

Hotel Reservation Management System

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Abstract: In this era various information and communication technologies refers to all equipment and programs that are used to process and communicate information. For example, internet has transformed the way people communicate, study, work and others daily activities. The internet is becoming popular in all the country to search the information. This study was conducted to discuss about the development of the online management system which is develop of Hotel Reservation Management System. In this system we use Waterfall Model and it involved 6 process which is requirement analysis, system design, implementation, system testing, system deployment and system maintenance to develop this system. Every phase should be following the step starting from planning phase where is we planned what will be archived in this system. This system design should be make sure the system is fully completed and functionally within the prescribed period. At the end, this system process can be used to ensure users can use this system properly and efficiently. Other than that, this system will allow customer to visit the hotel website with full access to make reservation with no extra charge. The important of using this system that will help hotel employee to manage online and walk in reservation. Besides that, customer can check the room availability based on the selected date and make reservation online. Hopefully at the end of this system will help to improve the customer experience and hotel employee work efficiency.

Keywords: *Hotel Management, Hotel Reservation, Waterfall Model, Web-Based System*

1. Introduction

It is evident that advances in technology can help us enhance our lives in our modern day. By various means, we can know about why computer is very important because it allows us to access many information and easier our daily work. Most of the workplace fully using computer to process and store the information but still have some workplace still using paper work. As we know, a management system is very useful for workers because it can increase the productivity, easier time finding and also decrease the security risk.

Hotel Reservation Management System is a system that helps hotel to manage their customer personal information, check in and out process, reservation process and also room details. This system also convenient for hotel employees to organize all the reservation to avoid duplicate reservation problem. Hotel employees can check the room availability, so they can let their customer know which type of room still available for which date.

As we can see, Covid-19 is very serious in Malaysia and we should avoid close contact with each other. Customer can make reservation in hotel website, so they no need take a long queue and wasting a lot of time at reception counter for filling the guest information manually. Customer just need to fill their personal details before submit the reservation in the website, if the personal details found out is misinformation, hotel have the right to cancel the reservation without prior notice. Customer are not required to sign up and log in to their account before making any reservation. Customer cannot make cancellation for their reservation in their side based on hotel terms and condition.

Hotel Reservation Management System will replace the traditional method which is manually handling operations. After the reservation is confirmed, hotel employees can check the information of guest before customer arrive for check in procedure. The problem of double booking, forgotten reservations would be solved after using the system. The hotel management also can check the latest reservation record and update the status after their customer check out their room

2. Literature Review

Meilin Hotel has been in hotel business since 1960 and already operating 61 years until now. It is a historical hotel in the town of Batu Pahat Johor. They retain the vintage style of Batu Pahat and it attract many customers to stay in their hotel. The significance of computers and their applications has been acknowledged all over the world. The influence of computers on society may be seen in the hotel reservation management system. Many of the tasks and business such as buying or selling the products by using online. The customer is no longer required to leave from his current location, they just need click from his mouse and it will serve to complete the task. Hotel Reservation Management System is a system or a website that allow users to make a room reservation directly. In hotel main page contains hotel room types, availability room based on the selected date and the hotel information. In this era, many people prefer to book the room online compared with walk in booking. This will save a lot of time to process the booking details. Besides that, hotel room is limited and very fast to sold out. For example, customer walk in the hotel but notice that the room is sold out, they would very disappointed. Hotel Reservation Management System can help the hotel to attract more customer visit their room and make a reservation in the fastest and easiest way.

2.1 Katerina Hotel

Katerina Hotel is 4 Star hotel which located in Batu Pahat town. This is the largest hotel in Batu Pahat and have 188 guest room and suites with the modern furniture. Katerina Hotel have a useful function for customer which is they can check the availability room based on the selected date. Customer required to select the number for adults and children, then it will display the suitable room for them. Furthermore, customer can select the currency and this function is very good for foreigner customer. Beside the room type have a more info button, customer can know what facilities is provided such as window view, coffee maker and others.

2.2 Elegant Hotel

Elegant Hotel is popular because it is contemporary hotel in Batu Pahat Johor and the price is very reasonable compare with others. For the main page, there have auto slide banner at the top page. They attach the early bird promotion code in the banner to attract more customer to make reservation for the upcoming date. Besides that, customer can be browse the type of the room and get the room rate. This is very important information for customer because they can make reservation based on their budget.

Customer can know the bed type and it is suitable for how many persons. Other than that, customer can know what facilities provided in the room such as executive seat, table, fridge, safety box and Jacuzzi.

2.3 Hotelogix

Hotelogix is a web based hotel management system. It providing a single window for all hotel operations and reservations. Hotelogix have a function which allows to integrate and sync the data with third party platform which is Agoda, Trivago and others. In the system, there have two roles can select which is front desk or housekeeping. For the front desk main page, there have a table displayed all the hotel room. If there have any confirmation reservation, it will remark with color based on the selected date. It is very clear for front desk employee because they can check the available room easily.

2.4 Comparison of Existing Systems

Every system has its own advantages and disadvantages because perfect things does not exist. We may learn from these advantages and disadvantages since they can guide us in developing an effective system. The system not only does the required functions, but it can also encourage additional users to utilize it. The system should be distinct from others and able of demonstrating our system's primary objective. The study of existing system would be list out and analyze each website or system feature and weakness for the system, so can learn from the weakness. Table 1 shows the comparison of existing system and Hotel Reservation Management System.

Table 1: Comparison of Existing Table

System Name	Advantages	Disadvantages
Elegant Hotel	<ul style="list-style-type: none"> • Customer interface easiest to understand • Promotion details in banner • Contact us form can contact hotel directly 	<ul style="list-style-type: none"> • Cannot make reservation in hotel website • The photo for each room type only have one picture
Katerina Hotel	<ul style="list-style-type: none"> • Allow customer to search the availability of room based on selected date • E-Shop function • Log in account to make reservation and can refer back booking information • Customer can make reservation and payment in website 	<ul style="list-style-type: none"> • The interface for this system messy • Can make reservation without login account • No photo in gallery page • Cannot make order for food and beverage directly
Hotelogix	<ul style="list-style-type: none"> • Housekeeping role to update the room status • Sync the reservation from third party platform • Billing, check in and check out function • Providing 24/7 live chat services 	<ul style="list-style-type: none"> • Very difficult to use system • Housekeeping not receive notification for cleaning the room • System price is very expensive • No search function for customer name

Hotel Reservation Management System	<ul style="list-style-type: none"> • Can make room reservation or cancellation easily • Can check the availability of room • Billing function • Add / Edit / Delete room 	<ul style="list-style-type: none"> • System in secure • Many customers cannot access in the same time
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3. Methodology

Waterfall Model is one of the model in Software Development Life Cycle (SDLC) and it works well for smaller projects where requirements are very easy to understand. In a waterfall model, we must complete the first phases then only can proceed to next phase and it is not allowing to overlapping in the phases. We will choose waterfall model as our methodology because we can show our system progress simply. The specific milestones defined in the first phase make it simple to verify whether a project is completed on time. Furthermore, since the waterfall approach does not allow for revisiting a previous phase, the discrete phases indicate how far a project is to overall completion at any given time. Project implementation should be conducted sequentially to this methodology phase. Table 2 shows the waterfall model.

Table 2: Waterfall Model

Phase	Task
Requirement Analysis	Developers should have a good understanding of the project's requirement. This data may be gathered in a variety of ways, including interviews, questionnaires, and interactive brainstorming, so we can understand what the user and admin needs in this system. The project needs should be clear by the end of this phase, and we should prepare a document or proposal which captures all feasible needs for the system to be created to the hotel management. After the discussion with hotel management, we can have confirmed what requirement should be in the system such as reservation function, billing, customer data and others. We will also double confirm with hotel management because after all the requirement document confirmed and verified, we will not consider the extra function. This is because we will complete requirement analysis then only proceed with the next stage.
System Design	Examines the requirements specifications from the previous phase and prepares the system design. This system design helps in designing the overall system architecture and there is no coding is done during this phase. We should sketch the website and system design, so the hotel management can understand our interface design ideas. If the hotel management would like to use the selected colour or use some special feature such as slide show banner, then we will design based on their idea. We also need to specifying hardware and system requirements to develop and run this system.

Implementation	<p>Developers use coding to develop the system. We can take the data from the previous phase and develop it into a functional system. We should development the system based on the objective of our project. The system is first built as discrete programs called units, which are then merged in the following step, using inputs from the system design. After that, we had to create a database and connecting the system to database. This stage would take longer than other stage because we need to make sure all the feature and requirement including in this system. Unit testing is the process of developing and testing each unit for its functioning.</p>
System Testing	<p>After each unit has been tested, all of the units developed during the implementation phase are merged into a system. The entire system is then checked for any errors or failures after it has been integrated. This is when quality assurance, unit, system, and beta tests are conducted in order to identify and report any issues that need to be resolved. Debugging may be required to repeat the coding step as a result of this. The waterfall proceeds onward if the system passes the tests.</p>
System Deployment	<p>The system is deployed into a live environment in order to test its performance. We will include real-time user training in order to explain the system benefits and its feature. In this briefing, hotel management staff can understand how to use this system after their customer make reservation in website. They can check the reservation details and also process the check in on the day. After that, they can print out the billing for customer during when customer check out. Other than that, we will also show them how to make reservation in website as a customer. So the hotel staff can assist their customer if they need any assistance. End user can access the system once it has been deployed.</p>
System Maintenance	<p>After the deployment phase, the last one would be maintenance. The system would have delivered to the hotel management and it is online to use for their customer. We would provide software support and maintenance to Meilin hotel to ensure that the functions are running smoothly. We may need to generate fixes and updates to address issues as they occur. The aim for this phase is to resolve any problems, faults, or issues that the hotel management or customer encounter during they using. Large concerns may force a return to phase one.</p>

4. System Analysis and Design

The analysis and design section discuss the process of data analysis and the design process for Hotel Reservation Management System. According to LeCompte and Schensul, analysis is a process to reduce the research problems and analyse it in gaining insights. It also rather than a solution, more focuses on analysis of the problem and requirements. Rather of focusing on implementation, design emphasizes a

conceptual solution that meets the requirement. Each development system requires analysis and design to ensure data storage and used in a systematic and neglected way. This is because the form data and types of data required are clearly described, a detailed analysis will help in the process of developing the system. The way of the analysis for this system are structure method by using the Entity Relationship Diagram, Context Diagram and Data Flow Diagram to understand process of the system. This chapter would help to analyses the problem and provide the suitable solution and idea for developing the system.

4.1 Context Diagram

Context diagram is a diagram that defines part of a system and showing entities that interact with it. There have two entities in the system which is customer and hotel employee. As we can see, hotel employee has more function than customer. Customer is not allowing to edit or manage their account and reservation. If customer need to edit their reservation or account, they had to contact with hotel for this issue. Figure 1 shows the context diagram for Hotel Reservation Management System

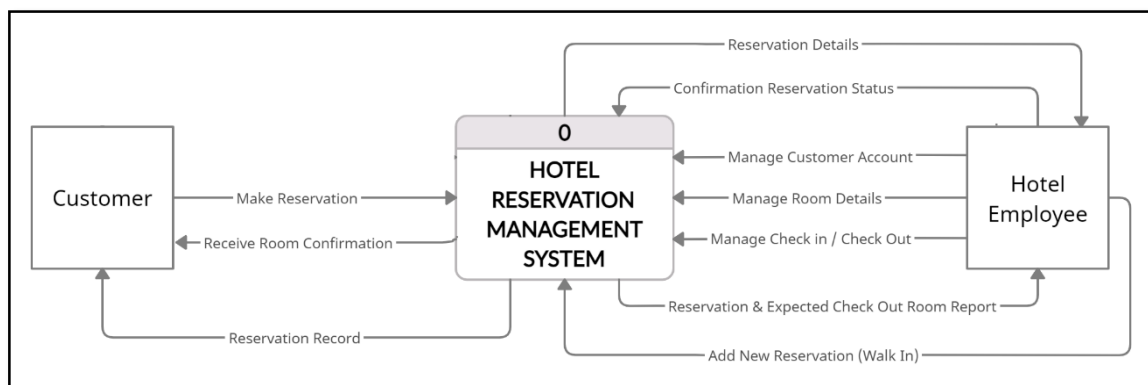


Figure 1: Context Diagram

4.2 Data Flow Diagram

Data flow diagram (DFD) describe the dataflow in a business information system graphically. DFD specifies the steps involved in transferring data from the input to file storage and result the output in a system. The diagram consists of 7 processes, 2 entities and 7 storage data. Figure 2 shows the data flow diagram.

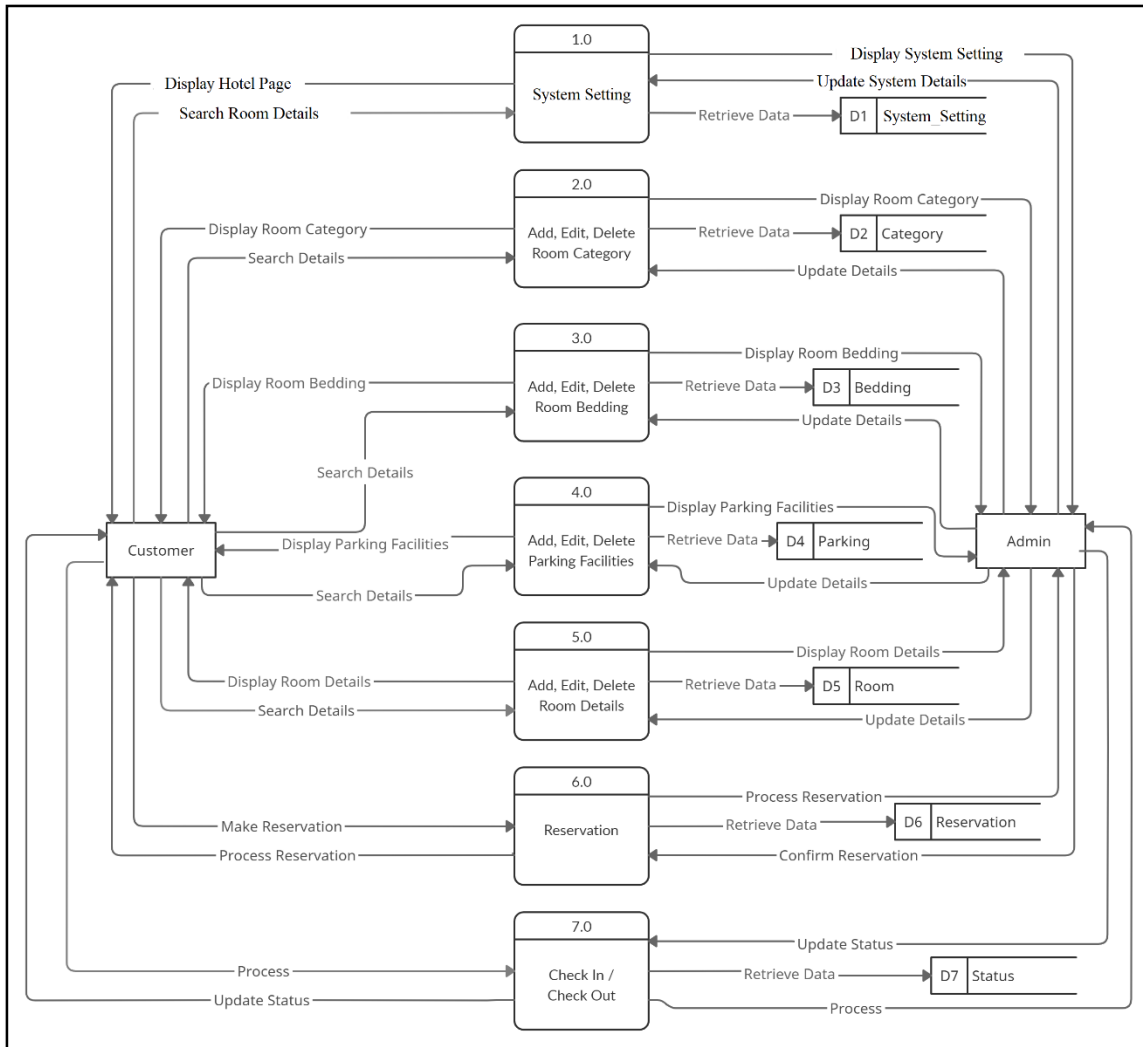


Figure 2: Data Flow Diagram

4.3 Entity Relationship Diagram

The Entity Relationship Diagram (ERD) is a graphical representation of an information system that depicts the relationships among people, objects, places, concepts or events within that system. The ERD diagram involves several entities and attributes for each entity. The attributes are a characteristic or trait of an entity type that describes the entity. Entity is a real object which can store data and define the system relationship between entities known as relationships. Figure 3 shows the entity relationship diagram.

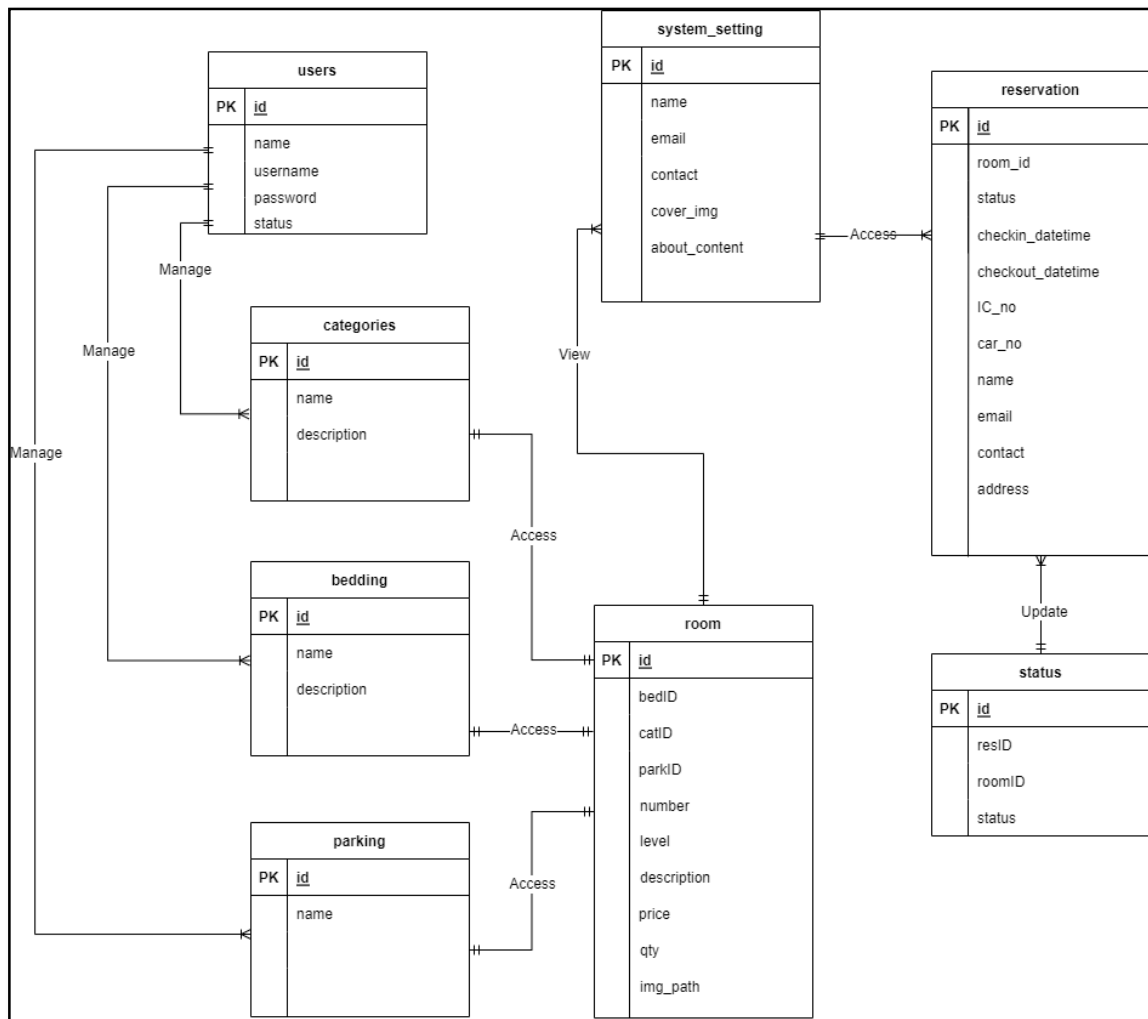


Figure 3: Entity Relationship Diagram

4.4 Flowchart Diagram

After collecting all the data from analysis phase, we will move forward to system design. In the early of the system design phase, we required to draw flow chart for our system to give an overview of the process flow which would be develop after this. Flow chart will help us to speed up the process of developing the system. In Hotel Reservation Management System, the flowchart would be divided into two part which is customer (user) and hotel employee (admin). In the user part, they not required to register new account or login. They can search the available room by using check in, check out date and also room category. If the selected date is available, system would display the room details. After that, customer can make reservation and enter their personal information. Figure 4 shows the flow chart diagram for the user.

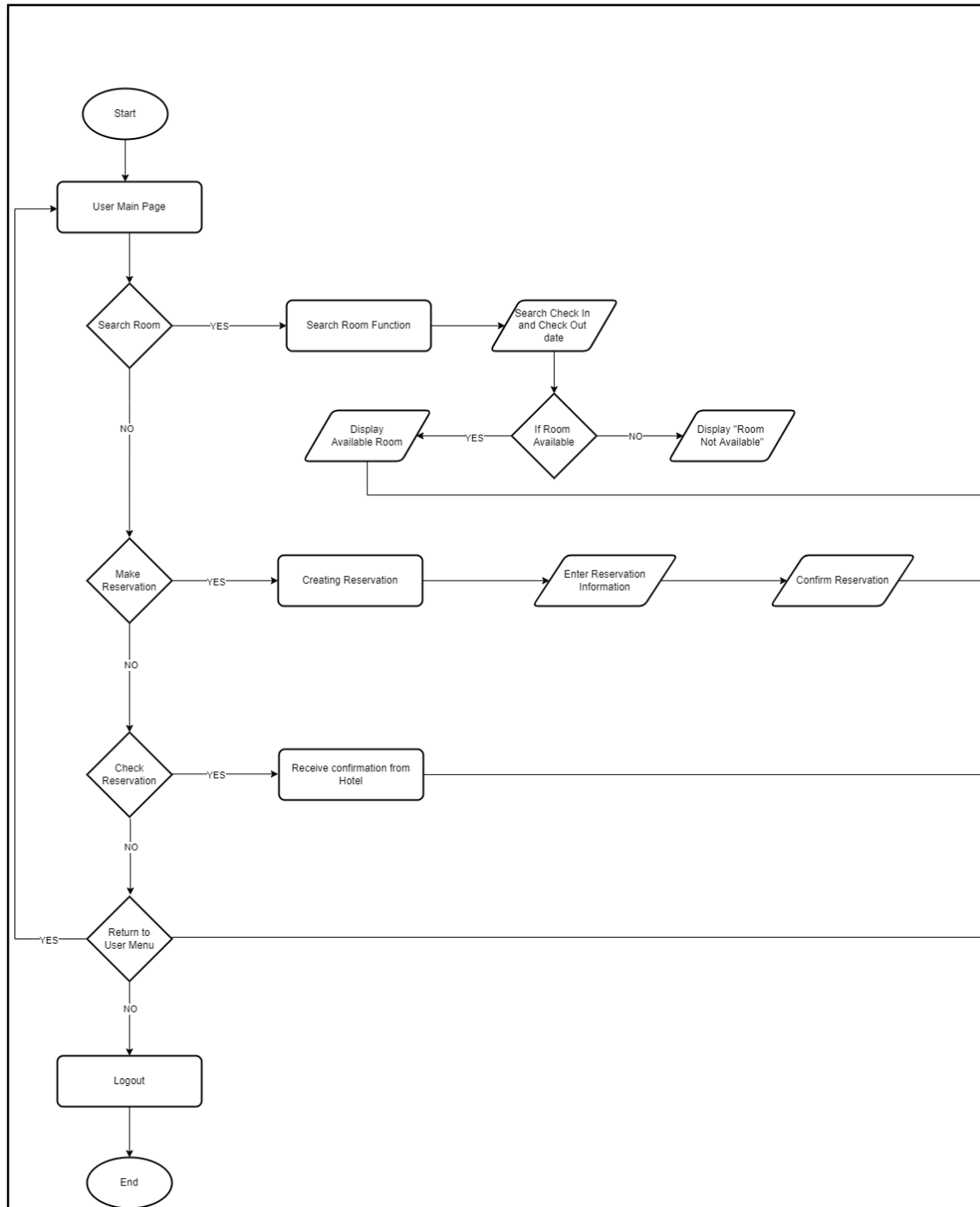


Figure 4: User Flowchart

For the admin part, they need to login to their admin account by using admin id and password. In the admin main page, there have different service for admin. Admin can add, edit and delete the room category, bedding details and parking details. Admin can update or delete the room details, they need to add the room by enter room number, room level, bedding type, room category, parking facilities, room description, room pricing, room quantity and room image. In the reservation part, admin can add reservation for walk in customer. If customer would like to edit their reservation details, admin also allow to edit. Admin had to update the reservation status from pending to confirm. For the check in and check out function, it would display all the confirm reservation. Admin need to add check in details

which is identity card number and car plate number. Admin just need to update the status after their customer check out the room. Figure 5 shows the flow chart diagram for the admin.

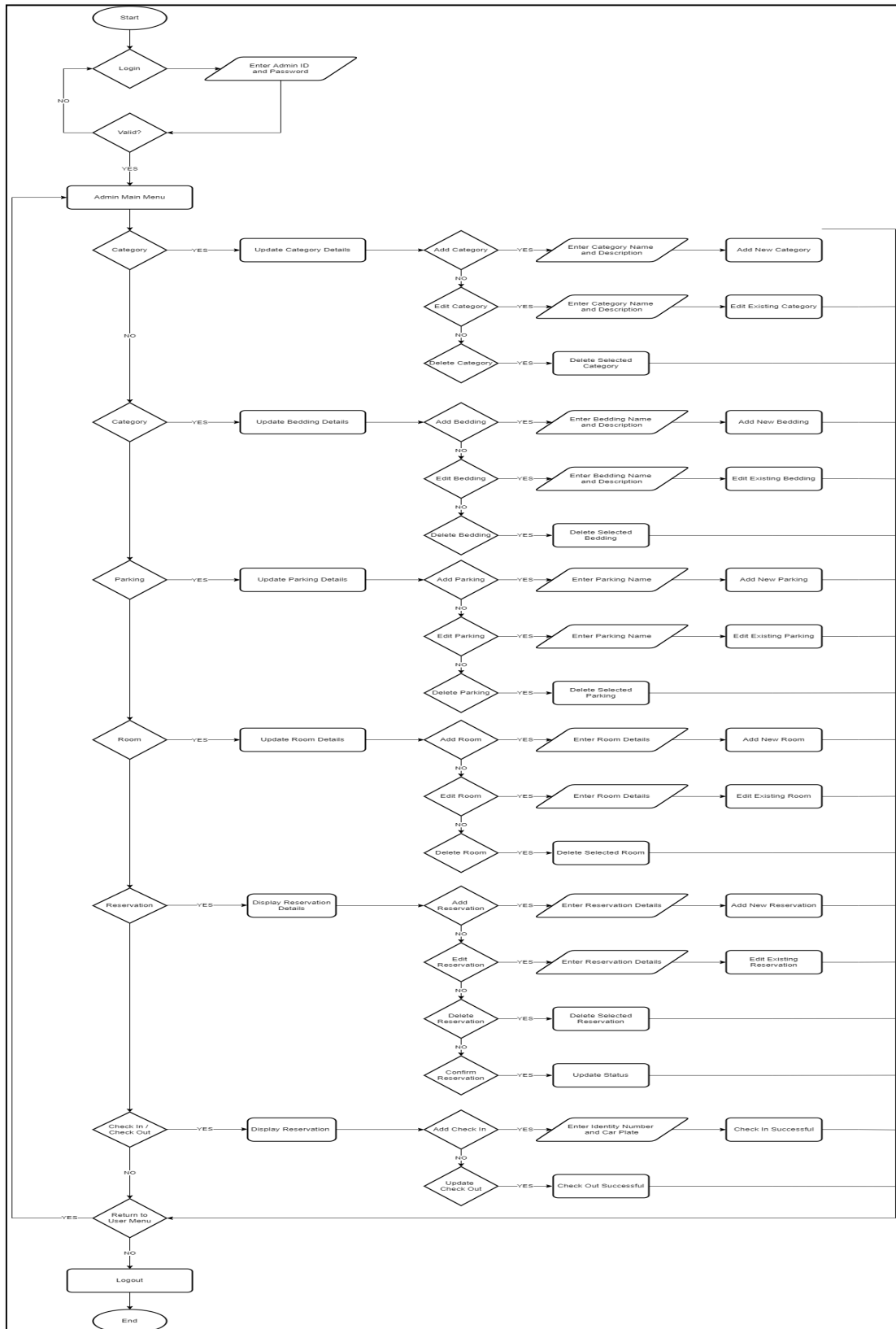


Figure 5: Admin Flowchart

5. Result and Discussion

Implementation is system development process based on how the system should be built and ensuring the system meets the quality standard. For developing the system, it involves the development of programs that are programming process of the system. Besides that, it also involves the development of database. The aim of the testing system is to make sure that the system can be run without any errors and all the function according to the user needs and requirement. The testing process is implemented to some user after the system is ready to develop and implemented to all user. There are three general testing stages had been discussed in this chapter which is test unit, integration system and testing.

5.1 System Implementation

The Hotel Reservation Management System's development and implementation is based on MeiLin Hotel management's original planning, analysis, and design, which was completed during the previous phase. In the implementation phase, it involves the coding and executing of the system. There are two roles for access this system which are customer and admin. As a customer, they are not required to sign up or log in account for making reservation. But for the admin, they need to log in their account due to privacy policy.

5.1.1 Users Interface

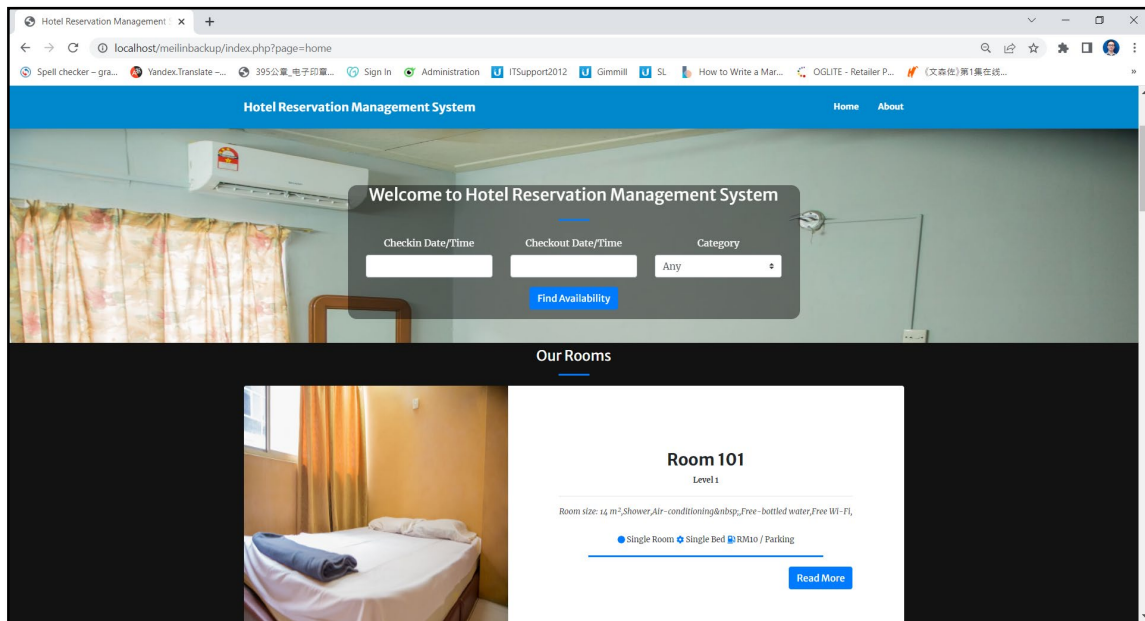


Figure 6: User Homepage

In user interface, we can notice that in the main pages of the system shows multiple carousel image in the top of the page. The carousel image will display based on the room image, if admin add new room and the new room image will also update in the carousel image. In the middle of carousel image, there have a search room function and allow user to find available room based on the check in date and check out date. If the room are booked on selected date, the system will only display other category room for user. Figure 6 shows the home page for user.

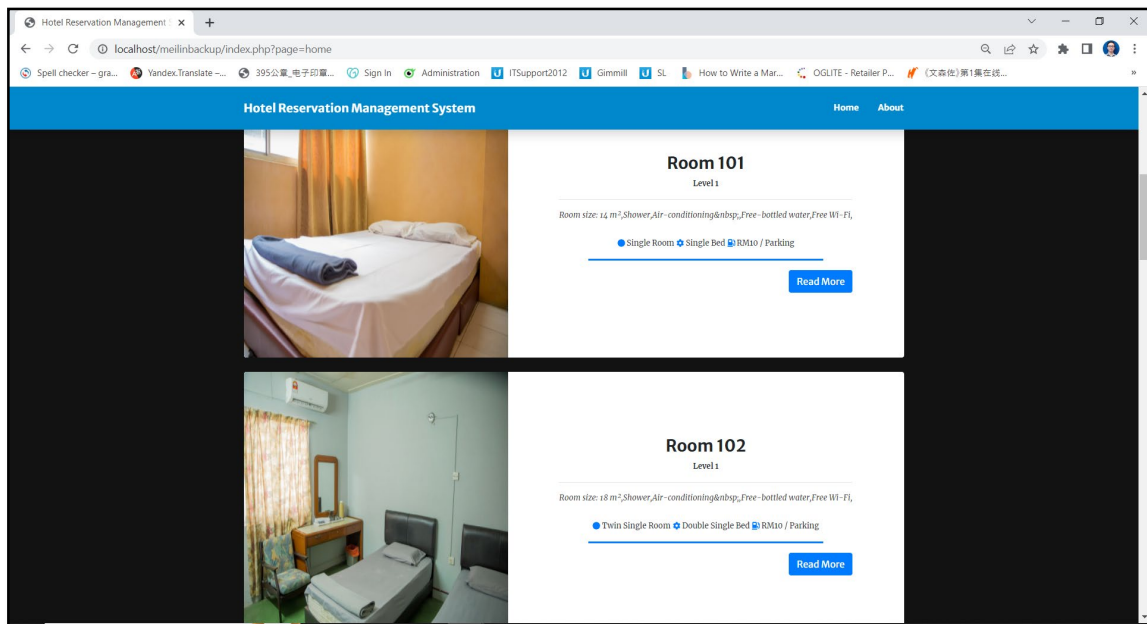


Figure 7: Hotel Room Information

In the middle of home page, all the hotel room will display here. The room number and room level will display directly, so their user can know which room and which floor they would stay. Each room will show the room type, bedding type and parking price. In the read more button, room details will show the room size, shower or bathtub, air conditioning, free bottled water and free Wi-Fi or not. Figure 7 show the hotel room information.

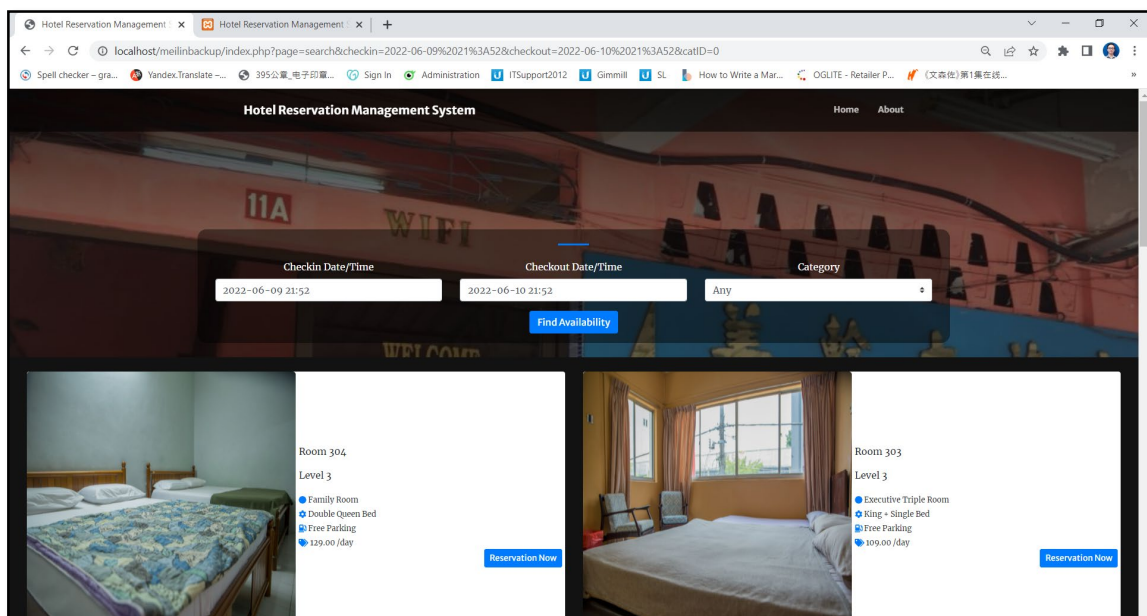


Figure 8: Room Availability

For the search availability room function, user can insert the check in date/time and check out date/time and it will display the available room. Based on the hotel policy, they will allow customer check in earlier if the previous customer check out earlier and the room is ready. But if the room are not available earlier, hotel only will allow customer check in after 3pm. Figure 8 shows the room availability.

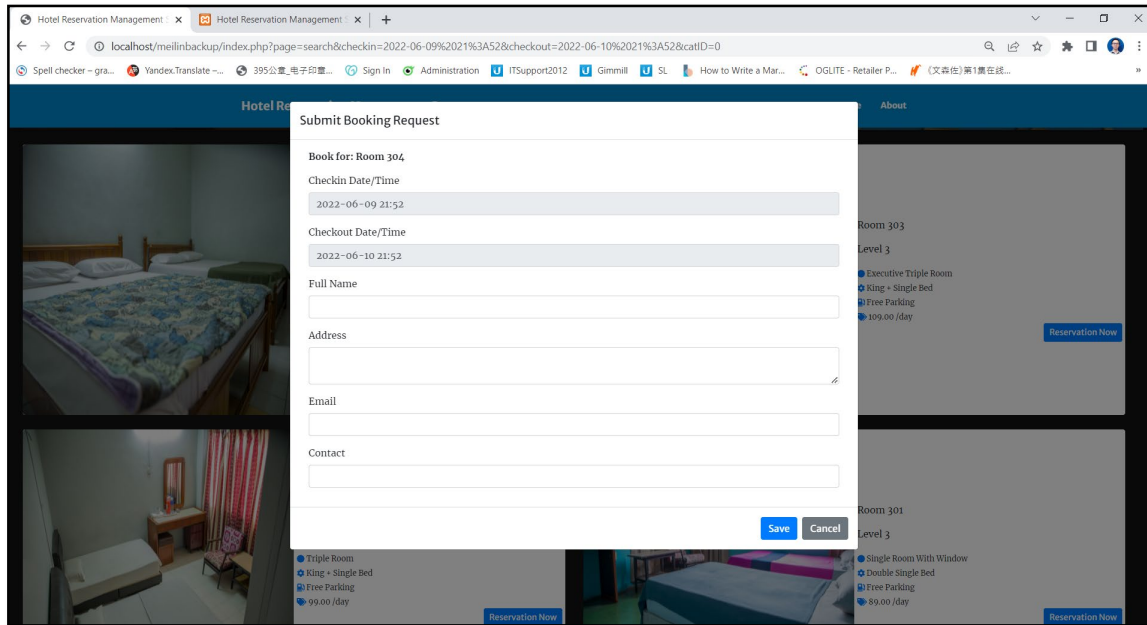


Figure 9: Reservation Form

If user would like to make reservation, they can select the room and click reservation now button, then it will pop up reservation form. In the reservation form, it will show the room number, check in and check out details, full name, address, email and contact number. After filling the information, user need to click save for reservation. It will display reservation request sent that's mean the reservation successful. Figure 9 shows the room reservation form.

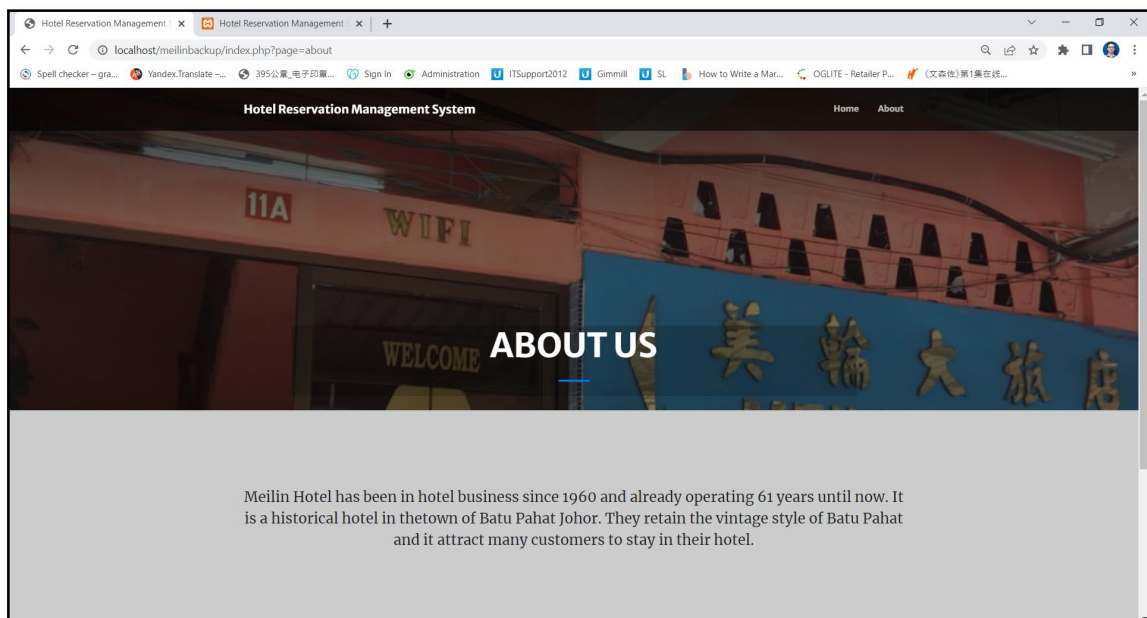


Figure 10: About Us

In the sub menu which is About page, it displays the hotel outdoor image and the hotel information. So their customer can understand hotel background and related information. Figure 10 shows the about us page.

5.1.2 Admin Interface

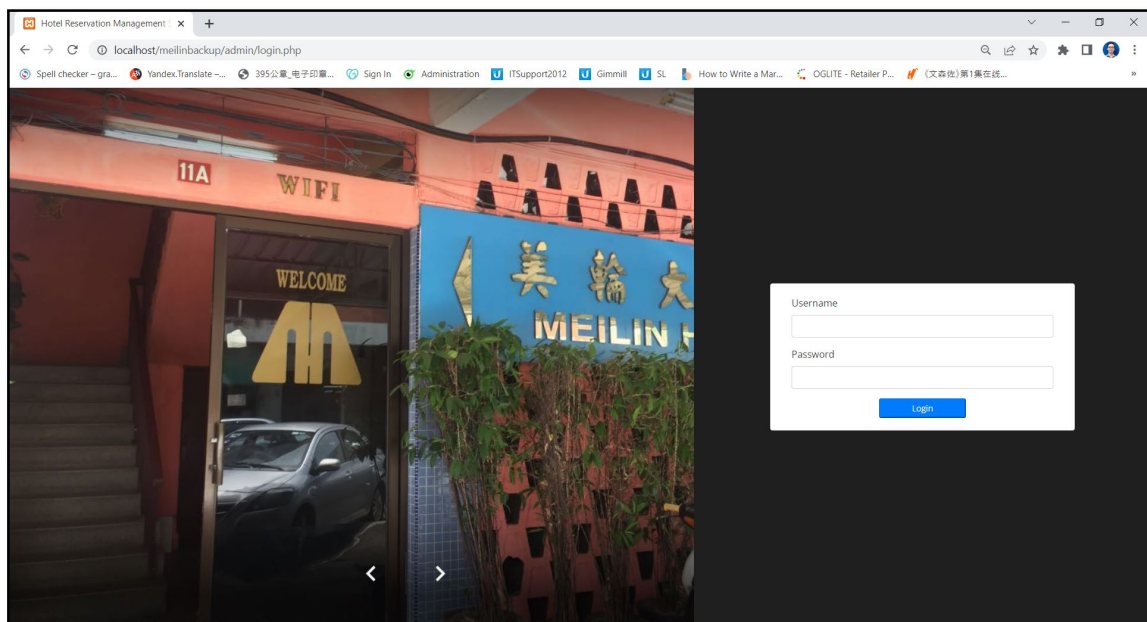


Figure 11: Admin Log in

Admin required to log in to their existing account. Admin need to insert username and password for log in. If there have new staff would like to sign up new account, the main admin can sign up in the system. Figure 11 shows the log in interface for admin.

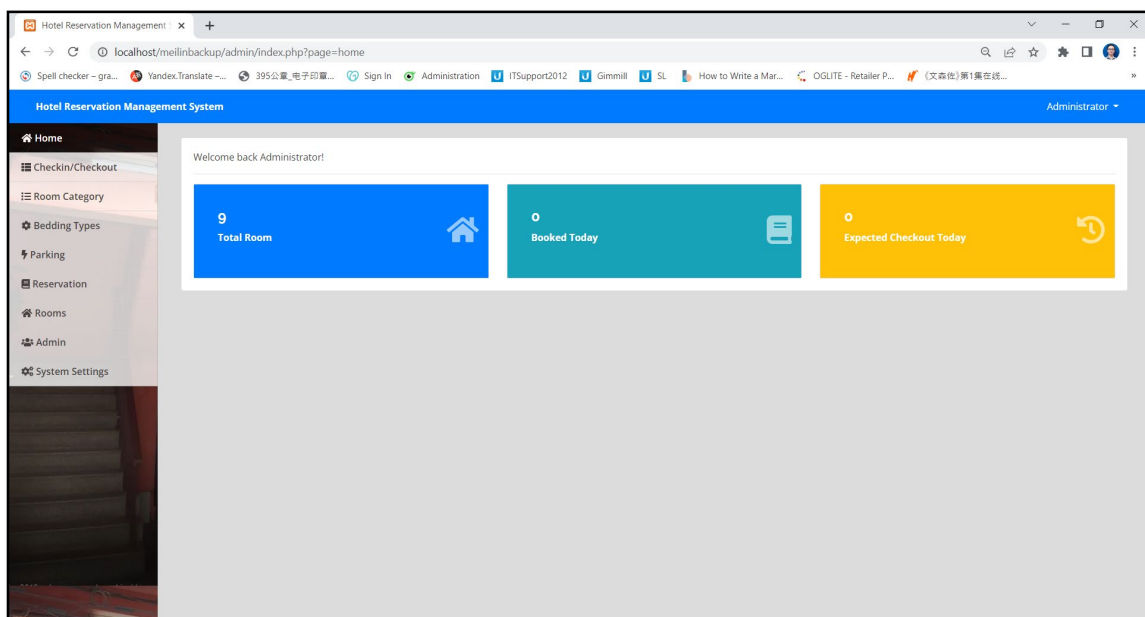


Figure 12: Admin Homepage

After admin log in to their existing account, there have a dashboard which including total room for the hotel, booked today and expected checkout today. The total room is based on the total list of rooms and it will update based on room quantity. For the booked today tab, if there have customer would check in today and it will display here, so hotel employee can know today have how many customers would check in. From the other side, the expected checkout today tab will display how many customers would

check out today. So the hotel employee can check if there have walk in customer asking for enquiry. Figure 12 shows the home page for admin.

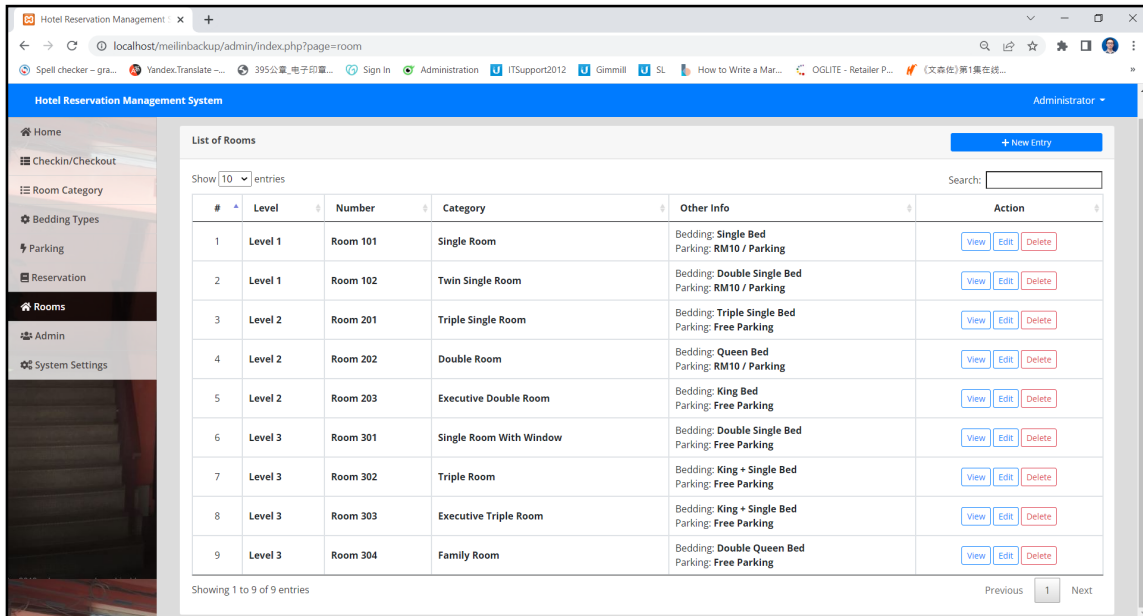


Figure 13: Room Table

In the rooms tab have a list of rooms. It shows the room level, room number, room category and other information. In the top of the right part, there have a search function for admin. Figure 13 shows the room table. There have three button in Action tab which are view, edit and delete. In the view button, it will display all the room details such as room level, room number, category, bedding, parking, price per day, room quantity, room quantity and also room description.

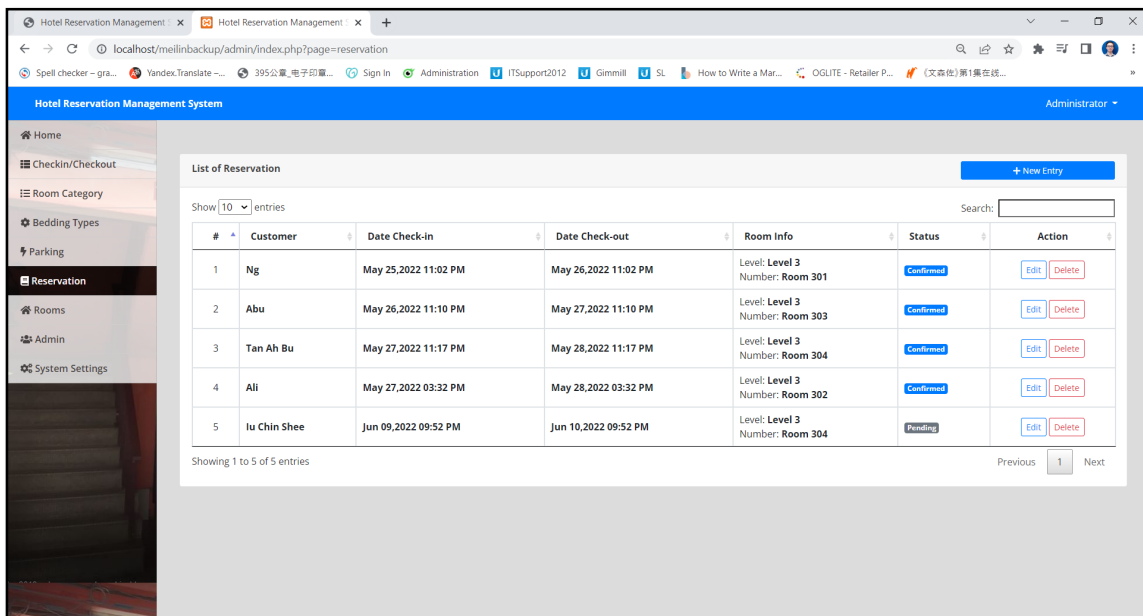


Figure 13: Reservation Table

In the reservation page, there have a list for all reservation which including walk in customer and online customer. In the list have customer name, check in date and check out date, room information and also status. There have three statuses can select and the default status is pending, confirmed and cancelled.

Hotel admin will call the customer for confirmation, then they only will update the status to confirmed. If they found out that the customer provides wrong booking information, they had the right to cancelled the reservation without inform customer. If the status changes to cancelled, the room will available again in user page. For the search function, admin can search by using customer name and the reservation record will display out. Figure 13 shows the reservation page for admin.

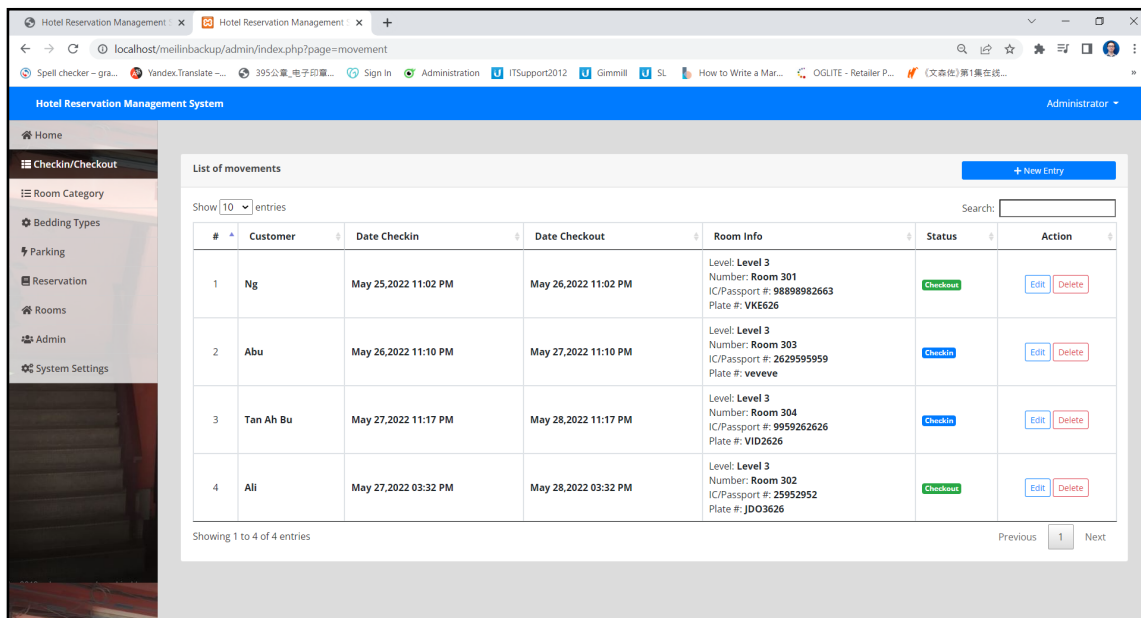


Figure 14: Check in/ Check out

In the check in and check out page, admin or hotel employee can know the list of movement in every room. In the list of movement have customer name, check in and check out date, room information and customer personal information. Figure 14 shows the check in and check out page. Admin should make sure in the reservation status updated to confirmed, then admin only can proceed check in process. In the check in entry form, customer need provide their identity card or passport number for ensure safety of other guests. Besides that, if their customer driving to hotel, they need provide their car plate number so they can enter the hotel parking lot. After fill in of these details, the status will update to check in. If there have customer would check out, admin need to update the status to check out manually.

5.2 Functional Testing

Functional testing is generally used to ensure that a software program produces the same results that the end-user or company requires. Functional testing usually entails assessing and comparing each software feature to the business requirements. Software is tested by giving it some related input and evaluating the output to determine how it complies, relates, or differs from its underlying requirements. Furthermore, functional testing verifies the software's usefulness, such as verifying that navigational capabilities perform properly.

Table 3: Test Plan for Admin Registration Function

No.	Test Cases	Expected Output	Actual Result
1.	Admin registration data are complete and valid	Registration successful and message of registration successful is displayed	As Expected
2.	Register using existing username	Registration unsuccessful and message of username already exists	As Expected
3.	Incomplete data inputs	Registration unsuccessful and message of please fill up all information	As Expected

Table 4: Test Plan for Admin Login Function

No.	Test Cases	Expected Output	Actual Result
1.	Admin login with valid username and password	Login successful and redirect to admin homepage	As Expected
2.	Admin login with invalid username	Login unsuccessful and message of username or password is incorrect	As Expected

Table 5: Test Plan for Find Availability

No.	Test Cases	Expected Output	Actual Result
1.	User insert check in and check out date	The available room on the selected date would display out	As Expected
2.	User insert check in date only	Unable to retrieve available room. A message of please fill out this field	As Expected
3.	The room are full on the selected day	No available room display	As Expected

Table 6: Test Plan for Reservation

No.	Test Cases	Expected Output	Actual Result
1.	User click reservation after find the room availability	The check in and check out date automatically display in booking form	As Expected
2.	User click reservation after select the room	The room unable to change in booking form	As Expected
3.	User need insert full name, address, email and contact for reservation	The reservation form will submit in admin system	As Expected
4.	Display room details before reservation	System display room size, type of bedding, parking and price	As Expected

Table 7: Test Plan for Checkin/Checkout

No.	Test Cases	Expected Output	Actual Result
1.	Admin can find the customer	Search function to find customer name	As Expected
2.	Admin can update the status	After insert check in details, the default status would be Check in and admin can update status to Check out after customer return back the key	As Expected
3	Admin can insert customer details	Check in process required to fill in customer identity card or passport number and car plate number	As Expected

Table 8: Test Plan for Reservation Management

No.	Test Cases	Expected Output	Actual Result
1.	Admin can add new reservation	The new reservation insert for walk in customer will be added into database	As Expected
2.	Admin can edit reservation	The existing reservation details can edit and update to database	As Expected
3.	Search function	The search result based on customer name	As Expected
4.	Update reservation status	Admin can update reservation status from pending to confirmed	As expected
5.	Reservation status to cancelled	The selected date for room would available again in user page	As expected

5.2 User Acceptance Testing

User Acceptance Testing (UAT) is a sort of testing in which the end user or client verifies and accepts the software system before it is delivered to the client. After functional, integration, and system testing, UAT is performed in the final step of testing. In the graph, Scale 1 indicates that the user is strongly unsatisfied with the features and Scale 5 indicates that user is strongly satisfied with the features. From the Table 9 and Table 10 shows the evaluation results after testing.

Table 9: Result of User Interface Evaluation

No	Features	Scale					Total
		1	2	3	4	5	
1	Interface Design	0	0	0	15	5	20
2	Clarity of the Navigation Bar	0	0	0	5	15	20
3	Easy to Use	0	0	0	12	8	20
4	Easy to Understand	0	0	0	8	12	20
5	Size & Color of Text	0	0	0	4	16	20

Table 10: Result of Admin Interface Evaluation

No	Features	Scale					Total
		1	2	3	4	5	
1	Login Function	0	0	0	7	13	20
2	Admin Homepage	0	0	0	5	15	20
3	Reservation Process	0	0	2	10	8	20
4	Room Management	0	0	0	11	9	20
5	Check In / Check Out Process	0	0	0	7	13	20
6	System Setting	0	0	0	9	11	20

6. Conclusion

The Hotel Reservation Management System was developed for Meilin hotel to replace traditional reservation and management method. Overall, all the phases in system development process have been implemented and achieve our system objective. As a conclusion, we hoped that Hotel Reservation Management System provides advantages to Meilin Hotel employee and their customers. Lastly, sincerely hope that this system can be further enhanced and improved, so more user can access our system.

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