive information, several steps were taken during the data collection process. To find out more about the current reservation and management procedures used by resort employees, surveys and interviews were first conducted with them. The second step entailed scrutinizing the extant data records to identify patterns and possible avenues for enhancement. Disseminating a questionnaire was the third step. Customers of 13 Nature Spring Resort participated in the survey to provide input on their requirements and hopes for the new system. Finally, industry standards and best practices were

investigated to incorporate cutting-edge features into the system. This comprehensive data collection process enabled the development of a dependable and user-friendly solution tailored to the Resort's requirements.

Analysis of the Data/Statistical Treatment

The researchers used descriptive statistics to summarize and describe the data gathered using a Likert scale, which measured the participant's evaluation with the criteria in the checklist given during the testing phase. The scale and corresponding descriptive values are shown in Table 1.

Table 1. Five-Point Likert Scale

Scale	Mean N=35	Descriptive Value
5	4.20 – 5.00	Outstanding
4	3.40 - 4.19	Very Satisfactory
3	2.60 – 3.39	Satisfactory
2	1.80 – 2.59	Fair
1	1.00 – 1.79	Poor

This five-point Likert-Scale and its descriptive value were used in analyzing the evaluation of participants during the testing phase of the developed system.

The following formula was used to compute the mean score for each question:

Mean = (Sum of all responses) / (Number of participants)

This calculates the participants' opinions on the web-based reservation and management system as per ISO 25010:2015.

RESULTS AND DISCUSSION

A. **Problems in the present reservation and management system.**

Nature Spring Resort currently needs help with its manual reservation and management system. Inefficiency in handling reservations, limited accessibility, human errors, resource allocation challenges, and a lack of data insights hinder the resort's operational efficiency and guest satisfaction.

In response, a proposal was presented for developing a Web-Based Reservation and Management System to address these issues.

The first problem identified is the inefficiency of the manual reservation process. The current system relies on paper records, leading to delays and potential booking errors. Additionally, limited accessibility to reservation information poses challenges in retrieving and updating details promptly. The lack of real-time access may result in overbooking or missed opportunities to accommodate guests.

Human errors and miscommunication represent another significant challenge in the current system. Relying on manual processes increases the likelihood of errors in recording reservation details, leading to confusion and incorrect guest information.

To overcome these challenges, the Web-Based Reservation and Management System offers features such as an online reservation portal, real-time availability updates, automated confirmation and communication, resource management tools, and analytics and reporting. The system aims to streamline the reservation process, improve accessibility, reduce errors, enhance resource allocation, and provide valuable data understandings for informed decision-making.

The transition to this web-based system aligns with modern hospitality practices, offering a more efficient, secure, and customer-centric experience for both guests and staff of the resort. It addresses the limitations of manual transactions,

enhances operational excellence, 18 and supports sustainable growth. The implementation includes security measures to ensure the confidentiality of guest information, with access restricted to authorized personnel. Overall, the proposed system represents a comprehensive solution to Nature Spring Resort's current challenges, enabling them to be sustainable in the competitive hospitality industry.

B. Core Features of the Developed System

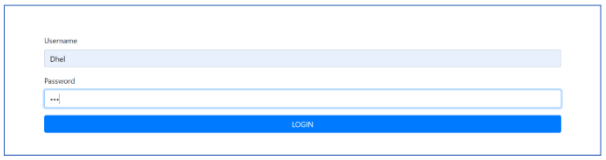


Figure 1: Admin Log-In Form

Figure 1 shows the admin page, which includes a secure login screen where administrators can enter their credentials. Administrators can access and handle the system's functionalities after logging in. The page ensures that only authorized individuals can execute administrative tasks, which improves the system's overall security.

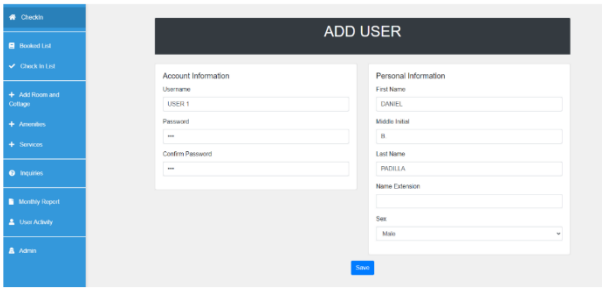


Figure 2: Add User

The system's add user page, shown in Figure 2, allows administrators to enter account information for new users. Administrators can add users by adding the appropriate information, 19 such as usernames and passwords. The information entered will be used for user authentication when logging into the web-based system.

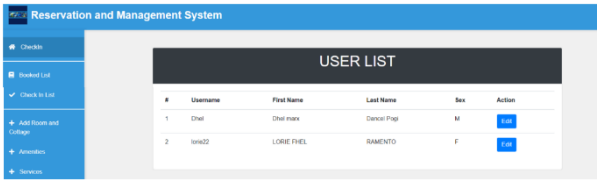


Figure 3: Users List

Figure 3 shows the user's list page, which displays all registered users in the system. This page enables administrators to examine and manage the user database. Each entry on the list contains detailed information about each user.

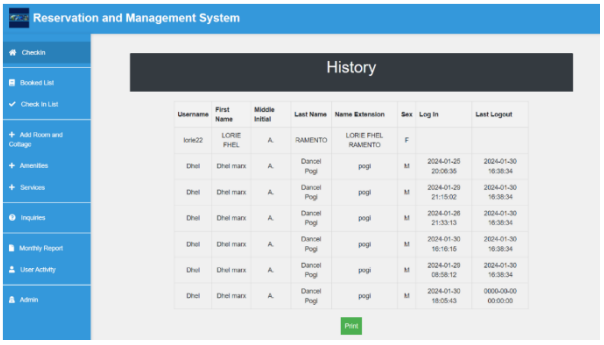


Figure 4: Users Activity

Figure 4 shows the user activity page. This page allows the admin to view the users' activity history; it will show the name of the user as well as the date and time that the user logs in and out.

Figure 5: Dashboard: Rooms and Cottages List

Figure 5 shows the page where the administrator can view all uploaded rooms and cottages. This page contains a thorough list of accommodations offered through the system. This interface allows administrators to edit and change details

for each room and cottage.

Figure 6: Dashboard: Add Rooms and Cottages

Figure 6 shows the dashboard for adding rooms and cottages. This page allows the admin to add rooms and cottages and also allows to add or edit the rooms and cottages' information, such as description, type, price, status, and image.

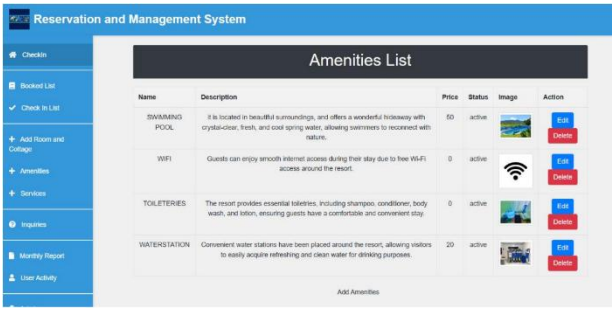


Figure 7: Dashboard: Amenities List

Figure 7 shows the page where administrators can view all added facilities. This page provides a full list of the system's facilities. This interface allows administrators to maintain and update information about each amenity.

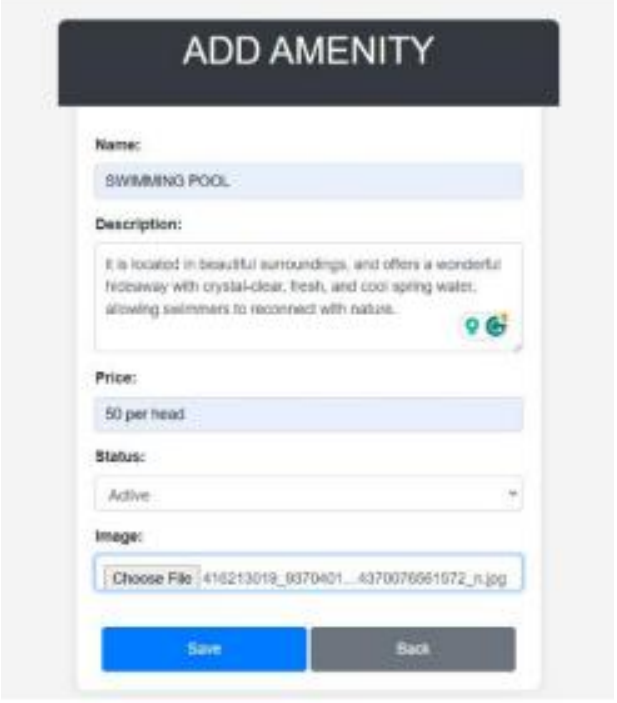


Figure 8: Dashboard: Add Amenities

Figure 8 shows the Dashboard for adding Amenities. This page allows the admin to add amenities and also allows to add or edit the amenities information, such as description, price, status, and image.

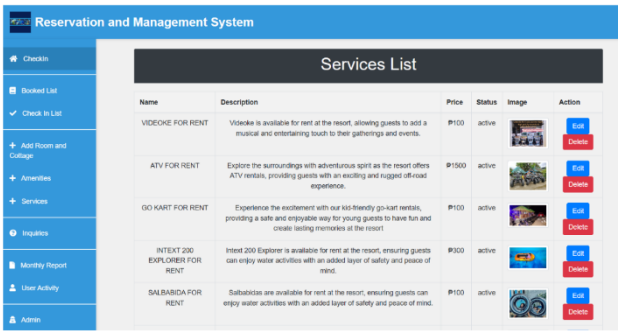


Figure 9: Dashboard: Services List

Figure 9 shows the page where the administrator can view all uploaded services. This page contains a thorough list of the system's available services. This interface allows administrators to manage and update the details of each service.

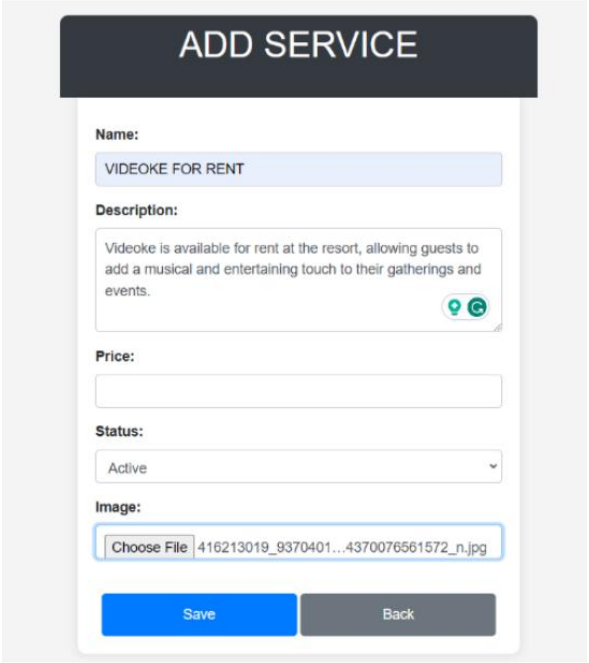


Figure 10: Dashboard: Add Services

Figure 10 shows the Dashboard for adding Services. This page allows the admin to add services and also allows to add or edit service information such as description, price, status, and image.

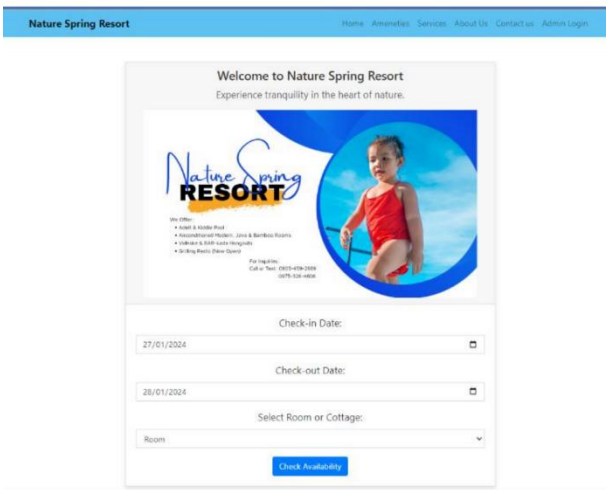


Figure 11: Customer's Homepage

Figure 11 shows the customer's homepage. This page shows the customer's homepage. The customer will select their preferred dates to see what rooms or cottages are available on those dates.

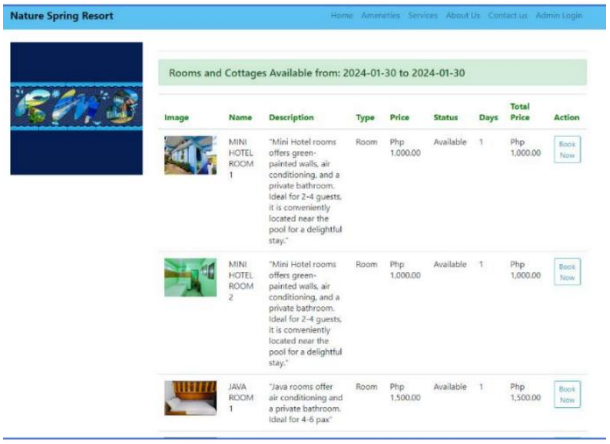


Figure 12: Available rooms

Figure 12 shows the page that displays available rooms on the dates provided by the customer. This page lists rooms that meet the customer's specific dates. Customers can use this interface to look up room availability and make reservations.

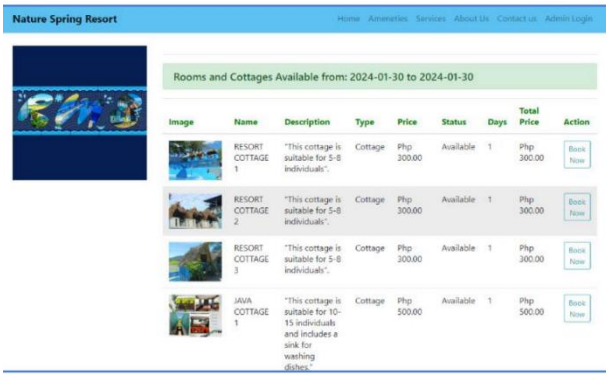


Figure 13: Available Cottages

Figure 13, shows the page that displays available cottages for the dates selected by the customer. This page lists cottages that meet the customer's requested dates. Customers can use this interface to check cottage availability and book bookings.

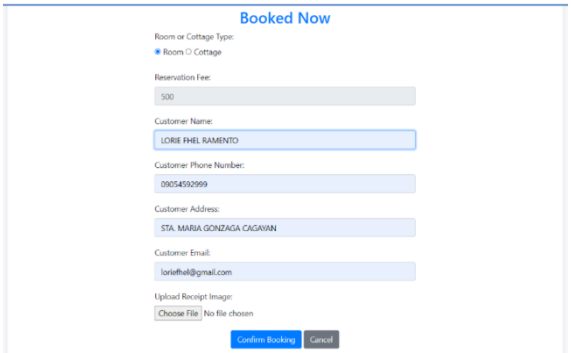


Figure 14: Book Now

Figure 14 is the Book Now page. On this page, customers will submit their required information, such as name, number, address, email, and the receipt of the reservation payment via Gcash.

Figure 15: Booking Terms and Regulations

Figure 15 shows the Booking Terms and Regulations page. On this page, customers can view the terms and regulations of booking; they must read it carefully before scanning their payment on the provided QR code.

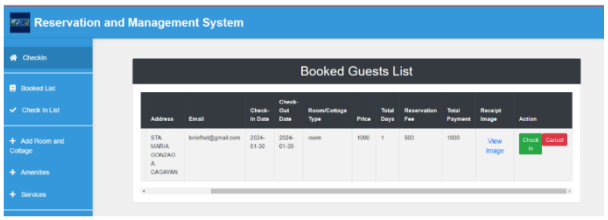


Figure 16: Booked Guest List

Figure 16 is the Booked Guest List page. On this page, the administrator can view the customer's booking list, as well as the customer data and the payment receipt that was uploaded. Admin can check in bookings when the customer checks in.

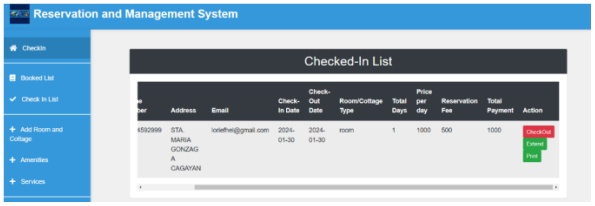
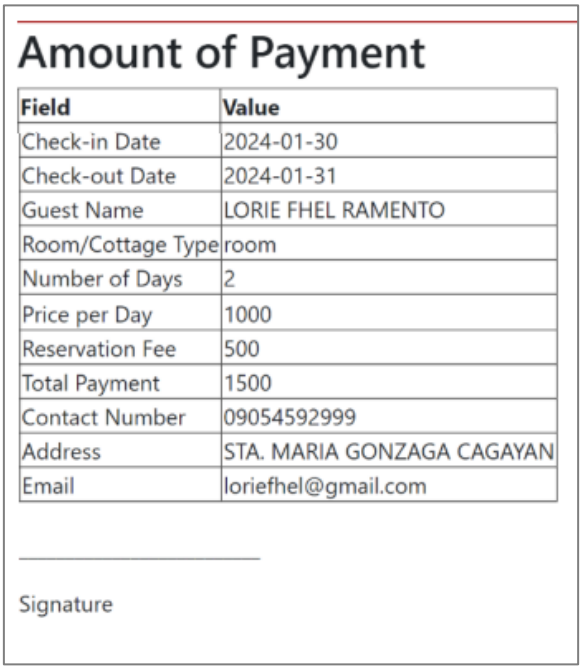


Figure 17: Check-in List

Figure 17 is the Check-in List page. After checking in, the information is transferred to the "Check In List" page. On this page, the administrator may extend the customer's stay, check out the customer, and print the invoice for the total amount of the customer's bill.



Amount of Payment

Field	Value
Check-in Date	2024-01-30
Check-out Date	2024-01-31
Guest Name	LORIE FHEL RAMENTO
Room/Cottage Type	room
Number of Days	2
Price per Day	1000
Reservation Fee	500
Total Payment	1500
Contact Number	09054592999
Address	STA. MARIA GONZAGA CAGAYAN
Email	loriefhel@gmail.com

Signature

Figure 18: Invoice

Figure 18 is the Invoice page where the receipt that displays the customer's total bills is shown. This page contains a full breakdown of all charges incurred by the customer throughout their stay. The receipt includes detailed charges for services, amenities, and lodging.

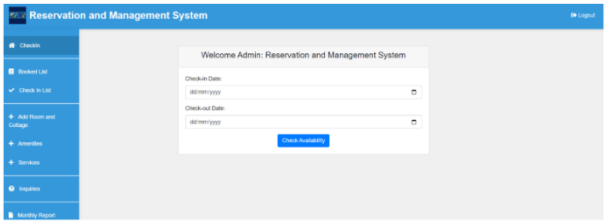


Figure 19: Dashboard: Check-in Customer

Figure 19 shows the Dashboard for Check-in Customer page. This page is utilized when customers come into the resort. The administrator will be the one to check in directly to the system.

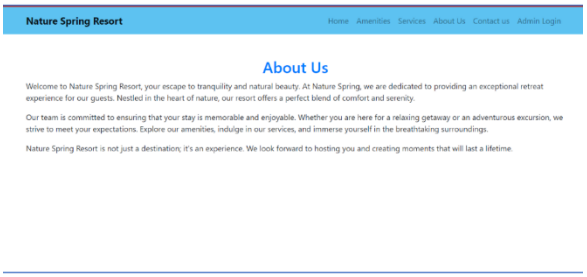


Figure 20: About Us

Figure 20 shows the page where you can find information about the resort. This page contains complete information on the resort's amenities, services, and lodgings. It guides prospective guests to learn more about the resort's offerings.

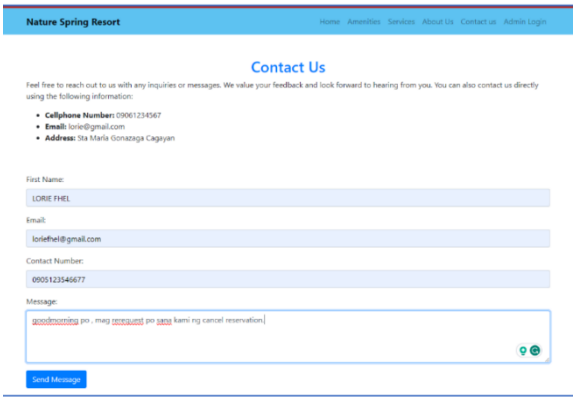


Figure 21: Contact Us

Figure 21 is the Contact Us page. On this page, customers can contact the administrator by leaving a message in the system and the customer must provide contact information for the administrator to contact when responding to the customer's inquiries through phone calls or email.

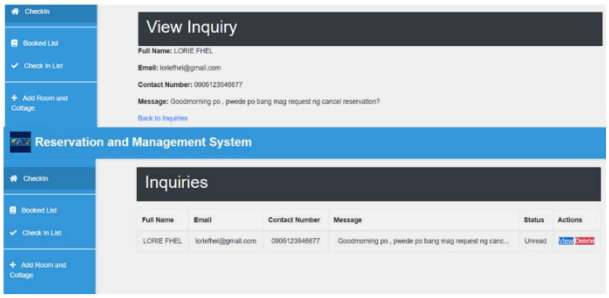


Figure 22: Inquiries page

Figure 22 shows the page where the administrator can view messages from consumers. This page lists all consumer messages received by the system. Administrators can read, manage, and respond to these communications to ensure that customers receive effective communication.

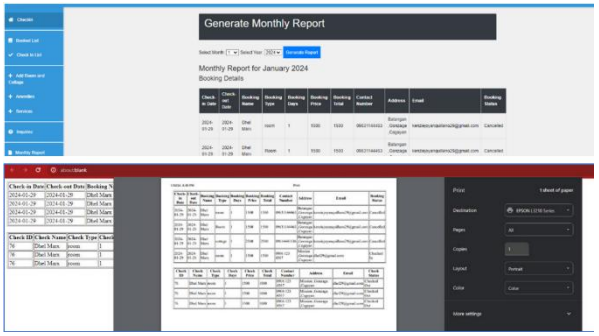


Figure 23: Generate Monthly Report

Figure 23, is the Generate Monthly Report page. On this page, the administrator can check the monthly report with all the booking history of the canceled or confirmed bookings. The monthly report is also printable.

C. Compliance of the proposed system with the CSA ISO/IEC 25010:12 (R2021) Standards

Table 2: Results of Evaluation Testing by the expected users in terms of Functionality

Indicators	Weighted Mean N=35	Descriptive Value
Functionality (Sustainability, Accurateness, Interoperability)		
1. The software can perform the tasks required.	4.9	Outstanding
2. The system can function well and accurately.	4.7	Outstanding
3. The system interacts with another system?	3.7	Very Satisfactory
4. The system can only be accessed by authorized users.	4.9	Outstanding
Overall Weighted Mean	**4.55**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

Table 2 shows the results of evaluation testing by the expected users regarding functionality.

The system can perform the tasks it is designed for and meets the requirements outstandingly. The system not only functions well but also demonstrates a high level of accuracy in its operations. It is rated as outstanding in terms of its performance.

The system can interact with another system successfully. It shows good compatibility and integration capabilities, earning a very satisfactory rating.

The system has robust access control measures, ensuring only authorized users can access it. This high level of security is rated as outstanding.

In summary, the system performs tasks effectively, functions accurately, interacts well with other systems, and maintains strong access control, making it an exceptional system overall events.

Table 3: Results of Evaluation Testing by the expected users in terms of Reliability

Indicators	Weighted Mean N=35	Descriptive Value
Reliability (Maturity, Fault Tolerance, Recoverability)		
1. The system reaches its full functionality.	4.9	Outstanding
2. The system is able to determine incorrect inputs. The system shows error messages instead of crashing due to incorrect inputs or event done by the user	4.6	Outstanding
3. The system is able to recover files and records if they are saved in the database properly.	4.9	Outstanding
Overall Weighted Mean	**4.8**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

The system achieves its full functionality and meets its intended purpose outstandingly. Its performance in this regard is rated as outstanding.

The system demonstrates the ability to identify incorrect inputs and handle them gracefully. Instead of crashing, it provides error messages to the user, ensuring a smooth user experience. This capability is rated as outstanding.

The system exhibits exceptional capability in recovering files and records when appropriately saved in the database. This feature is highly reliable and earns an outstanding rating.

Considering the individual ratings and their respective weights, the overall weighted mean for the system's performance is 4.8, categorized as outstanding.

In summary, the system achieves its intended functionality, handles incorrect inputs gracefully, and excels in file and record recovery. Its overall weighted mean is outstanding, as illustrated in Table 3, which implies the developed system is reliable.

Table 4: Results of Evaluation Testing by the expected users in terms of Usability

Indicators	Weighted Mean N=35	Descriptive Value
Usability (Understandability, Learnability, Operability, Attractiveness)		
1. The system uses words that can understood easily and has buttons that can easily show what it does.	4.9	Outstanding
2. The system can be easily learned by all of the users due to its user-friendly interface.	4.7	Outstanding
3. The system is capable of running all of its capabilities into full use.	4.7	Outstanding
4. The system has a user-friendly design that is pleasing to the eyes.	4.3	Outstanding
Overall Weighted Mean	**4.65**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

Table 4 shows that the system makes good use of simple language, ensuring that users understand the information they are presented with. Additionally, the system uses clearly 32 named buttons, allowing users to quickly understand their purpose. This feature leads to an excellent user experience, with a rating of 4.3.

Furthermore, the system has a user-friendly design, which promotes easy learning for all users. Its design is simple and easy, enabling users to navigate and interact with the system quickly. With this outstanding level of user-friendliness and a rating of 4.7, users can readily understand and use the system's features.

Lastly, while the system's design is attractive to viewers, it has a 4.3 grade for visual aesthetics.

The system's general usability and functionality are outstanding.

In conclusion, the system exhibit well with its simple, understandable language, labeled buttons, user-friendly design, efficient use of capabilities, and suitable visual design. With an overall weighted mean of 4.65, it can be stated that the system provides an excellent user experience and works incredibly effectively in terms of usability.

Table 5: Results of Evaluation Testing by the expected users in terms of Efficiency

Indicators	Weighted Mean N=35	Descriptive Value
Efficiency (Time Behavior, Resource Utilization)		
1. The system responds easily right after every transaction.	4.6	Outstanding
2. The system utilizes resources efficiently	4.6	Outstanding
Overall Weighted Mean	**4.6**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

In Table 5, the system's responsiveness after each transaction is rated as outstanding, with a score of 4.6. It also demonstrates efficient resource utilization, which is also rated as excellent. The overall weighted mean for the system's performance in terms of its efficiency is 4.6, categorizing it as outstanding.

Table 6: Results of Evaluation Testing by the expected users in terms of Maintainability

Indicators	Weighted Mean N=35	Descriptive Value
Maintainability (Analyzability, Changeability, Stability, Testability)		
1. The system can be easily maintained by the administrator or anyone the administrator gave permission to.	4.7	Outstanding
2. The system can be easily modified.	4.8	Outstanding
3. The system remains stable for a long period of time.	4.6	Outstanding
4. The system has undergone various examinations and test runs before implementation to ensure the quality and efficient functionality	4.7	Outstanding
Overall Weighted Mean	**4.7**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

Table 6 shows that the system's maintenance is easily manageable by authorized administrators or individuals granted permission, receiving an outstanding rating of 4.7. It also demonstrates ease of modification, earning an exceptional rating of 4.8. The system remains stable over a prolonged period, achieving an outstanding rating of 4.6. Additionally, the system undergoes thorough examinations and test runs to ensure high quality and efficient functionality, rating at an exceptional level of 4.7. With an overall weighted mean of 4.7, the system's performance in terms of maintainability is categorized as outstanding.

Table 7: Results of Evaluation Testing by the expected users in terms of Portability

Indicators	Weighted Mean N=35	Descriptive Value
Portability (Adaptability, Installability, Conformance, Replaceability)		
1. The system can be moved to other environments	4.9	Outstanding
2. The system can be installed easily.	4.9	Outstanding
3. The system can perform its capabilities on what the user wants to do without hassle.	4.8	Outstanding
4. The system is capable of having upgrades.	4.5	Outstanding
Overall Weighted Mean	**4.77**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

Table 7 shows that the system exhibits outstanding characteristics related to its adaptability, installability, conformance, and replaceability. Firstly, the system can be moved to different environments seamlessly, contributing to its adaptability and flexibility. This feature is rated as outstanding, with a score of 4.9.

Secondly, the system can be easily installed, allowing users to set it up without complications. Its user-friendly installation process receives an outstanding rating of 4.9. Furthermore, the system efficiently performs its capabilities according to the users' needs, ensuring a hassle-free experience. This capability, rated at 4.8, demonstrates the system's outstanding performance.

Lastly, the system can receive upgrades, enabling it to evolve and incorporate new features and improvements. This upgradability factor is rated as outstanding, with a score of 4.5.

Considering the individual ratings and their respective weights, the overall weighted mean for the system's performance is 4.77, categorizing it as outstanding. The system showcases outstanding characteristics by being movable, easily installable, capable of hassle- 35 free performance, and upgradeable. With an overall weighted mean of 4.77, the system provides exceptional performance as to its portability.

Table 8: Results of Evaluation Testing by the expected users in terms of All Characteristics

Indicators	Weighted Mean N=35	Descriptive Value
All Characteristics (Compliance)		
5. Comply with laws or regulations.	4.9	Outstanding
Overall Weighted Mean	**4.9**	**Outstanding**

Legend:

4.20 – 5.00	Outstanding	1.80 – 2.59	Fair
3.40 - 4.19	Very Satisfactory	1.00 - 1.79	Poor
2.60 – 3.39	Satisfactory		

Table 8 shows that the system demonstrates outstanding compliance with laws or regulations, earning a rating of 4.9. It indicates that the system effectively adheres to legal requirements and regulations. The overall weighted mean for the system's performance is also 4.9, reflecting its outstanding compliance.

CONCLUSION

The development of the web-based reservation and management system for Nature Spring Resort has improved the reservation process, making it a valuable tool for both users and managers. By addressing and resolving past ineffectiveness, the system allows users to make bookings faster and more effectively. The significant improvements in accuracy, operational processes, and user contentment demonstrate the system's success. These results illustrate the system's ability to improve the reservation and booking experience, making it more reliable and user-friendly.

Overall, the developed web-based reservation and management system modernizes Nature Sprint Resort's booking process and significantly improves its operational capabilities.

RECOMMENDATION

Although this web-based reservation and management system has produced outstanding results, there are still areas for improvement. To improve the system further, regular updates are needed to accommodate changing demands and technical improvements. User training programs must be established to ensure that all users are knowledgeable about the system's functionality, resulting in improved system advantages. Furthermore, feedback systems should be actively promoted to gain insights for future improvements.

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