

## Research on Hotel Management System

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### ABSTRACT

With rapid growth of economy and tourism, there is an intensified competition can be seen in the hotel industry in today. To be in the competition, they need to continuously improve their management techniques and procedures. "Online Hotel Management system" is software developed by focus on these factors. Through this system, it will be able to manage various functions including room and hall reservations, ordering food, and managing employees and suppliers. We intend to develop this web application using React JS, Express JS, Node JS, and Mongo DB. This system addresses hotel management issues while avoiding issues that arise when tasks are carried out manually. In terms, the main objective of this whole process is to automate the day today manual tasks of this system. Therefore, this online hotel management system is designed to find a more practical, well-organized, and quick way of processing the service from the hotel for both nearby and distant customers by giving more user friendly and more GUI oriented experience.

**Keywords--** Hotel Management, Database, System Function, Reservation, Restaurant, Reviews, Employees, Data Analysis

### I. INTRODUCTION

The hotel industry creates socioeconomic prospects for both the owner and the consumer, just like any other industry [1]. It serves the purpose of giving consumers hospitality services. These clients may be locals, foreigners, business people, tourists, etc. Customers are mostly confined in their attempts to get a place to spend the night since it is customary to hunt for a hotel once they have arrived in a specific spot, step inside, and see if there is an open room. If there isn't a room available, customers must go on to the next nearest hotel and re-inquire. What transpires then if customers seek for a room at times extremely late at night and discover that all nearby hotels are completely booked. Other times, Customer might be fortunate to have the hotel's phone number and can call to

make a reservation. However, we can't guarantee about Room Reservation and Foods.

So, website regarding the Hotel Management System is what we plan to create. With this approach, you can anytime purchase food and accommodations online. This System helps to encourage people to get Information about Rooms, Foods and make Reservations in online platform. So, in 1980, the "Wijaya Beach Hotel" was founded. It is a low-cost motel that has grown to be one of the most favored places in the neighborhood. Its popularity among the local expat population and the number of tourists who come back year after year to enjoy our cuisine, beverages, breathtaking beach, and laid-back atmosphere. They also have an eight-room luxury bed & breakfast situated around the courtyard behind the beachside restaurant and bar, which serves an unusual mix of Asian and European cuisine. This serene beach has a reef that protects it, forming a lagoon that makes swimming safe all year round. In addition, there is a little surf break just in front of our restaurant.

So, in this web application, have four main sections. Employee Management, Supplier Management, Room Reservation Management, Food Management are Main sections in this Web Application. As for Customer side, Customers can view Rooms Information based on their requirements. They can reserve room by selecting check-in date and check-out date and can pay for the room in online platform. And they can order food by their requirements and pay for the foods in online platform. Then they can add reviews also based on the Rooms. They can search required food names and Rooms name in the Search bar. Customers can search comments in the comment Section. Then Customers can edit and delete their own comments. Customer can view their booking details in the profile. And, if customer need to cancel booked room, they can send request to cancel room booking by sending a request to administrator. And as for Admin side, Admin can add, update, delete Employees, Rooms, Foods, and Suppliers in the system. Admin can search employees and Suppliers in the system. And

Admin can view all the Bookings and Orders.

The rest of the paper is organized as follows: In Related Work section, we briefly review previous research that has been carried out related to information recommendation and how it related to our system. In Methodology section, we discuss about the technologies and tools that used to implement the system and briefly review the backend processes of the system. In Proposed system section, we described our proposed hotel management system by using main functions of the system. In Discussion section, we discussed the analytical results in a logical way and testing methods that used for testing the main functions. In Conclusion section, Conclusions and future work are presented, respectively.

## II. RELATED WORK/ LITERATURE REVIEW

As mentioned above, the main purpose of hotel industry is to offer consumers' hospitality services. The hospitality comprises a wide range of fields within the hotel industry that includes accommodations, restaurants, event planning and other sectors with tourism. (Law, 2009) It seems that if a hospitality company can provide valuable web sites that attract their visitors, they will also get benefits ultimately [2]. According to that, if we can promote hospitality better from our website, we can get more reviewers for our system. Therefore, providing better hospitality service is crucial fact in the hotel management system.

With the current state of the economy and the strong rivalry in the hotel industry, internet marketing has been seen as a very successful technique to stand out as distinctive in the business. According to Srinivasa R. (2014), keeping aside the complication in the hotels, today hotel management are basically performed as internet-based system [3]. The majority of the world's regions in the modern day have technological amenities like the internet, smartphones, computers, laptops, etc. With the use of the internet, customers can book a hotel room, purchase their desired meals and beverages at any time etc. by following a few simple online steps. This may be appreciated by customers since it saves them valuable time. Our system also is an e-commerce web application that provide numerous facilities for the customer such as booking rooms, order foods and beverages from the user friendly and convenient way.

According to Kalaskar P. (2013), hotels upgrade as luxury accordance with the amenities provided by the hotels like 5 Star [3]. All the criteria necessary to provide the greatest amenities to the hotels are examined to arrive at these ratings. According to Popat K. (2013), hotel system requires courageous team which works in a manner that will make proper coordination with all the facilities or

services that they are providing in the hotel [3], [4]. The system should have no issues with any of its management features. It involves the hotel administration, financial department, Room service, employee department and food and catering service etc. Our system also provides a user-friendly way to manage those administrations for the user. This system features number of managements that are integrated with one another, including user management, staff and supplier management, room and reservation management, and restaurant management. These enable the administrator to manage hotel resources with ease, which will improving the property's ratings.

Reviews and comments are particularly influential for all industries' development. Review articles become very important role not only for the users but for the hotels and travel industry [5], [6]. Customers who utilize hotel reservation services can post reviews of their experiences, and potential customers can request these reviews based on their own stays. This hotel management system has a review management that customer can give comments according to their experiences.

After reviewing research papers on the hotel management systems built in such developed countries, we believe it is important to design this web application for even our country in an effort to provide a better user experience and boost the nation's economic growth.

## III. METHODOLOGY

Our hotel management system is an e-commerce web application that support to manage the chores of the hotel system. When developing this system, we used different types of tools and technologies. Tools that we used for this application are, AzureBoards, Github, SonarQube and Selenium. Azure Boards provides interactive and customizable tools for the software development teams which they need to manage their software projects. It provides a wide variety of features, such as calendar views, configurable dashboards, and integrated reporting, as well as native support for Agile, Scrum, and Kanban processes. From this we tracked the tasks, issues and code defects immersed during implementation that related to our project. The Kanban board shows the features that enable us to add, edit and filter tasks, bugs, features and epics.

Github is a platform that provide internet hosting service and version control using Git. Utilizing the version control system will make merging and branching for the project easier and display interactions with each project contributor. In addition to the distributed version control of Git, it provides access control, bug tracking, software feature requests, task management, continuous integration, and wikis for every project. SonarQube is a tool that systematically helps you to deliver Clean Code with self-

managed and automatic code review features. It will assist to enhance the process of controlling code quality, which is a crucial step in the software development process. SonarQube may help to perform ongoing code inspections of the projects by integrating into the current process and identifying problems in the code. Selenium is an umbrella project for a range of tools and libraries that enable and support the automation of web browsers. It provides playback tools for writing functional tests that can be executed in the current web browsers and provide interface to write test scripts in different programming languages.

The technologies that we used for this application are, React JS, Node JS, Express JS and MongoDB. For the front-end implementation we were used React JS. React JS is one of the most popular open-source, component-based front end JavaScript library which developed and maintained by Facebook and Instagram. It is used to develop user interfaces and reusable UI components that ideal for large web applications that consume data and

change over the time without reloading the entire page. Express JS is an open-source backend Node JS framework. It streamlines and facilitates the production of back-end code rather than requiring the use of Node.js to write the codes and creation of several Node modules. The fact that Express supports a wide variety of middleware results in shorter, simpler code. NodeJS is a cross platform, open-source runtime environment for server-side and networking applications that built on Google Chrome’s JavaScript Engine called V8 engine. Node.js also comes with several JavaScript libraries, which makes easier to develop web applications. MongoDB is an open-source, NoSQL document database which uses SpiderMonkey JavaScript engine. In here, each record is stored as a document comprising of key-value pairs that resemble to JSON objects.

Figure 1. shows the system functionality module diagram that describe the overall system functionality.

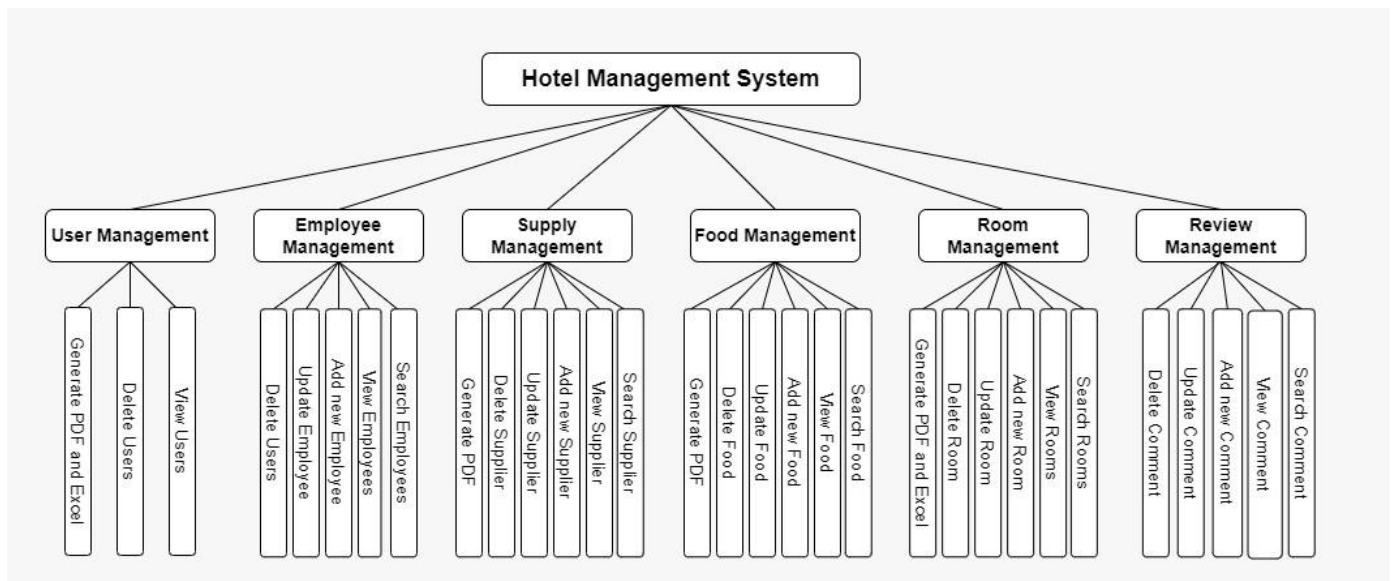


Figure 1: System Function Module Diagram

This system consists of 04 main functions such as Restaurant management, Room reservation management, Review management and Employee and Supplier management. In here we discussed about the backend processes related to these 04 main functions. In our system there are mainly 04 CRUD operations used for each function such as Add, Update, Delete, Search and additionally we implement the report generation. In adding function, admin can add food menus, room details, employee, and supplier details. When adding food menu details and room details, admin can upload images related to each component. The URL of those images are saved as an array in the Mongo DB. For the customers, can add food

items to the cart, booking rooms and add comments and reactions to the specific rooms. All the details are saved in the Mongo DB by using POST method to create relevant component. In the update function, admin can edit details of the food menus, room details, employee, and supplier details. Customers can edit their own comments only that they give for the relevant rooms and update the status of the booking details (When customers need to cancel the booking requests). By using PUT method, all the details will be updated and saved in the Mongo DB. In the delete function, admin can delete food menus, rooms, employees, and suppliers and all the booking details of the customers. Customers can delete their own comments only that they

give for the room. This will use the DELETE method to delete the components from the Mongo DB. If specific operation is successfully executed, there is a pop-up message will be displayed; otherwise, if it is not successful, then pop-up message will be displayed. Customers and admins can search details relevant to the component by name. Details will be retrieved from the Mongo DB by using GET method. In the system, the additional feature called report generation will be implemented for all the components. In here, the reports for all food menus, all booking details, all supplier details and all users will be generated as PDF. There is a separate report will be generated as Excel sheet for all users.

#### IV. PROPOSED SYSTEM

This system consists of four main interconnected components such as Website, Admin front-end, system back-end and the database server. Here, both customers and administrators must work on same platform. First users need to sign up or sign-in to the system with valid information which will directly store in the Mongo DB. Then users can follow user-flow as follows according to their opinion.

##### A. Restaurant Management

The main objective of this section is the ordering the food items according to their preference and manage food menus. In here, after customer successfully signing, he/she can navigate to the Restaurant page as shown in Figure 2 and view the different types of food that currently available in the hotel. From here, customer can select one or more food items. Every customer has a cart that shows the selected food items with the quantity and will display the calculated total price. Customer can increase or decrease the quantity from either 'Restaurant' page or cart. Then customer can make the payment by giving relevant details. In here, he/she can pay via credit card or debit card. Furthermore, when user need to manage food menus, he/she need to be signing as admin. Admin can view all food menus available in the hotel via 'Manage Restaurant' page. Also, admin can search relevant food menu by name, add new food menu, update existing food menu details, or delete food menu that are not used anymore. In 'All Orders' page, admin can view all the order details that made by each customer as shown in Figure 3. Additionally, there is another feature was implemented as report generation that will generate a report about details of food menus as PDF.

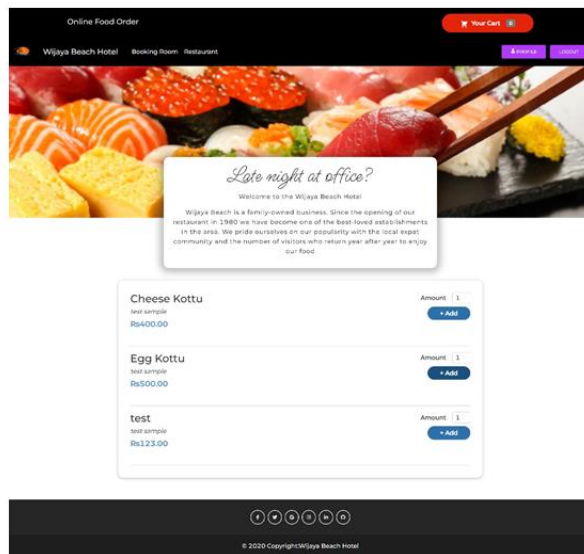


Figure 2: Restaurant page – Customer view

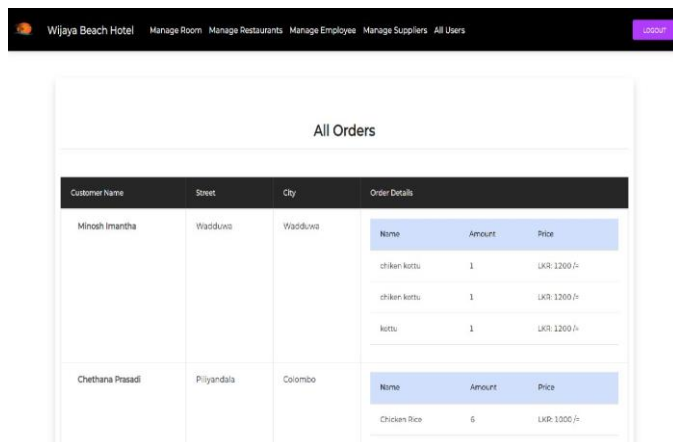


Figure 3: All Orders page – Admin view

##### B. Room and Reservation Management

The main objective of this section is booking the preferred rooms and manage rooms and reservations. If user signing as customer, he/she can navigate to the 'Rooms' page to view all the rooms that are available in the hotel. From here, customer can get brief idea about the preferred room. Then customer can book the room by entering check-in and check-out dates. Afterwards in 'Booking' page as shown in Figure 5, will display the calculated total price and total days, room details and user details. Customer can make the payment via credit card or debit card. Customer can view the booking details from his/her profile. If user signing as admin, he/she can navigate to the 'Manage Rooms' page that shows all the

rooms details available in the hotel as shown in Figure 4. From here, admin can search relevant room by name, add new room, update existing room details, and delete room that are not available anymore. Admin can filter the room details according to the room type. The ‘All Bookings’ page will demonstrate all the booking details for the admin. Also, admin can generate a report as PDF and Excel for all booking details and customer can generate a report as PDF for his/her booking details.

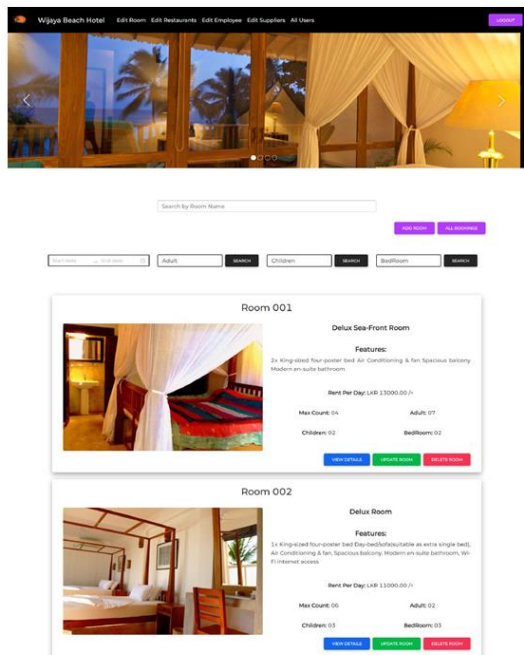


Figure 4: Manage Rooms page – Admin view

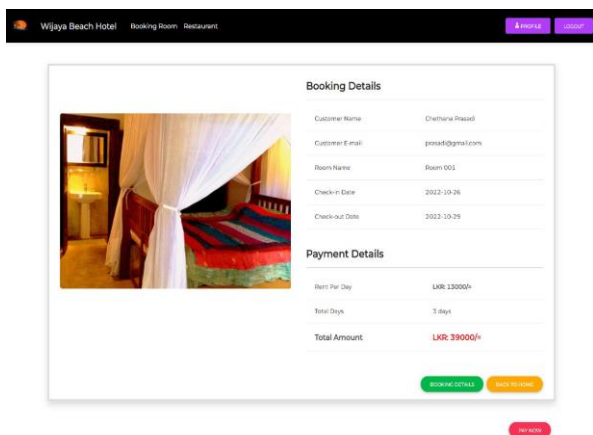


Figure 5: Booking page – Customer view

**C. Review and User Management**

The main objective of this section is managing comments that given to the rooms and manage all user details. After customer successfully signing to the system, he/she can give the comments according to their

experiences in the ‘Booking Room’ page as shown in Figure 6. Here, there is a rating system that customer can give ratings based on the service. Also, customer can search comments, update, and delete their own comments only. Every customer can give reactions (Heart reaction) to the comments that given to the relevant room. Apart from that, as shown in Figure 7 admin can manage all user details that signing to the system from the ‘Manage Users’ page. From here, admin can view all user details and delete users if needed. Additionally, admin can generate a report that demonstrate about all user details as PDF and Excel.



Figure 6: Booking page – Customer view

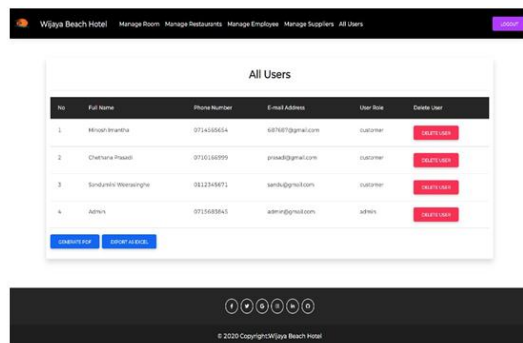


Figure 7: Manage Users page – Admin view

**D. Employee and Supplier Management**

The main objective of this section is managing employees who work in the hotel and managing supplier details who supply different supplies for the hotel. After successfully signing to the system, admin can navigate to the ‘Manage Employee’ page to view all the employee details as shown in Figure 8. From here, admin can search relevant employee by name, add new employee, update existing employee details, and delete employee that are not worked anymore. Then admin can navigate to ‘Manage Supplier’ page as shown in Figure 9 to view all supplier details. From here, admin can search relevant supplier by name, add new supplier, update existing supplier details, and delete supplier that are not supply supplies anymore. Additionally, there is another feature as report generation that demonstrate all the supplier details as PDF.

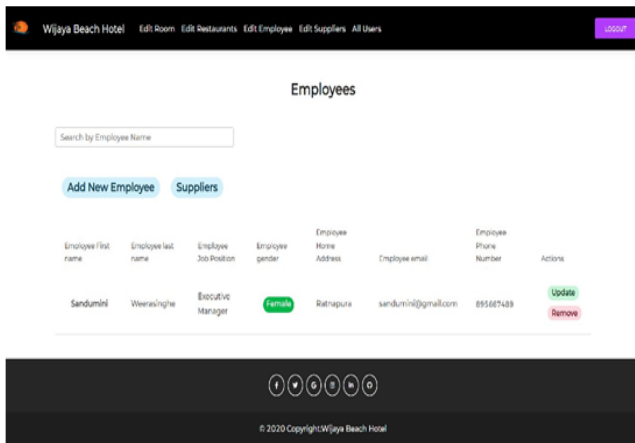


Figure 8: Manage Employee page – Admin view

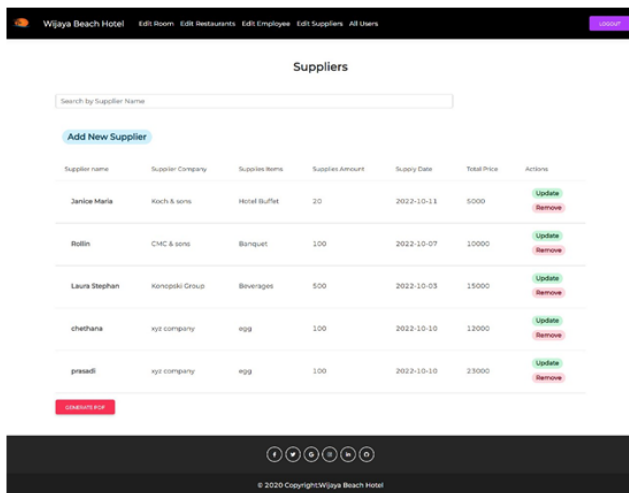


Figure 9: Manage Supplier page – Admin view

### V. DISCUSSION

The Table 1 demonstrate the food menu data taken from the database. These details will be saved to the database successfully by filling the relevant details of the ‘Add Food menu’ form. In this form, it will ask to fill the image, food name, description, and price of the food. The URL of the images will be saved in an array. The ID is automatically generated while saving food, which uniquely given to all food.

ID	Food Name	Description	Price (LKR)
1	Cheese Kottu	Popular evening street food which is made from chopped flatbread mixed and mashed together with cheese and vegetables.	1500 /=
2	Fried Rice	Dish of cooked rice that has been stir-fried in a wok or a frying pan	750 /=
3	Chicken Kottu	Popular evening street food which is made from chopped flatbread mixed and mashed with chicken.	1200 /=
4	Noodles	Food made from unleavened dough which is rolled flat and cut, stretched, or extruded, into long strips or strings	450 /=

Table 1: Food Menu Record

The Table 2 illustrate the booking data taken from the database that saved after successfully booking the room by the customer. This will show the customer’s name, room name, check-in date, check-out date, payment, and status. The ID is automatically generated while room is successfully booked, which uniquely given to all bookings. The last column, status of the booking, displays weather it is booked or cancel.

ID	Name	Room Name	Check-in Date	Check-out Date	Payment (LKR)	Status
1	Minosh Imantha	Room 001	2022-10-15	2022-10-18	99000 /=	Booked
2	Chethana Prasadi	Room 003	2022-10-22	2022-10-25	70000 /=	Cancel
3	Sandumini Weerasinghe	Room 002	2022-10-14	2022-10-20	41000 /=	Booked
4	Kaveesha Mihiranga	Room 004	2022-10-16	2022-10-31	91000 /=	Booked

Table 2: Room Booking Record

The Table 3 demonstrate the registered users data taken from the database after successfully sign up to the system. In the ‘Register’ form, user must give the

username, phone number, email address and user role. As user role, user can register as either admin or customer. The ID is automatically generated while user sign up to the system, which uniquely given to all users.

ID	Username	Phone Number	E-mail Address	User Role
1	Minosh Imantha	0718890878	minosh@gmail.com	Customer
2	Chethana Prasadi	0710166999	prasadi@gmail.com	Customer
3	Sandumini Weerasinghe	07656787653	sandu@gmail.com	Customer
4	Kaveesha Mihiranga	0776756754	kaveesha@gmail.com	Customer
5	Admin	07867854367	admin@gmail.com	Admin

Table 3: User Record

The Table 4 illustrate the registered suppliers data taken from the database that saved after successfully submitting the 'Add Supplier' form details. It will ask about the supplier's name, supplier company, supply items, amount supply date and total price. Here the minimum date of the supply date should be the date that it will adding to the system. The ID is automatically generated while adding supplier, which uniquely given to all suppliers.

ID	Supplier Name	Supplier Company	Supplier Items	Supplies Amount	Supply Date	Total Price (LKR)
1	Rollin	PnS	Beverages	100	2022-10-11	10000/=
2	Laura	CMC & sons	Banquet	80	2022-10-25	9500/=
3	Janice	Konopski	Hotel Buffet	150	2022-10-19	15000/=
4	Maria	Koch & sons	Egg	100	2022-10-20	18000/=

Table 4: Supplier Record

As testing methods we used Selenium and SonarQube to test all the functionalities in the system. In the Selenium, we can configure that the functions are executed successfully or not by passing test cases. As example, Figure 10 and 11 are shown the testings that done using the test cases of 'Login' page and 'Booking' page. SonarQube used to configure all the issues such as blockings, criticals, major issues, minor issues etc. that related to the system. Basically, blockings and criticals must fixed by the developer to get quality report and clean code. Following Figure 12 shown the dashboard of the SonarQube that show the bugs, coverage, code smell etc.

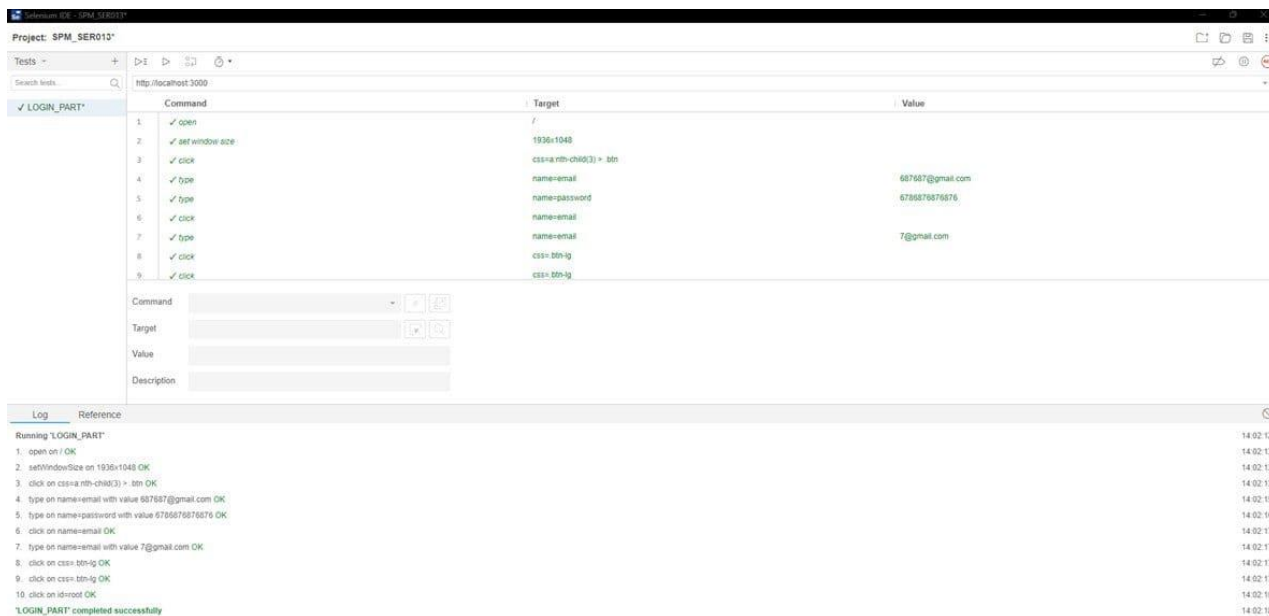


Figure 10: Selenium IDE Test Script of the Login

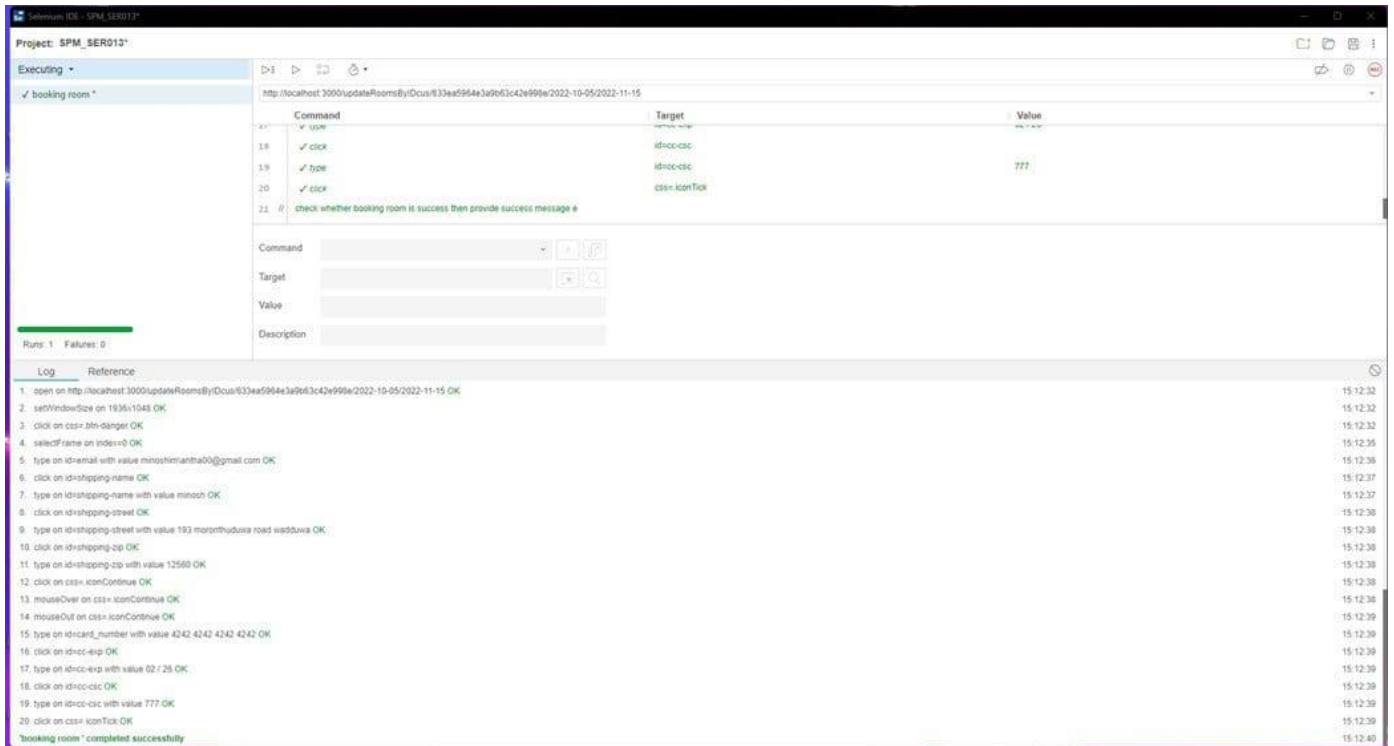


Figure 11: Selenium IDE Test Script of the Booking

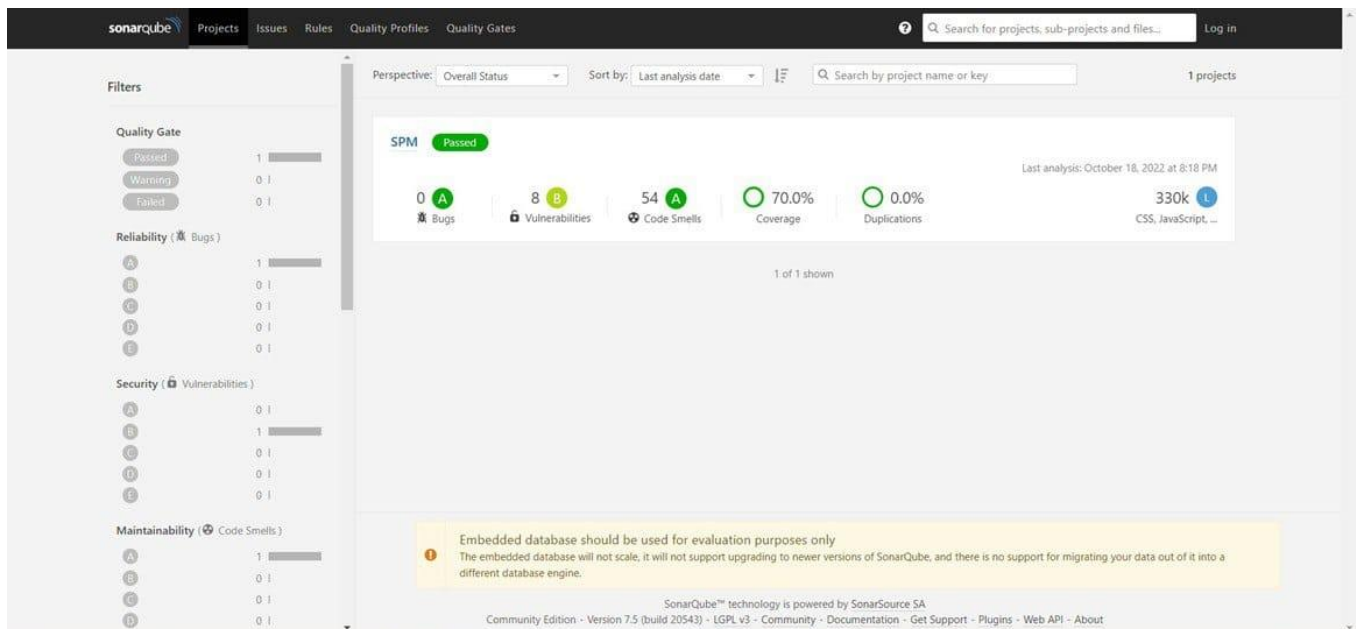


Figure 12: Project Overview Dashboard in the SonarQube

## VI. CONCLUSION

In conclusion, we think that if this application is used well, it will save time, lessen the amount of work that

must be done by the administration. The special feature of this program is that you may make reservations for a suitable accommodation and meal without physically visiting the hotel. Customers are encouraged to make



bookings using this method swiftly and simply. To filter according to consumer needs, there are several filters. Using such options, customers may quickly choose a room that meets their needs. Furthermore, consumers can add a variety of food products to their cart and checkout with a debit or credit card. Debit or credit card payments can be made for both food items and room reservations. This makes using this web application very simple. Using this web application, the customer may perform all actions. Additionally, customers may read reviews of pertinent rooms before selecting one. Customers can also post their reviews to the appropriate room. The consumer can also receive a booking receipt after making a reservation. But they can also make the request using this application if they wish to cancel the reservation. In addition to cutting labor costs, utilizing this system will give customers more reasons to enjoy the hotel and come back time and time again. For Further development, we will plan to develop the Mobile Application for this system because now we only have the web-based Application, but if we develop the Mobile Application, it will be easy for the Customers.

## REFERENCES

- [1] <https://www.coursehero.com/u/file/13388557/CIS-500-Research-paper/>.
- [2] J. Wu. (2010). A study of the hotel industry's application of the web site as a marketing tool. *3rd International Conference on Information Management, Innovation Management and Industrial Engineering*, pp. 632-635. DOI: 10.1109/ICIII.2010.471.
- [3] A. Pathak, A. Sngal & B. K. Rana. (2021). Review on hotel management system. *3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N)*, pp. 1834-1837. DOI: 10.1109/ICAC3N53548.2021.9725658.
- [4] Gray, W. S. & S. C. Liguori. (2002). *Hotel and motel management and operations*.
- [5] K. Tsujii, K. Tsuda & M. Takahashi. (2015). Towards extracting the hotel evaluations from the comments by the foreign tourists with text mining. *4th International Congress on Advanced Applied Informatics*, pp. 46-49. DOI: 10.1109/IIAI-AAI.2015.
- [6] Gretzel, Ulrike & Kyung Hyan Yoo. (2008). Use and impact of online travel reviews. *Information and Communication Technologies in Tourism 2008*, pp. 35-46.