



FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

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Assignment

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1.0 Part 1

1.1 Organisational background

The selected organisation for our group for this assignment is the Eastern & Oriental Berhad (referred to as ‘The E&O Group’) is one of the leading lifestyle property developers in Malaysia. The organisation is renowned for their Eastern & Oriental Hotel. The organisation is primarily active in Kuala Lumpur, Penang, Johor and Central London. The organisation’s leading position comes from the establishment of the Eastern & Oriental Hotel (E&O Hotel) by famed Sarkies Brothers in 1885, whose architectural landmarks also include the Raffles Hotel in Singapore. Now, the hotel is one of the important landmarks for the George Town UNESCO World Heritage Site.

1.1.1 History

In 1884, the 23 years old Tigran founded the Eastern Hotel and was soon combined with the Oriental that was established by Martin and Avviet in 1889. After that, the founder left Penang to expand their business abroad and the E&O hotel was left to run by Arshak. Under the leadership of Arshak the organisation has experienced tremendous growth. In 1911, The Hotel was called the “most beautiful hotel for Europeans in the East Indies.”. Today the hotel is owned by the Eastern & Oriental Berhad, a property consortium that bought the hotel in 1994 and did a major renovation and reopened to the public in 2001.

The Heritage Wing, which is the original site of the E&O Hotel, features 100 different suites that retained its characteristic and charm whilst offering round-the-clock butler service. In March 2023, the organisation extended the hotel with a 15-storey building named the Victory Annexe, its namesake being an old block of the hotel so named after the British victory in World War I. The building includes a further 122 sea-front suites that stayed true to its architectural inspiration, followed by new facilities like restaurants, pool, spa, and fine retail outlets.

The E&O group has established itself as a premier lifestyle property developer with an authentic track record for delivering innovative concepts and high standards of quality. The group’s past signature projects include the Dua Residency Condominium in the KL city centre. The Idamansara and Seventy Damansara exclusive landed homes in upscale Damansara Heights. Not only that, E&O’s St Mary Residences in the KL Centre Business District represents the latest in urbane and elegant city living.

1.1.2 Vision, purpose and values

The vision of E&O group is to craft legacies and histories for future generations by producing placemaking structures with enduring capabilities. The purpose of the organisation is to design and create homes and properties that meet the lifestyle requirements of the cultured peoples. The value cherished in the E&O group is they approach everything they do with sincerity, integrity and enthusiasm.

1.2 Requirement Gathering Techniques

The two fact-gathering techniques we have chosen to use are the interview and questionnaire methods.

1.2.1 Interviews

Justification

We have chosen the interview as one of the fact-gathering methods that we will be using for our proposed system. The reason why we chose the interview method is because In-depth questions and contextual comprehension of the problems at hand are made possible by interviews. The interviewer can ask follow-up questions, get clarification, and consider alternative perspectives by conversing with the interviewee to gain a thorough understanding of the subject at hand. This aids in gathering details and providing a comprehensive picture of hotel management procedures.

Besides that, using the interview method will also provide an opportunity for real-time feedback. Interviewers are able to ask participants on their opinions, suggestions in which they are able to provide immediate reaction. It also helps to get new viewpoints and swiftly address any worries or issues. User satisfaction, service quality, and hotel management procedures can all benefit from this.

Furthermore, by using the interview method we can incorporate more open-ended questions into the interview that otherwise are more difficult to be asked using the questionnaire method. In addition to that more in-depth and specific questions can be enquired by using the interview method.

Objectives

Interviews can provide more in depth information of the frustration and dissatisfaction of the existing system that allow us to analyse the fundamental problem of the system in a detailed manner. Interviews can also allow the enquirement of improvement towards the specific functionality of the system. Other than that, follow up questions can also be asked to know how the user actually wants to implement the said improvement.

Interviews can also let us know about the user's expectations towards the functional and non-functional aspects of the system. The interview will let us know what the user really wants in the proposed system. In addition to that, interviews allow us to directly rank the user opinions on the importances of the functions to be implemented in the proposed system.

Furthermore, interviews allow us to discuss with the frequent user their preferences of system and development pace. We are able to understand their preferred user interfaces and execution steps of each function. This can provide us with a rough idea of how the system will navigate and how the internal functions operate.

Target Audiences:

- Top management of the E&O group (such as CEO and the manager for each department).
- Selected Staff of the E&O hotel management
- Selected Customer

Venue:

The meeting room of the E&O group

Duration:

40 minutes

Interview process:

Before the conduct of the interviews, the interview format is planned and the interview questions are prepared. Then, the interviewee is informed about the details and purposes of the interview so they can prepare themselves. This allows the interview to go smoothly and allow the interviewee to give a more accurate answer to the questions.

Firstly, the interview will begin with a brief introduction by both sides of the interviews and the objective of the interview is also described by the interviewer. Continuing that, the Q&A session is initiated by the interviewer. Follow up questions are asked for specific questions that the interviewee is more interested or knowledgeable in so they can elaborate further. Interviewers are required to show positive feedback and to support the interviewee whenever necessary. Throughout the interview, the interviewer is required to take notes of the responses and answers of the interviewee and make a summary.

After the interview, the interviewer has to document all the information provided by the interviewee and cross checks with the interviewee to confirm their statement in the interview.

Sample of Interview Questions:

1. Which function of the existing system is the most flawed and how does it affect the overall system process?
2. What is your worst experience when using the system and how should it be improved?
3. What do you think about the process of reservation of the system, and how do you think it should be done?
4. What part of the system is causing you the most problems and inconveniences when performing the required task?
5. Do you experience any conflict with the customers when using the system to complete tasks?
6. Do you think that it is suitable for the customer to be able to make online registration?
7. Did you face any difficulties when generating reports for the current system?
8. Do you have any personal suggestion that would like the newly proposed system to include?
9. Do you think that the integration of the CRM system is a good idea, and if it is, how does it benefit the current system?

1.2.2 Questionnaires

Justification

Beside using interviews as one of our fact gathering methods, we also use questionnaires. Questionnaires offer a standardised method for gathering data, all respondents will receive the same set of questions and they will provide more standardised answers or responses. This allows the questionnaire to be sent to all if not most of the staff of the E&O hotel. As a result a more diverse opinion and response can be obtained. In addition to that, questionnaires can provide simultaneous data collection from more than one respondent. Therefore, the questionnaire can be distributed to a wide range of participants such as respondents from different levels of position and departments allowing a wider representation of opinions towards the system development. Large-scale data collection aids in capturing a diversity of perspectives and obtaining a comprehensive overview of the hotel.

Continuing that, questionnaires consist of mostly close-ended questions that do not require respondents to give an exact and detailed answer. This allows respondents to complete the questionnaire in a short period of time. Questionnaires will greatly reduce the time and effort required to gather a vast amount of data making it very time efficient. This allows the study of general opinion of the staff in the organisation. If there is a common trend in the answers of the respondents for a particular question, then decision making can be made more efficiently during the development of the software.

Questionnaire design:

Survey for E&O Hotel Management System

The survey is created to study and identify problem of the current system and the user requirements of the newly proposed system.

Answer the all the questions in each section based on your personal opinion.

Your replies and responses will remain confidential.

Your participation is greatly appreciated.

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Not shared

Section 1 : Demographic

This section will collect a brief information on the user of the system.

What department are you currently in?

- IT Department
- Sales and Marketing Department
- Financing Department
- Sales Operation Departments
- Front Desk
- Logistics Department
- Customer Service Departments
- Purchasing Department
- Security Department
- Kitchen Department
- Housekeeping Department

What level of position are you currently holding in the department

- Executive Level (Executive Officer)
- Management Level (Department Manager)
- Operational Level (Assistant and General Position)
- Entry Level (Part timer and internship)

Please describe your age group.

- Under 21
- 21- 29
- 30-39
- 40-49
- 50 and above

Is your position closely related to the usage of this system?



Do you frequently use the system?



Section 2 : Current System Issue

This section will collect information related to the issues and dissatisfactions that is faced by the user during the usage of the current system.

What are the **primary purposes** of your usage of the system?

- Sales & Marketing Purposes
- Communication Purposes
- Financing Purposes
- Reporting Purposes
- Security Purposes
- Database Management Purposes
- Other: _____

The current system is capable of completing all the task required by you.

1 2 3 4 5

Strongly Disagree Strongly Agree

What is your **overall satisfaction** when using the current system provided by the organization.

1 2 3 4 5

Very Unsatisfied Very Satisfied

The current system usage is **inefficient in performing task(generate reports, make reservation)** required.

- Strongly Disagree
- Strongly Agree

Are you satisfied with the **amount of guidance provided** throughout the usage of the system?



The data in the different subsystem(department) is unable to be integrated properly.



Are you satisfied with the security provided by the current system in protecting your personal data and privacy?



Do you agree that the information and reports provided by the current system is accurate and up to date?

1 2 3 4 5

Strongly Disagree

Strongly Agree

Section 3 : Requirements of Proposed System

This section will collect information related to the expectation of user towards the newly proposed system and the user requirements needed to be met.

The proposed system should be able to complete task give more efficiently.

1 2 3 4 5

Strongly Disagree

Strongly agree

The proposed system should be able to cater to user with different technology capabilities.

1 2 3 4 5

Strongly Disagree

Strongly Agree

The proposed system should be able to integrate data between different submodules more coherently.

1 2 3 4 5

Strongly Disagree

Strongly Agree

The proposed system should provide customer with a higher degree of system usage (such as allowing user to make reservations and contact customer support).

1 2 3 4 5

Strongly Disagree Strongly Agree

The proposed system should be able to generate accurate and up to date report at any given time.

1 2 3 4 5

Strongly Disagree Strongly Agree

The proposed system should be able to operate in devices from different platform (smartphone, tablet).

1 2 3 4 5

Strongly Disagree Strongly Agree

The proposed system should have a more sophisticated security system to protect the user data and privacy.

1 2 3 4 5

Strongly Disagree Strongly Agree

The proposed system should be able to handle customer related services and support more efficiently.

1 2 3 4 5

Strongly Disagree

Strongly Agree

The proposed system should be more scalable to accommodate future growth of the organization.

1 2 3 4 5

Strongly Disagree

Strongly Agree

In your opinion, are there any recommendations or suggestions that you would like to give for functionalities to be added into the system?

Your answer

Thank you for your contributions.

We greatly appreciate your feedback give and time put into responding to this survey. Your responds will provide us with important information towards creating a better system for the Eastern & Oriental

1.3 Problem of existing system

The existing E & O berhad hotel management system encountered several problems without using a proper CRM system. The problem includes:

1.3.1 Ineffective Guest Communication Management

One of the key components of managing a hotel system is having effective guest communication. A CRM system is essential to ensure smooth operation and provide great guest experience. However, due to the lack of implementation CRM system, the hotel management have experiences a number of loss of communication opportunities with the customer. The hotel management team is not able to communicate with the customer effectively especially during peak season where more customers make reservations for the hotel.

This happens due to the lack of automation and personalization in the communication management system. The current system requires the staff of the hotel to respond manually to the individual customer. The manual method is time consuming, prone to mistakes and less effective compared to automated systems. Due to that, customer encounter delays in getting essential information about their reservations, payments and other crucial details

Without a proper CRM system, the hotel loses chances to send pre-arrival emails or messages that provide essential information to the guest such as reservation notification, information on check-in procedures, nearby attractions, exclusive offers and personalised welcome messages. Without this kind of communication the hotel management are unable to relay messages to customers properly. This leads to customers experiencing confusion and poor arrival experiences due to lack of a grasp of the situation.

Other than that, the existing system lacks a fast and effective way of handling customer complaints and issues. The hotel management staff need to manually deal with each individual customer complaints and enquiry. This causes the hotel to be unable to respond immediately to customer demand. In conjunction to that, more manpower needs to be rerouted to solve this which causes the lack of staff in other departments and make the process of resolving customer issues cumbersome. When the customer issue is not resolved efficiently this will affect the satisfaction of the customer.

Lastly, effective communication is essential to create a welcome environment during the guest arrival and check-in procedure. However, without a proper customer communication system the

hotel staff fail to provide warm greetings and are unable to effectively tell customers about the services in the hotel. At this point, poor communication can make customers feel disengaged from the hotel experience from beginning to the end.

1.3.2 Ineffective Customer Feedback and Reviews Management

Customer feedback and reviews are extremely important for a hotel. They indicate areas for development, offer useful data on the experiences of guests and enable better service delivery. However, the current system loses out on important opportunities to gain useful insights and raise guest satisfaction due to lack of modules to handle customer complaints and reviews.

The ability for a hotel to extract valuable feedback from guest reviews is limited by the current system due to the inadequate feedback and reviews management system. Without the ability to gather actionable information, hotels lose out on the chance to make necessary changes and adjustments that could improve the overall guest experience. For example, a guest praises the hotel employees on their great service but also highlights a persistent problem on slow room service in their comment. Without an effective method to manage guest feedback, the hotel only pays attention to the positive aspects of the comment and misses the chance to solve the service problem and enhance the guest experience.

The current system also lacks the ability to quickly respond to customer feedback and reviews to resolve the problem and enhance the service. When guests receive slow or nonexistent responses, they will feel unheard and be less likely to offer feedback in the future. For example, a guest mentions in their feedback that their room wasn't clean enough but due to the poor feedback management, the hotel doesn't act quickly to take necessary action to fix it. The lack of responsiveness not only affects the guest's satisfaction but also casts doubt on the hotel dedication to resolve their issues.

Besides, the current system often misses opportunities for service recovery. An effective service recovery can minimize the effects of bad reviews, help to reestablish customer loyalty and regain trust from customers. However, hotels lose opportunities to interact with unsatisfied guests, address problems and transform bad experiences into positive ones due to the lack of an effective CRM system. For example, a guest complains about having a bad dining experience at the hotel restaurant but the hotel is unable to get in touch with the customer and apologize to them because of lacking a strong mechanism to monitor customer feedback. As a result, the guest's negative experience still remains unresolved, which can result in bad reviews and loss of business in the

future.

1.3.3 Poor Marketing Strategy

Effective Marketing is an important part which makes a hotel successful in the industry. Deep knowledge of customer tastes and behaviours is an essential component of any effective marketing plan. However, the current system has difficulty in gathering, managing and using guest data to set up proper marketing efforts because it lacks integration with the CRM system.

The lack of a CRM system causes the hotel management to have incapability of obtaining accurate and up to date customer information. This causes the system to be unable to collect data that is useful to plan an effective marketing strategy such as customer purchasing preferences, booking history, hotel room preferences from different sub modules of the system. As a result, it is difficult to properly understand guest preferences and construct personalised marketing strategies because the information about guests is still fragmented and unrefined.

Besides that, the current system is unable to provide any effective targeted marketing efforts. The Hotel management struggles to analyse guest preferences, booking behaviour or patterns without access to detailed guest data. Because of this, marketing efforts struggle to accurately target the right demographic which has a negative impact on their effectiveness and reduces the return on investment (ROI) making the marketing futile. For example, our hotel intends to advertise a special package for couples to celebrate their wedding anniversary. However, the system is unable to access the preferences and anniversary dates of the customer due to lack of specialised marketing sub modules in the system. Consequently, the marketing department is unable to specifically target potential guests who are likely to be interested in the package.

Furthermore, the current system has limited capability in guest segmentation and personalization. The system has difficulty in categorizing customers accurately without a good CRM system. The hotel management struggles to discover distinct guest segments without the proper data analysis and segmentation tools, resulting in generic marketing messages that don't resonate with any particular groups of customers. For example, our hotel launched a loyalty program to honour its regular guests. However, the system is unable to precisely identify and segment its loyal customers due to the limited CRM system utilisation. This causes the program effectiveness to be reduced and loyal customers are not given a personalised experience.

1.3.4 Ineffective Report generation and analysis

Accurate and knowledgeable report and analysis are essential for efficient decision making for the future of the hotel. However, the current system is having trouble in producing detailed and summary reports.

Without a proper CRM system integrated, the current system has trouble in compiling the data from numerous sources and producing detailed reports that offer insights into guest behaviour, booking and revenue trends and organisational performance. The lack of reports generating capability limits the organisation competency in evaluating the operation of the hotels, defining areas for improvement and to make executive decisions based on the hotels data. As an example, the hotel has many income sources such as revenue for room management, dining services, hall renting and other events. Due to the inadequate data analysis and report generation in the system, the system does not have a centralised method to gather and analyse data from different sources of income. This causes the current system to be incapable of producing reports to provide overview on the main sources of revenue and the performance of the hotel in different departments, which leads to the organisation not having a good reference to make wise decisions.

Besides, the lack of the capability to generate reports will affect the hotel management in evaluating the weakness of their organisation. The system will struggle to track the performance of the hotel and identify all the flaws and issues in the management that are required to be fixed. This causes the lack of immediate response to any issue the hotel might be facing and causes it to persist until it significantly affects the organisational processes. For example, without accurate and up to date reports, when the hotel is facing financial issues, the hotel will not be able to identify the major cause for the issue immediately which causes the organisation to be incapable of making any decisions.

Lastly, the ineffectiveness of report generation and data analysis will cause the departments and subsystems to act incoherently. The different departments in the hotel are unable to understand and predict the impact of the decision they made in affecting other departments. This is caused by the lack of references of the organisation's history. For example, the inventory department cannot predict the amount of food items they need to procure during the holiday season because there are no reports to indicate the amount of food sales during the holiday season.

1.3.5 Security and data privacy concerns

For a hotel management system, maintaining strong security measures and safeguarding customer data privacy are essential. However, the current system confronts serious security and data privacy issues due to not making effective use of a proper CRM system with security systems.

The current system does not store the customer data in a centralised manner and does not provide sufficient security measures on data security and recovery. Without a specialised security system implemented, the user data of the current system is susceptible to unauthorised access, hacking and data breaches. The confidentiality, integrity and accessibility of guest information are jeopardised which could harm the hotel reputation and have legal consequences. For example, the current system stores each individual data of different sub modules independently, this causes the data to be difficult to secure compared to centralised storage methods. Therefore, data for specific modules might be hacked and leaked. The weak security of the current system is due to the failure of implementation of features such as data encryption, user access control and authentication and secure payment process.

Besides that, inadequate implementation of the CRM system increases the risk of data leaks within the hotel. The current system might unintentionally reveal sensitive customer data to unauthorised users due to poor data security and access controls that might lead to the data being misused. The lack of security will increase the customer anxiety towards their own data and privacy because they are not guaranteed the utmost confidentiality. The customer will have doubts about the capabilities of the hotel to handle their data and ultimately affect their satisfaction. For example, lack of access management and segmentation on the current system allows staff members from all departments to access guest information without restriction. This is very concerning as the data might be leaked to a third party.

Furthermore, unsecure on security and data privacy negatively affects customer trust and the reputations due to inadequate utilisation of the CRM system. The guest expects our hotels to prioritise data privacy and carefully handle their personal information but our current system fails to implement adequate security measures because it doesn't utilise the CRM system effectively. This will result in a loss of customer trust, negative reviews and possible harm to the hotel. For example, our current system often suffers a data breach, revealing that guest data, including personal information and payment details has been exposed. The hotel lacked the appropriate security procedures to stop breach due to improper CRM system usage. Guests will become reluctant to share their information to the hotel as a result, which leads to low booking rate and harms the hotel reputation.

1.4 Software Quality Attribute

1.4.1 Usable

The proposed CRM system should include usable as one of the software quality attributes. The proposed system should be user friendly and provide users with a satisfying experience when using the system. The current system is old and outdated where the system does not have the latest feature to make the system more user friendly, this causes the current system to become cumbersome to use and visually cluttering. The UI design is inconsistent and is difficult for inexperienced users to navigate.

The proposed system should have a better-designed UI with proper distinction and visual separation. This makes the system less visually cluttering and users are able to distinguish between the different sections of the system. Other than that, the system also should have a more clearer navigation with better guidance throughout the usage of the system. This will help the inexperienced users to learn and get used to the system quickly and also make the system navigation flow smooth and seamless. Lastly, the system should include features to allow ease of data entry such as text completion and more selection based inputs. This enables the user to enter any required data input swiftly and easily. In addition to that, the proposed system should have a more simpler and interactive interface that is more captivating to use and keep the user interested while making

With the implementation of the CRM system, the system is able to make sure the user can have a more satisfying experience when using the system. The system can also cater to different categories of users.

1.4.2 Security

Security is one of the important software quality attributes that the proposed system should include. The current system does not have a dedicated CRM system therefore the guest data is unsecured. This causes the current system to be prone to data leakage and DDOS attacks. This caused the customers to have security concerns over their own data and privacy. The proposed system should have a dedicated CRM system that introduces better and more sophisticated security measures in protecting the customer data.

The proposed system should encrypt important guest data such as the identification card number, address, credit card and banking information so that it is inaccessible by the hackers and unauthorised personnel. In addition to that, the proposed system should be able to store the customer data in a centralised storage and keep it secured. Other than that, security measures such as user authorization and authentication should also be implemented to prevent hackers and unauthorised users from accessing the system.

Lastly, the proposed system should be able to provide countermeasure in case of error happening in the system. The CRM system will be able to protect its own data and check for erroneous data that is circulating within the system to inform the main system.

1.4.3 Functional

The proposed system should have the software quality attributes of functional. The current system is only operable by the staff of the hotel. Therefore, for a customer to be able to make a reservation they need to go through the receptionist desk.

The proposed system should allow the customer to access the system to perform client activities such as make reservations, make online payments, view reservation details and contact customer support. The proposed system should also be able to track and analyse customer preferences and behaviour for marketing purposes. In addition to that, the proposed system should be able to generate reports with accurate information in a timely manner.

With a dedicated CRM system, the organisation can have a dedicated system for customer support, this can nurture the hotel relationship with the customers and increase the customers satisfaction. In addition to that, the organisation is able to monitor customers behaviour to find better upselling opportunities and have better marketing efforts. Besides that, customers can make reservations online without needing to go through a staff. This will make the reservation process less cumbersome and more efficient. Lastly, the organisation makes use of the reports and data analysis to make better organisational decisions.

1.4.4 Efficiency

Efficiency will be one of the software quality attributes of the proposed CRM system . The system will be able to perform tasks quickly and efficiently while using less resources. The current system is unable to perform the task in a quick succession especially when there are a large number of users. The proposed system will be able to hasten the flow of the system when navigating through the application. Moreover, the system will be able to handle a larger number of active audiences in an instance with better process management and task allocation. The proposed CRM system also has increased efficiency in resource utilisation. The system is able to execute allocated tasks with reduced usage of memory by reducing background processing and include improved task automation.

The CRM system should be able to automate most of the processes which are able to speed up most processes as it does not require the user to manually navigate and execute the command. The automation of small individual processes throughout the system will increase the efficiency of the user when completing a task. This will lessen the time needed by the user to complete tasks such as login, make reservations and make online payment. The automation will be a substantial addition to the system as these tasks are repetitively operated when the user uses the system. Other than that, the proposed system should be able to utilise the resources provided by the organisation more efficiently, the proposed system should have a better algorithm for iterating through a huge amount of data that will not only speed up the process but also lessen the load of the server and the computer. This also has indirect benefits where the spare resources can be allocated into executing other tasks more efficiently.

1.4.5 Reliability

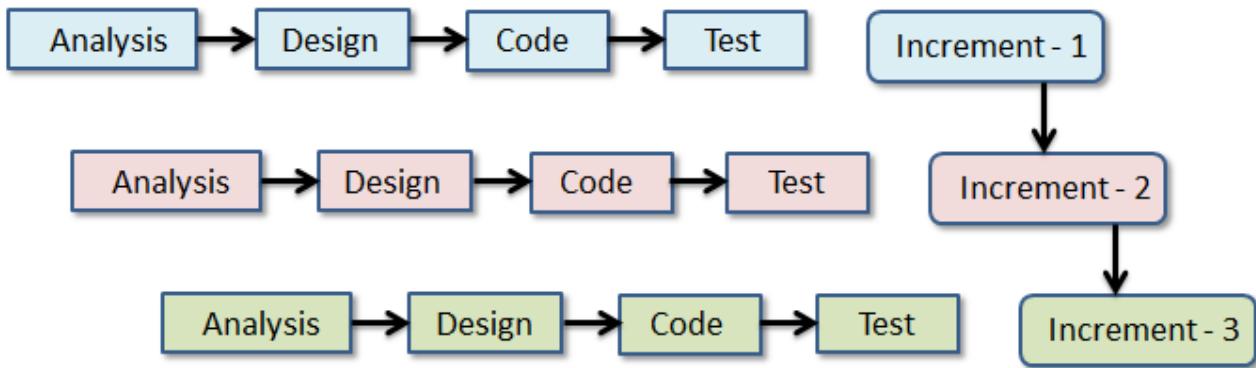
The proposed CRM system should have the software quality attributes of reliability. The current system is not capable of supporting the user of the system 24/7 as it will experience downtime during maintenance, database or network failure or even cyber attacks. The proposed system should be able to provide countermeasures for each situation and keep the hotel management system uptime to 100%, so the customer is able to access the system to complete any required task at any time.

The newly proposed system should be able notify the customer ahead of time for any maintenance work to be done to the system, so the customer can prepare themself and not be surprised during the downtime of the system. The system should also state the duration and time of the maintenance. Besides that, the system should be able to prepare a secondary database whenever the system database experiences any issue, this will allow the system to switch to a backup database and make the system go live immediately. This is the same for networks, the organisation should

prepare a backup network that can handle the same amount of traffic and data in case of primary network outage. All these features are able to increase the uptime of the server to nearly perpetual and thus guarantees the reliability of the hotel management system.

Lastly, one of the banes of the current system that causes the system reliability to plummet is the networks and cyber attacks from the third party. The proposed CRM system should be able to prepare protection against network or cyber attacks from a third party. This allows the system to be able to survive through the attacks that might incapacitate the system in any way.

1.5 Software Process Model



1.5.1 Incremental Process Model

In this assignment, we will be using the incremental process model as our software process model. The incremental process model is a software process model that breaks the overall software development process into smaller and easier-to-manage increments or iterations. Tasks such as planning, analysing, designing and implementing are all included in each iteration, also known as a miniature project. The main objective of the incremental process model is to deliver a working component of the software at the end of each iteration and gradually build on it in succeeding iterations. The reasons why we use an incremental model in our assignment are as follows.

Using an incremental model can provide early availability of essential features as an incremental model enables hotel personnel to utilise and reap the benefits of crucial features sooner, including reservation management, guest check-in/check-out, and room assignment.

Using an incremental model can divide the development process into smaller iterations or increments to define iterations. Every iteration should focus on implementing a certain set of features and functionalities into place. For instance, the first iteration may focus on developing the reservation management module whereas the second iteration may focus on the room inventory module.

Using an incremental model promotes regular feedback from hotel workers and management throughout the whole development process. The feedback provided can be used to improve and enhance the system in subsequent iterations. Early user input can also help the system to better match the unique requirements and processes of the hotel, producing a more specialised and efficient solution.

Using an incremental model can provide flexibility to adapt changes as operational needs and requirements can change rapidly from time to time. As new requirements or operational needs emerge or existing ones evolve, the following iterations can be altered to accommodate them ensuring that the system is always up to date and are aligned with the evolving business needs.

Using an incremental model provides an efficient resource allocation as it allows the system to gradually allocate resources as well as investments. Resources can be allocated incrementally for each iteration rather than waiting for the system to be complete before being put into use. This offers improved resource management and financial planning, providing the system to make adjustments and changes depending on the results and feedback from earlier iterations.

2.0 Part 2

2.1 Project Planning Schedule

2.1.1 Project Planning

Our project schedule is divided into 8 stages. The first stage is to conduct organisational background research and fact gathering. In this stage, the background such as the history, goals, vision and purpose of the organisation is studied to outline the CRM system to be designed. Continuing that, information or feedback will be collected from the clients in order to investigate the current software issues and user expectation of the proposed system by conducting interviews and distributing questionnaires. At this step, the proposed system's goal must be defined, the issue it faces must be examined, potential solutions must be identified, and their viability must be assessed. The third stage is to conduct the first increment module for the user management module. In this stage, operations pertaining to user authentication, authorization, and account management within a software application or system are taken care of. Then, the fourth stage is to conduct the second increment module for the online reservation module. In these systems where users can make reservations for services, goods, or make cancellations, an online reservation module is frequently employed.

Next, the fifth stage is to conduct the third increment module for the online payment system. In this stage, we will try to make it possible for users to pay for goods or services using our web-based application. After that, the sixth stage is to conduct the fourth increment module for the report generation module. In this stage, we will produce reports, offer insightful analysis, and assist users and administrators in making wise decisions. Next stage is to conduct the fifth increment module for the customer support module. At this stage, we will let the user provide feedback and get in touch with the administrator for any technical assistance. Additionally, this module often includes a number of functionalities and features designed to support users, respond to their questions, address their problems, and improve their overall experience. Lastly, the last stage is to conduct the deployment. The main goal of deployment, a crucial stage in the software development life cycle, is to make sure that the programme is correctly installed, set up, and functional in the target environment.

2.1.2 Task Allocation

Stage 1 : Organisational background & requirement gathering

| Task Name | Person-In-Charge(pax) | Duration (Days) |
|----------------------------------|--|-----------------|
| Organisation Background Research | Ong Zu Liang, Wong Yoke Sin, Song Chan Zhen, Ma Yu Chuan, Lim Yong Guo (5) | 4 |
| Interview | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Song Chan Zhen (4) | 2 |
| Design Questionnaire | Ong Zu Liang, Lim Yong Guo, Song Chan Zhen (3) | 3 |
| Questionnaire Distribution | Lim Yong Guo, Ma Yu Chuan, Wong Yoke Sin (3) | 7 |

Stage 2 : Requirement Analysis

| Task Name | Person-In-Charge | Duration (Days) |
|----------------------------|--|-----------------|
| Problem Statement Analysis | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Song Chan Zhen, Lim Yong Guo (5) | 4 |
| Define System Objectives | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan (3) | 3 |
| Propose Solution | Lim Yong Guo, Song Chan Zhen, Ma Yu Chuan (3) | 7 |

Stage 3: User Management Module (First increment)

| Task Name | Sub-task Name | Person-In-Charge | Duration (Days) |
|-----------|-------------------------------|--|-----------------|
| Design | Design decision | Ong Zu Liang, Wong Yoke Sin, Lim Yong Guo, Song Chan Zhen, Ma Yu Chuan (5) | 2 |
| | Diagram creation | Ong Zu Liang, Wong Yoke Sin, Lim Yong Guo (3) | 2 |
| | Design logical flow | Ong Zu Liang, Wong Yoke Sin (2) | 2 |
| | Prototype creation | Lim Yong Guo, Ma Yu Chuan, Song Chan Zhen (3) | 3 |
| Coding | Account registration function | Ong Zu Liang, Wong Yoke Sin (2) | 5 |
| | Account login function | Ong Zu Liang, Ma Yu Chuan (2) | 5 |
| | Account editing function | Ong Zu Liang, Song Chan Zhen (2) | 4 |
| Testing | Unit Testing | Ong Zu Liang, Wong Yoke Sin, Song Chan Zhen (3) | 3 |
| | Module Testing | Ong Zu Liang, Lim Yong Guo, Song Chan Zhen, Ma Yu Chuan (4) | 2 |

Stage 4: Online Reservation Module (Second increment)

| Task Name | Sub-task Name | Person-In-Charge | Duration (Days) |
|-----------|------------------------------------|--|-----------------|
| Design | Design decision | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 1 |
| | Diagram creation | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Song Chan Zhen (4) | 1 |
| | Design logical flow | Wong Yoke Sin, Lim Yong Guo, Song Chan Zhen (3) | 1 |
| | Prototype creation | Ong Zu Liang, Ma Yu Chuan, Song Chan Zhen, Lim Yong Guo (4) | 3 |
| Coding | Search Room Availability function | Ong Zu Liang, Wong Yoke Sin, Lim Yong Guo (3) | 3 |
| | View and Select Room Type function | Ong Zu Liang, Wong Yoke Sin (2) | 2 |
| | Make Reservation function | Ong Zu Liang, Ma Yu Chuan, Song Chan Zhen (3) | 3 |
| | View Reservation Detail function | Lim Yong Guo (1) | 2 |
| | Reservation Cancellation function | Ma Yu Chuan, Song Chan Zhen (2) | 2 |
| Testing | Unit Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan (3) | 3 |
| | Module Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 2 |

Stage 5: Online Payment Module (Third increment)

| Task Name | Sub-task Name | Person-In-Charge | Duration (Days) |
|-----------|--------------------------------|--|-----------------|
| Design | Design decision | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Song Chan Zhen, Lim Yong Guo (5) | 2 |
| | Diagram creation | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan (3) | 1 |
| | Design logical flow | Ong Zu Liang, Lim Yong Guo, Ma Yu Chuan, Song Chan Zhen (4) | 1 |
| | Prototype creation | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 3 |
| Coding | Select Payment Method function | Ong Zu Liang (1) | 2 |
| | View Payment Details function | Ma Yu Chuan (1) | 2 |
| | Make Payment function | Wong Yoke Sin, Song Chan Zhen, Lim Yong Guo (3) | 3 |
| | Generate Receipt function | Ong Zu Liang, Song Chan Zhen (2) | 3 |
| | View Payment History function | Wong Yoke Sin, Ma Yu Chuan (2) | 3 |
| Testing | Unit Testing | Lim Yong Guo, Ma Yu Chuan, Song Chan Zhen (3) | 3 |
| | Module Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 2 |

Stage 6: Report Generation Module (Fourth increment)

| Task Name | Sub-task Name | Person-In-Charge | Duration (Days) |
|-----------|------------------------------|--|-----------------|
| Design | Design decision | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 1 |
| | Diagram creation | Wong Yoke Sin, Song Chan Zhen (2) | 1 |
| | Design logical flow | Ma Yu Chuan, Lim Yong Guo (2) | 1 |
| | Prototype creation | Ong Zu Liang, Lim Yong Guo, Ma Yu Chuan (3) | 3 |
| Coding | Generate report function | Wong Yoke Sin, Lim Yong Guo (2) | 4 |
| | Report Organization function | Ong Zu Liang, Ma Yu Chuan (2) | 3 |
| | Filter Report function | Song Chan Zhen (1) | 2 |
| Testing | Unit Testing | Wong Yoke Sin, Song Chan Zhen, Lim Yong Guo (3) | 3 |
| | Module Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 2 |

Stage 7: Customer Support Module (Fifth increment)

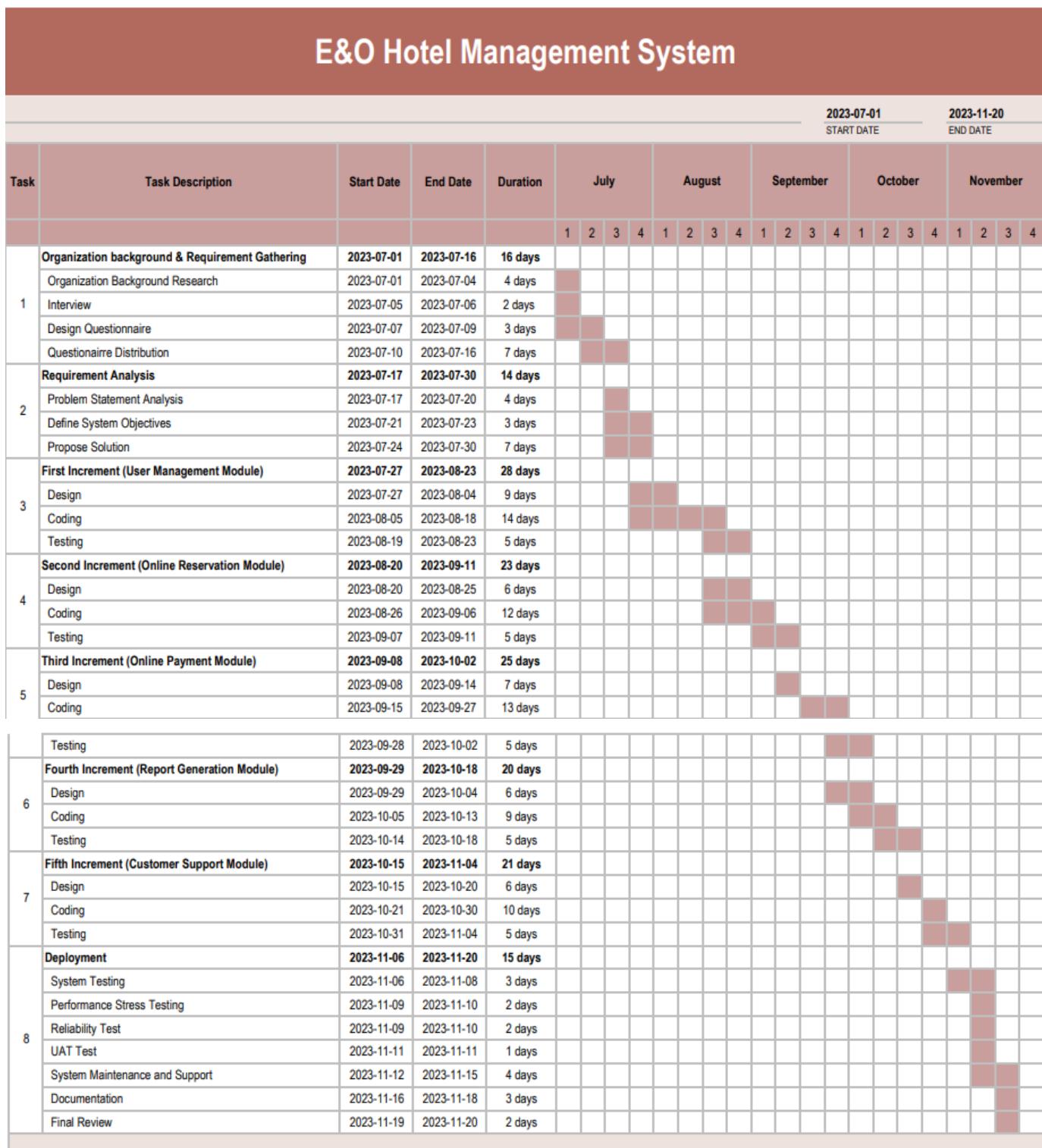
| Task Name | Sub-task Name | Person-In-Charge | Duration (Days) |
|-----------|-------------------------|--|-----------------|
| Design | Design decision | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 1 |
| | Diagram creation | Ong Zu Liang, Lim Yong Guo, Ma Yu Chuan (3) | 1 |
| | Design logical flow | Ong Zu Liang, Song Chan Zhen ,Ma Yu Chuan, Lim Yong Guo (4) | 1 |
| | Prototype creation | Wong Yoke Sin, Lim Yong Guo, Ma Yu Chuan, Song Chan Zhen (4) | 3 |
| Coding | Email Response function | Ong Zu Liang, Lim Yong Guo (2) | 2 |
| | Live Chat function | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Song Chan Zhen (4) | 3 |
| | Feedback form function | Ma Yu Chuan, Song Chan Zhen (2) | 3 |
| | FAQ function | Wong Yoke Sin (1) | 2 |
| Testing | Unit Testing | Ong Zu Liang, Lim Yong Guo, Ma Yu Chuan (3) | 3 |
| | Module Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 2 |

Stage 8: Deployment

| Task Name | Person-In-Charge | Duration (Days) |
|----------------------------|--|-----------------|
| System Testing | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 3 |
| Performance Stress Testing | Wong Yoke Sin, Song Chan Zhen, Ma Yu Chuan (3) | 2 |
| Reliability Test | Ong Zu Liang, Lim Yong Guo (2) | 2 |
| UAT Test | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 1 |
| Maintenance and Support | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 4 |
| Documentation | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 3 |
| Final Review | Ong Zu Liang, Wong Yoke Sin, Ma Yu Chuan, Lim Yong Guo, Song Chan Zhen (5) | 2 |

2.1.3 Gantt Chart

Overview Gantt Chart



Detail Gantt Chart

Organization Background & Requirement Gathering

| Task | Task Description | Start Date | End Date | Duration | July (Week 1) | | | | | | | July (Week 2) | | | | | | | July (Week 3) | | | | | | |
|------|---|------------|------------|----------|---------------|---|---|---|---|---|---|---------------|---|----|----|----|----|----|---------------|----|----|----|----|----|--|
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| 1 | Organization background & Requirement Gathering | 2023-07-01 | 2023-07-16 | 16 days | | | | | | | | | | | | | | | | | | | | | |
| | Organization Background Research | 2023-07-01 | 2023-07-04 | 4 days | | | | | | | | | | | | | | | | | | | | | |
| | Interview | 2023-07-05 | 2023-07-06 | 2 days | | | | | | | | | | | | | | | | | | | | | |
| | Design Questionnaire | 2023-07-07 | 2023-07-09 | 3 days | | | | | | | | | | | | | | | | | | | | | |
| | Questionnaire Distribution | 2023-07-10 | 2023-07-16 | 7 days | | | | | | | | | | | | | | | | | | | | | |

Requirement Analysis

| Task | Task Description | Start Date | End Date | Duration | July (Week 3) | | | | | | | July (Week 4) | | | | | | | | |
|------|----------------------------|------------|------------|----------|---------------|----|----|----|----|----|----|---------------|----|----|----|----|----|----|----|----|
| | | | | | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 2 | Requirement Analysis | 2023-07-17 | 2023-07-30 | 14 days | | | | | | | | | | | | | | | | |
| | Problem Statement Analysis | 2023-07-17 | 2023-07-20 | 4 days | | | | | | | | | | | | | | | | |
| | Define System Objectives | 2023-07-21 | 2023-07-23 | 3 days | | | | | | | | | | | | | | | | |
| | Propose Solution | 2023-07-24 | 2023-07-30 | 7 days | | | | | | | | | | | | | | | | |

First Increment (User Management Module)

Second Increment (Online Reservation Module)

Third Increment (Online Payment Module)

| Task | Task Description | Start Date | End Date | Duration | September (Week 2) | | | | | | | September (Week 3) | | | | | | | September (Week 4) | | | | | | | October (Week 1) | | | | | | | | | | | | | |
|------|----------------------------------|------------|------------|----------|--------------------|---|----|----|----|----|----|--------------------|----|----|----|----|----|----|--------------------|----|----|----|----|----|----|------------------|----|---|---|---|---|---|---|---|--|--|--|--|--|
| | | | | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | |
| 5 | Design | 2023-09-08 | 2023-09-14 | 7 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design decision | 2023-09-08 | 2023-09-09 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Diagram creation | 2023-09-10 | 2023-09-10 | 1 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design logical flow | 2023-09-11 | 2023-09-11 | 1 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Prototype creation | 2023-09-12 | 2023-09-14 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Coding | 2023-09-15 | 2023-09-27 | 13 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Select Payment Method function | 2023-09-15 | 2023-09-16 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - View Payment Details function | 2023-09-17 | 2023-09-18 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Make Payment function | 2023-09-19 | 2023-09-21 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Generate Receipt function | 2023-09-22 | 2023-09-24 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - View Payment History function | 2023-09-25 | 2023-09-27 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Testing | 2023-09-28 | 2023-10-02 | 5 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Unit Testing | 2023-09-28 | 2023-09-30 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Module Testing | 2023-10-01 | 2023-10-02 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fourth Increment (Report Generation Module)

| Task | Task Description | Start Date | End Date | Duration | September (Week 4) | | | | | | | October (Week 1) | | | | | | | October (Week 2) | | | | | | | October (Week 3) | | | | | | | | | | | | | |
|------|--------------------------------|------------|------------|----------|--------------------|----|----|----|----|----|----|------------------|----|---|---|---|---|---|------------------|---|---|---|----|----|----|------------------|----|----|----|----|----|----|----|----|--|--|--|--|--|
| | | | | | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | | | | |
| 6 | Design | 2023-09-29 | 2023-10-04 | 6 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design decision | 2023-09-29 | 2023-09-29 | 1 day | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Diagram creation | 2023-09-30 | 2023-09-30 | 1 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design logical flow | 2023-10-01 | 2023-10-01 | 1 day | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Prototype creation | 2023-10-02 | 2023-10-04 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Coding | 2023-10-05 | 2023-10-13 | 9 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Generate report function | 2023-10-05 | 2023-10-08 | 4 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Report organization function | 2023-10-09 | 2023-10-11 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Filter report function | 2023-10-12 | 2023-10-13 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Testing | 2023-10-14 | 2023-10-18 | 5 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Unit Testing | 2023-10-14 | 2023-10-16 | 3 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - Module Testing | 2023-10-17 | 2023-10-18 | 2 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fifth Increment (Customer Support Module)

| Task | Task Description | Start Date | End Date | Duration | October (Week 3) | | | | | | | October (Week 4) | | | | | | | November (Week 1) | | | | | | | | |
|------|---------------------------|------------|------------|----------|------------------|----|----|----|----|----|----|------------------|----|----|----|----|----|----|-------------------|----|----|---|---|---|---|---|---|
| | | | | | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | Design | 2023-10-15 | 2023-10-20 | 6 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design decision | 2023-10-15 | 2023-10-15 | 1 day | | | | | | | | | | | | | | | | | | | | | | | |
| | - Diagram creation | 2023-10-16 | 2023-10-16 | 1 day | | | | | | | | | | | | | | | | | | | | | | | |
| | - Design logical flow | 2023-10-17 | 2023-10-17 | 1 day | | | | | | | | | | | | | | | | | | | | | | | |
| | - Prototype creation | 2023-10-18 | 2023-10-20 | 3 days | | | | | | | | | | | | | | | | | | | | | | | |
| | Coding | 2023-10-21 | 2023-10-30 | 10 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Email Response function | 2023-10-21 | 2023-10-22 | 2 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Live Chat function | 2023-10-23 | 2023-10-25 | 3 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Feedback form function | 2023-10-26 | 2023-10-28 | 3 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - FAQ function | 2023-10-29 | 2023-10-30 | 2 days | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Testing | 2023-10-31 | 2023-11-04 | 5 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Unit Testing | 2023-10-31 | 2023-11-02 | 3 days | | | | | | | | | | | | | | | | | | | | | | | |
| | - Module Testing | 2023-11-03 | 2023-11-04 | 2 days | | | | | | | | | | | | | | | | | | | | | | | |

Deployment

| Task | Task Description | Start Date | End Date | Duration | November (Week 1) | | | | | | | November (Week 2) | | | | | | | November (Week 3) | | | | | | | |
|------|----------------------------|------------|------------|----------|-------------------|---|---|---|---|---|---|-------------------|---|----|----|----|----|----|-------------------|----|----|----|----|----|----|--|
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | |
| 8 | System Testing | 2023-11-06 | 2023-11-08 | 3 days | | | | | | | | | | | | | | | | | | | | | | |
| | Performance Stress Testing | 2023-11-09 | 2023-11-10 | 2 days | | | | | | | | | | | | | | | | | | | | | | |
| | Reliability Test | 2023-11-09 | 2023-11-10 | 2 days | | | | | | | | | | | | | | | | | | | | | | |
| | UAT Test | 2023-11-11 | 2023-11-11 | 1 day | | | | | | | | | | | | | | | | | | | | | | |
| | Maintenance and Support | 2023-11-12 | 2023-11-15 | 4 days | | | | | | | | | | | | | | | | | | | | | | |
| | Documentation | 2023-11-16 | 2023-11-18 | 3 days | | | | | | | | | | | | | | | | | | | | | | |
| | Final Review | 2023-11-19 | 2023-11-20 | 2 days | | | | | | | | | | | | | | | | | | | | | | |

2.2 System Requirements

2.2.1 Functional requirements

FR 1: User Management Module

| User Management Module | | |
|------------------------|---|--|
| 1 | The system shall allow users to register a new account | For example, the user is required to fill in detailed information such as username, email, phone number and password in a proper format to create a new account. |
| 2 | The system shall allow users to login to their existing account. | For example, users need to enter their username or email and password in order to login to their account. |
| 3 | The system shall perform validation check on every user input | The user input must go through every validation check before they can proceed to the next step. If invalid input is detected then the user is not allowed to proceed to the next step. |

FR 2: Online Reservation Module

| Online Reservation Module | | |
|---------------------------|---|--|
| 1 | The system shall allow the user to view the room type and room details | The system will prompt the room type and its room details related to each room type. |
| 2 | The system shall show the availability status of every room for a specific date. | The system will check the status of every room in a hotel to determine whether the room that is selected by the guests is available or not on the date selected. |
| 3 | The system shall allow the user to select a room from the available option. | The system provides sorting options to help guests to find the desired rooms based on room type and pricing range. |
| 4 | The system shall allow the user to select date duration for their reservation. | The system will provide options for guests to choose their desired date to have their stay in the hotel. |
| 5 | The system shall notify the user when the selected room is not available | The system will prompt the guests messages reminding them that the room that they selected is not |

| | | |
|----------|---|---|
| | | available and have to choose alternate rooms. |
| 6 | The system shall calculate the total amount of the reservation based on the selected room type and duration of reservation. | The system will check through every room type and duration of the reservations made and then calculate the total amount of reservations made. |
| 7 | The system shall show the summary of the reservation details which include selected room type, date duration and total amount. | After guests have finished making their reservations, the system will display the summarised version of the reservation details which will only include the important details such as the selected room type, date duration and also the total amount for the reservation. |
| 8 | The system shall allow the user to check and confirm the reservation before moving on to the payment section. | Before proceeding to the payment section, the system will let the guests check their reservation details and verify whether the details displayed are correct or not. |

FR 3: Online Payment Module

| Online Payment Module | | |
|-----------------------|--|--|
| 1 | The system shall offer secure payment processing for online transactions | The system will have a function that provides hotel guests to make online transactions for their hotel reservations. |
| 2 | The system shall offer a variety of payment methods which include bank transfers, credit cards and digital wallets. | The system will display several payment methods such as bank transfers, credit cards and e-wallets for hotel guests to choose from before making their payment for their rooms. |
| 3 | The system shall encrypt the data to protect sensitive payment information. | The system will make sure that all the data entered by the hotel guests during the transaction are secured and confidential. |
| 4 | The system shall allow the user to enter payment details which include the card details or account information. | The system will require hotel guests to enter their payment details such as their card details and also their account information before making their transaction. |
| 5 | The system shall allow the users to view the | The system will let the hotel guests to |

| | | |
|----------|---|--|
| | total amount needed to be paid including taxes and additional charges depending on any additional request from the user. | view their payment amount required for transactions before proceeding to the actual payment process. |
| 6 | The system shall allow the user to check and confirm the payment. | The system will allow the hotel guests to check through and make sure the payment details are accurate before confirming the payment. |
| 7 | The system shall allow the user to cancel the payment in a limited time constraint. | The system will let the hotel guests cancel their payment 24 hours from the time of payment. |
| 8 | The system shall generate receipts and successful messages for the user after the transaction. | The system will generate a receipt and prompt a successful message after the guests have successfully made their payment. |
| 9 | The system shall allow the user to view their payment history and transaction details. | The system will let the hotel guests look back at their precious transactions that they made. |

FR 4: Report Generation Module

| Report Generation Module | | |
|--------------------------|---|---|
| 1 | The system shall allow the user to search report type. | The system will allow the user to search for different reports according to their preferences |
| 2 | The system shall generate daily occupancy reports. | To show the percentage of occupied and unoccupied rooms as well as the number of occupied rooms per day. |
| 3 | The system shall generate income reports. | To show the overall income, income by room type, income by services and overall income trends. |
| 4 | The system shall generate guest bookings reports. | To show the booking sources, guest data and booking information. |
| 5 | The system shall generate financial reports. | To show income statements, balance sheets and cash flow statements. |
| 6 | The system shall generate sales reports. | To show information on room, service and staff specific sales. |
| 7 | The system shall generate inventory reports. | To show data on consumptions, stock levels and past purchases. |
| 8 | The system shall generate guest feedback reports. | To show customer feedback including reviews, ratings and surveys regarding customer satisfaction. |

FR 5: Customer Support Module

| Customer Support Module | | |
|-------------------------|--|--|
| 1 | The system shall allow the user to generate and send email responses. | Hotel guests can send email responses to the system if they want to enquire any further information or details regarding their reservation. |
| 2 | The system shall allow the user to use real-time chat functionality to engage in live chat with customer support. | In case hotel guests want to enquire for hotel details, the system will have a real-time functionality to let hotel guests to engage in a live chat. |
| 3 | The system shall allow the user to call in to the hotline of the system. | Hotel guests could also call in to the hotline of the system to enquire more details through their mobile devices. |
| 4 | The system shall offer a self-service portal for users to obtain information, make requests and keep track of their experiences. | Hotel guests are able to obtain information, make requests and also keep track of their stay experiences through the self-service portal provided. |
| 5 | The system shall allow the user to fill in a feedback form. | Hotel guests could fill in the feedback form provided by the hotel to provide any feedback regarding the hospitality. |

2.2.2 Non-Functional requirements

2.2.2.1 Product requirements

Usability

Usability describes how effective a user can learn and use the system. Users can complete their task more effectively and efficiently if the system has good usability. The system has a user-friendly and simple User Interface with intuitive navigation and clear instructions that enables users to learn and get used to it quickly. This will shorten the time needed for users to learn the system and ultimately improve the overall satisfaction of the user. Other than that, the system will provide clear guidance such as HELP facility and clear error messages throughout the usage of the system. The guidance will help novice users who are inexperienced to be able to complete their required task easily. The guidance provided will mitigate the error that the user otherwise would have encountered and speed up the process of completing the task. Lastly, feedback such as sound cues and visual cues that would help direct the user attention to the next step or to important actions is also developed to make the overall experience of the system more smooth and seamless. The system shall also provide language options for at least English, Bahasa Melayu to accommodate different guests and staff. Lastly, the system shall support accessibility features, such as keyboard navigation and screen reader compatibility, to enable users by individuals with disabilities.

Performance

Performance describes how well the system can operate especially under the condition of high workloads and stress in the system. The proposed system is able to automate most of the tasks making most of the processes to be completed swiftly, this allows the system to be able to reduce its workload more efficiently. Besides that, the system has also incorporated the latest software and hardware with better processing power, this allows the system to process larger amounts and more complicated tasks. This enables the system to work under high pressure and can continue to produce good results. Other than that, with newer software the system is capable of delivering accurate and precise information in the system without any redundancy of data. The system can also give immediate feedback and respond to any user request without delay. For example, the system shall respond to users actions swiftly, such as every room reservations or guest check-ins shall be done within 5 seconds, support a minimum of 250 concurrent users without a significant degradation in performance. This will greatly improve the satisfaction of the user towards the system.

Scalability

Scalability describes how well the system is able to scale to accommodate more increased user loads going into the future. The current system is able to accommodate a large number of users with surplus processing power and capacity capable of handling an annual growth of 20% without performance degradation. The proposed CRM system shall be able to incorporate more database servers and implement higher computational power whenever necessary. This allows the system to always be scalable whenever there are additional users needed to be incorporated to the system. Scalability enables the organisation to expand their business without needing to doubt the capabilities of the system to handle a larger workload. Lastly, the system shall dynamically allocate computing resources to handle peak demand periods which ensure consistent performance for all users.

Reliability

Reliability describes how well the system performs without failure for a specific number of uses or amount of time the system is operated. The proposed CRM system shall be able to keep the system up to 99.9% except the time where maintenance or system overhaul is required. This will allow the user to always have access to the system whenever they need to perform any task. This allows the users of the system to always rely on the system being operational which will increase the overall satisfaction of the customer. The proposed system shall also implement countermeasures against system failures. The system will be able to recover from any type of system failure immediately with a backup plan devised to solve the issue to provide uninterrupted services. Other than that, the system shall be able to backup all the data in the system from time to time and the backup is stored for a set amount of time in case of system failure.

Security

Security describes how well the system is able to protect its data against attacks from outer sources. The proposed CRM system shall be able store all the data in a centralised database with the implementation of utmost security to encrypt and protect all the sensitive and confidential data as guest personal information and financial transactions. The system will be able to safeguard all the data from any third party attacks that might cause data corruption or leakage. Besides that, the system shall be able to implement user authentication to only allow authorised personnel to access specific system data and functionalities. The system shall also log and monitor user activities to detect and prevent unauthorised access attempts or suspicious behaviour.

2.2.2.2 Organisational requirements

Standards requirements

Standard requirements are the standards for software design and development that need to be followed during the development of the system. The proposed system will strictly adhere to the standards of ISO 9001. The CRM system shall consistently deliver goods and services that meet any applicable legal and regulatory customer requirements. Other than that, the system shall strive to enhance the customer satisfaction through the efficient use of the proposed system, including system improvement procedures and the assurance of adherence to the needs of the customer and any applicable legal and regulatory requirements.

Implementation requirements

The system shall be a web-based application system that will allow customers to make reservations, make payments and contact customer support wherever they are, whenever they want as long as they are connected to the internet. The system shall be developed in a Java platform to allow incorporation of sophisticated functionalities. The User Interface of the system will be developed in HTML and is designed with the help of CSS. Oracle database will be used to store all the data of the system.

Delivery requirements

The system shall deliver all the system developed along with the complete documentation as the system implemented. The system will deliver the system and the whole documentation in one week of the completion of the system development. The documentation will include detailed documentation and instructions on the usage of the system.

2.2.2.3 External requirements

Interoperability

Interoperability describes the ability of different subsystems in the CRM system to communicate with each other in terms of sharing data and information. The proposed CRM system shall be able to integrate all the subsystems into the main system that allow data exchange between different sub modules in the system to happen seamlessly. This prevents the data in the system to become redundant and allows different subsystems to access and modify the same data simultaneously without affecting each other.

Legislative

Legislative describes the ability of a system to comply with all relevant laws and regulations. The system shall adhere to any law and regulations imposed by the government on the service industry and all other law related to software systems. This will make sure that the system of the organisation does not violate any law that will affect the reputation of the organisation. Other than that, the system shall follow any licensing agreements for usage of third party software in the CRM system. This will allow the system to be able to work hand in hand with the third party software without having any conflict.

Ethical

Ethical describes the principles, values and guidelines incorporated in the organisation's action and behaviour. The system shall address any potential biases and discrimination in the decision making, to ensure fair and equal treatment to all users of the same level. This will ensure that the system is fair and there are not any biases that will cause conflict between users. The system shall also ensure that the system functionalities such as reservation process, payment process and cancellation policy is stated clearly. This will resolve any confusion and misguidance towards how the system operates that might cause the organisation to be held accountable.

Privacy

Privacy describes the ability to keep user data in the system private and confidential. The system shall be able to safeguard the privacy of each user and prevent any misuse towards the data. The system shall be able to authenticate and grant access to users with different levels of clearance that only allow authorised users to use specific data and functions. For instance, if a user makes a purchase, the web-based application needs to keep the customer's payment information private and cannot permit regular staff or unauthorised individuals to access the information. Additionally, only senior management or authorised individuals are permitted access to the user's information.

2.3 Viewpoint-oriented analysis

Viewpoint-oriented analysis is used to collect and comprehend the requirements of stakeholders who can aid in the development of the system as well as to distinguish between each stakeholder by offering various points of view. The multi-perspective analysis is used to ensure that the various points of view have gathered all the information necessary to categorise the stakeholders and other information sources. The graphic below shows the Eastern & Oriental Hotel system's viewpoint hierarchy.

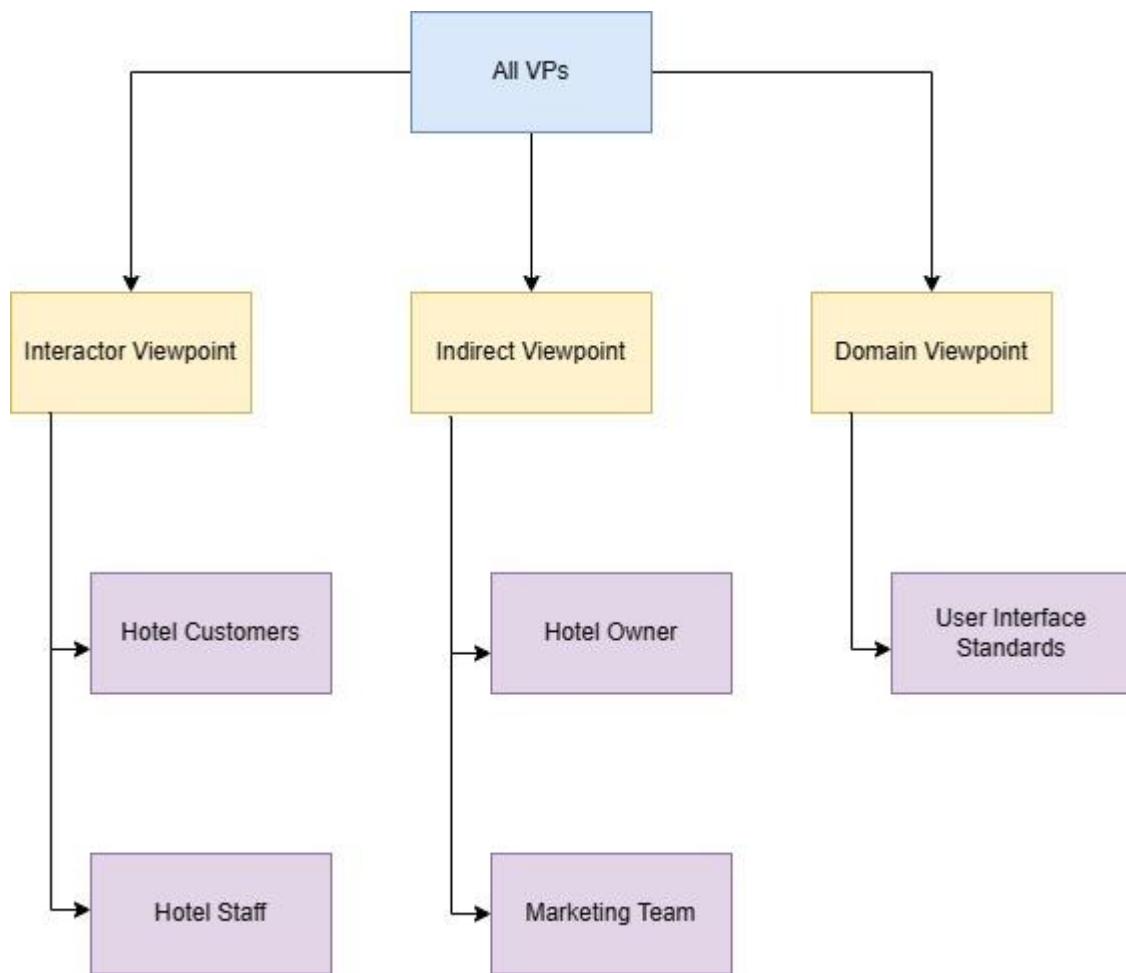


Diagram 2.3 : Viewpoint Hierarchy of Eastern & Oriental Hotel Management System

2.3.1 Interactor Viewpoints

2.3.1.1 Hotel Customers

The hotel customers of E&O hotel will be one of the interactor viewpoints in the system. The hotel customers will interact with the hotel system directly to perform their hotel bookings and other relevant tasks. For example, hotel customers initiate interaction with the hotel system by making a room reservation in the system at any given time. The hotel customer also will use the system to make payment for their room reservation or any customer services they requested with their preferred payment method. Lastly, the hotel customer will also use the system to contact the customer support for any enquiries and complaints.

2.3.1.2 Hotel Staff

The hotel staff of E&O hotel is another interactor viewpoint in the system. The hotel staff will interact with the hotel system to make reservations for the customers that book physically in the hotel. The hotel staff will also interact with the system when they want to check customers in and out of the property by verifying their details, process customers payments of rooms, assign rooms for them and also generate room access cards for the customers. As for billing and payment processing, hotel staff will also interact with the system so that they could process customers payments, verify charges and generate the receipts for the hotel customers. Besides that, the hotel staff will also interact with the system to generate relevant details and summary reports. Lastly, the hotel staff will also interact with the system to use the customer support to respond to any customer request.

2.3.2 Indirects Viewpoints

2.3.2.1 Hotel owner

One of the indirect viewpoints in the hotel system would be the owner of the hotel. The hotel owner may not have direct interaction with the daily operations of the hotel system, however they are concerned about the financial oversight of the hotel and they rely on the accurate financial data that the system could provide. Data such as revenue report, profit and loss statement, as well as cash flow analysis can help the hotel owner assess the hotel's profitability and the overall financial health of the hotel. Besides that, hotel owners will also work together with the hotel management system to set their financial goals, allocate resources for the system and also to plan for capital expenditures of the hotel. These decisions and goals could ensure that the hotel operates .

2.3.2.2 Competitors

Competitors are another indirect viewpoint in the hotel management system. The competitors do not interact directly with the hotel management system but they will affect the system in terms of comparison and differences in marketing strategies and trends. The different marketing strategies of the rival hotel can be used as a reference for the proposed system. For example, the rival organisation has implemented a new marketing strategy on their hotel by allowing the customers to attend special events during their stay in the hotel. Depending on the success or failure of the marketing strategy. Our organisation can choose to use the same marketing strategy approach. By taking into consideration the point of view of different rivals, the organisation will be able to further improve the quality of the system and appeal to a wider variety of customers.

2.3.3 Domain Viewpoints

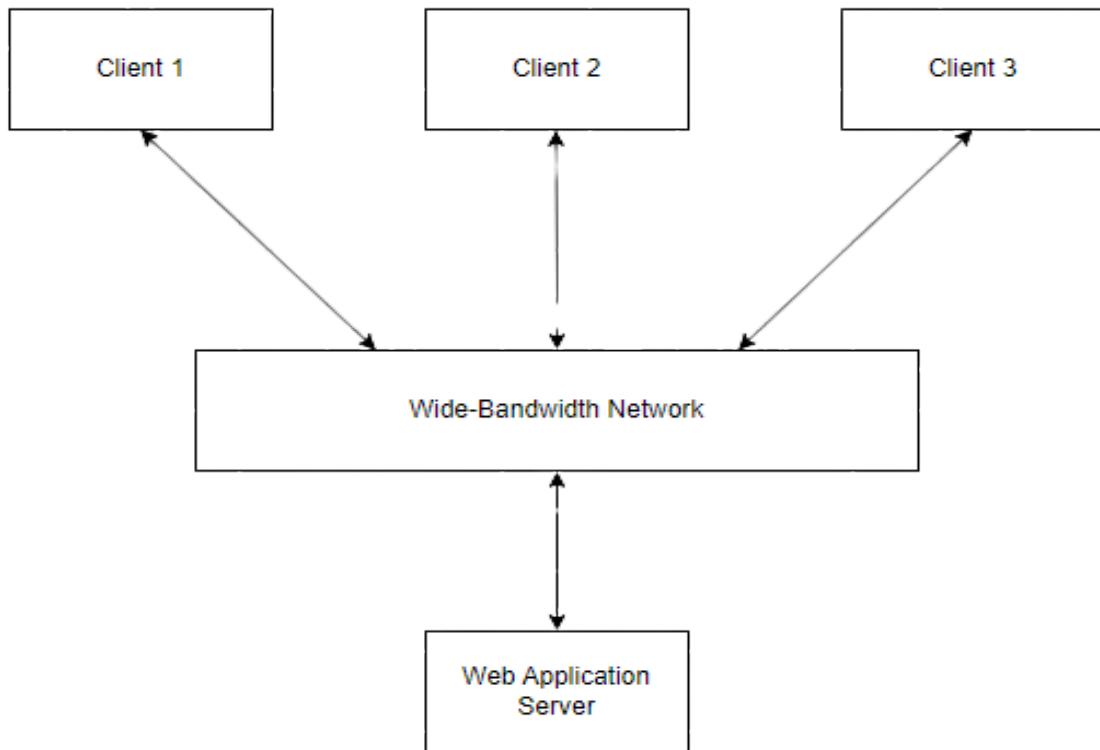
2.3.3.1 User Interface Standards

User interface standards are the primary domain viewpoint from the hotel system. Users can more readily comprehend and utilise all of a website's capabilities with a simple and intuitive user interface. A well designed user interface ensures that the users are able to understand each functionalities in the system and enable the user to learn the system quickly. The system can aim for a user-friendly interface that is clean and distinctive. This will allow the user to have a better experience in which they can when using the system which will increase the number of users willing to use the system. The user interface will also adhere to the industrial standards to ensure that the customer can get used to the system functionality as soon as possible. These standard viewpoints can improve the system in terms of design and also improve user satisfaction.

3.0 Part 3

3.1 Architectural Design

3.1.1 Client-server model



Client-server model has been chosen as the system architectural model for the hotel system. The client-server model is one of the architectural designs that shows how data and processes are distributed across a range of components in a system. The hardware and software of the model are divided into two categories which are clients and servers. Clients are also called as service requesters as they consume the services, resources and data provided from the server, they are usually end-user devices such as smartphones, computers and other devices. Clients will start their communication with the server by requesting specific services or data. Servers are the providers of resources or services to clients. They will wait for incoming requests from clients, process and respond to the clients accordingly. Servers are usually able to handle a large number of requests at the same time therefore they are more powerful.

Client-server models offer a number of advantages, making it a common architectural design to use when building a system. One of the advantages would be that the client-server model offers centralised resources on the server. All data and functions are managed by the server therefore the

server ensures that the data and functions are always available to the client in the system, reducing data inconsistency and improving overall data management. Besides offering centralised resources, the client-server model also has efficient resource utilisation. Servers are more powerful and have more computing resources compared to clients therefore allows them to utilise resources efficiently and also be able to handle multiple clients and processes at the same time

3.2 Test Planning

3.2.1 Testing Process

Unit testing, module testing, system testing, and user acceptability testing are the four distinct steps that make up the software testing process. In order to guarantee the quality and operation of the software system, each step has a distinct function.

In the first testing phase known as **unit testing**, certain software units or modules are tested to ensure that they function as expected. To ensure it performs as planned, it involves splitting each individual piece of software code. Developers can find and fix problems early on by running unit tests while working on a module. It is possible to improve the quality and dependability of the module through early problem detection and correction. Due to the module's split into numerous smaller pieces of code, it is simpler to debug and improve each piece of code separately, making unit testing especially helpful.

Module testing is the stage that comes after unit testing. The primary objective of module testing is to examine how various software system modules interact and integrate with one another. The goal is to make sure that the necessary data can be successfully transferred across modules, enabling them to cooperate without any problems. Module testing ensures that a module's outputs function according to expected inputs for other modules. Developers can find any inconsistencies or mistakes that might occur during the interaction between various system components by evaluating the integration of modules.

The next step in the testing process is **system testing**. Instead of focusing on specific modules, it attempts to assess the entire system as a whole. By putting the system through multiple test scenarios, system testing determines whether it operates as intended. By providing the system with both valid and invalid inputs, testers simulate real-world usage and can evaluate the system's performance and behaviour under various scenarios. System testing ensures that all requirements, both functional and non-functional as outlined in the system's requirement specification are satisfied. It enables developers to fill in any gaps or deviations from the intended system behaviour

before the application is released.

User acceptance testing (UAT) is the last phase in the testing process. UAT includes having actual users or a representative group of users test the software system. The goal of UAT is to make sure the system is prepared for deployment and that it satisfies the needs and expectations of the users. Users carry out numerous tasks while assessing the usability, functionality, and overall user experience of the system. User acceptance testing results assist in identifying any problems or potential areas for improvement and guarantee that the final system complies with user needs and preferences.

3.2.2 Testing Items

The user management module, online reservation module, online payment module, report generation module, and customer support module are the items that will be tested. If a user is already a member, the user management module will check to see if they have successfully logged in. Additionally, it checks whether a user who is fresh to the programme can successfully register. When using the online reservation module, it will check to see if the user was able to book the room successfully and whether they were able to book more than one room on a different date. The online payment module will check to see if the user has made the payment successfully. In the case that the payment is accepted, a receipt will also be generated. For the report generation module, it will check to see if the report was successfully generated depending on the requirements of the user. The customer support module will check to see if the customer's response has been successfully sent to the system.

3.2.3 Testing Procedure

The user is required to register for an account if they are a novice user. If the users already have an existing account on this system , they only need to login to the system using their account. After they login their account, the system will direct the user to the home page that includes options for the user to choose which page they want to access. If they want to view the list of room types available, they can click the book now button to display a list of room types in the hotel. If they would like to view the details of a hotel room, they should click on the specific room that will guide them to view all of the room types. The user is able to reserve the room if the desired room is available for reservation. User is required to fill in guest information before proceeding to the payment page. In the payment page, the user needs to choose the payment method and fill in the payment details regarding their chosen payment method. The user will be able to generate a receipt after payment is done successfully. If the user would want to interact with the customer support,

they will have different options to interact with the customer support. If the user seeks to chat with the customer support, the user needs to click on the icon at the bottom right of the page to start a conversation with the chat bot. The user needs to select the Contact Us page to fill in the feedback form if they like to complain issues to the customer support. From a staff viewpoint, system users need to filter the report to generate the report they wished to on the CRM system.

3.2.4 Testing Requirement

Hardware Requirement

For this system, end users should use electronic devices such as tablets, smartphones and laptops that fulfil the required hardware specifications in order to use the online hotel management system properly. Tablets should have at least 3GB of RAM, a dual-core processor running at 1.5GHz or faster, and at least 32GB of storage, preferably an SSD for its greater performance. For smooth network access, they should also feature built-in Wi-Fi or cellular connectivity. On the other hand, smartphones must have at least 4GB of RAM, a quad-core processor running at 1.5GHz or higher, and a storage capacity of at least 32GB. They ought to include built-in cellular and Wi-Fi connectivity as well. For laptops, a dual-core processor clocked at 2GHz or higher, a minimum of 8GB RAM for smooth operation (recommended for more demanding jobs or multitasking), and a minimum storage capacity of 32GB are all required, with an SSD as an added bonus for better performance. For flexible network access, laptops should have built-in Ethernet and Wi-Fi connectivity. Additionally essential to ensuring smooth functioning is compatibility with popular operating systems like iOS, Android, Windows, macOS, or Linux.

Software Requirement

The computer needs an operating system that is compatible with the system, preferably Windows 10 or a more recent version. The most recent patches and updates for the operating system should be installed. A supported web browser must also be used during the testing, such as Google Chrome, Mozilla Firefox, Microsoft Edge or Safari. For the hotel management system to function properly and securely, it is crucial to make sure the web browser is likewise updated to the most recent version.

3.2.5 Testing Constraints

Budget

A testing operation should be carried out within the budget provided, taking into account any restrictions on resources, tools or outside services that may result in additional expenditures.

Infrastructure

The process of testing may be restricted depending on the stability and accessibility of the testing environment, which includes servers, databases, network connectivity, and hardware and software infrastructure.

Time Constraints

The testing time might not be enough to accommodate all types of testing, which would keep all testing phases including unit and module testing from being completed.

Skill and Expertise

The lack of skilled testers with experience and domain knowledge can be a restriction. The testing process and the capacity to effectively detect essential errors may be impacted by the lack of knowledgeable testers.

3.3 Test Case

3.3.1 Unit Testing

Unit test will test on the user management module, online reservation module, online payment module, report generation module and customer support module through unit testing. We will prioritise testing on each input to obtain different results from each module.

3.3.1.1 User Management Module

Register

| | |
|--|---|
| System: E&O Hotel Management System | Subsystem: User Management Module - Register Function |
| Test Date: 27th July 2023 - 23th August 2023 | |
| Tester Name: Ong Zu Liang | |
| Description: Test the register functionality of the user management module using valid and invalid input | |

| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
|----------------------------|---|----------------------------------|------------------------------|----------------------------|-----------|----------------------|
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Register Information | | | | | | |
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the valid phone number. | Phone Number = “0123456789” | - | - | - | - |

| | | | | | | |
|----|--|----------------------|--|-------------------------|------|---|
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button. | | Register successful. System display successful message “ Welcome, Andrew Ma” and navigate users to the login page. | Same as expected result | Pass | - |

Invalid Register Information(i)

| | | | | | | |
|----|--|----------------------------------|---|-------------------------|------|---|
| 1. | The user enters the invalid first name. | First Name = “Andrew\$” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the valid phone number. | Phone Number = “0123456789” | - | - | - | - |
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button | | Register unsuccessful. System display error message “Invalid first name. Please try again.” | Same as expected result | Fail | - |

| Invalid Register Information(ii) | | | | | | |
|-----------------------------------|--|----------------------------------|---|-------------------------|------|---|
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the invalid last name. | Last Name = “Ma\$” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the valid phone number. | Phone Number = “0123456789” | - | - | - | - |
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button | | Register unsuccessful. System display error message “Invalid last name. Please try again.” | Same as expected result | Fail | - |
| Invalid Register Information(iii) | | | | | | |
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma\$” | - | - | - | - |
| 3. | The user enters the invalid email address. | Email address = “Wish.gmail.com” | - | - | - | - |
| 4. | The user enters the valid | Phone Number = | - | - | - | - |

| | | | | | | |
|----|---------------------------------------|----------------------|--|-------------------------|------|---|
| | phone number. | “0123456789” | | | | |
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button | | Register unsuccessful. System display error message “Invalid email address. Please try again.” | Same as expected result | Fail | - |

Invalid Register Information(iv)

| | | | | | | |
|----|---|----------------------------------|---|-------------------------|------|---|
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma\$” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the invalid phone number. | Phone Number = “0123456789++” | - | - | - | - |
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button | | Register unsuccessful. System display error message “Invalid phone number. Please try again.” | Same as expected result | Fail | - |

| Invalid Register Information(V) | | | | | | |
|---------------------------------|--|----------------------------------|---|-------------------------|------|---|
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma\$” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the valid phone number. | Phone Number = “0123456789” | - | - | - | - |
| 5. | The user enters the invalid password. | Password = “w” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button | | Register unsuccessful. System display error message “Invalid password. The password length must not be less than 6 characters.” | Same as expected result | Fail | - |

Login

| | |
|---|--|
| System: E&O Hotel Management System | Subsystem: User Management Module - Login Function |
| Test Date: 27th July 2023 - 23th August 2023 | |
| Tester Name: Lim Yong Guo | |
| Description: Test the login functionality of the user management module using valid and invalid input | |

| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
|-------------------------|---|---------------------------------|------------------------------|----------------------------|-----------|----------------------|
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Login Information | | | | | | |
| 1. | The user enters the valid email address. | Email Address= "Wish@gmail.com" | - | - | - | - |
| 2. | The user enters the valid password. | Password=wish123 | - | - | - | - |

| | | | | | | |
|-------------------------------|--|--------------------------------|--|-------------------------|------|---|
| 3. | The user clicks the ‘Login’ button | | Login successful. System display successful message “ Welcome back, Andrew Ma” and navigate users to the home page. | Same as expected result | Pass | - |
| Invalid Login Information(i) | | | | | | |
| 1. | The user enters invalid email address. | Email Address=“Wish@yahoo.com” | - | - | - | - |
| 3. | The user enters the valid password. | Password=wish123 | - | - | - | - |
| 3. | The user enters the ‘Login’ button. | | Login unsuccessful. System display error message “Invalid Email Address. Please try again.” | Same as expected result | Fail | - |
| Invalid Login Information(ii) | | | | | | |
| 1. | The user enters the valid email address. | Email Address=“Wish@gmail.com” | - | - | - | - |
| 2. | The user enters the invalid password. | Password=wish345 | - | - | - | - |
| 3. | The user enters the ‘Login’ button. | | Login unsuccessful. System display error message “Invalid password. Please try again.” | Same as expected result | Fail | - |

3.3.1.2 Online Reservation Module

Reservation

| | |
|--|---|
| System: E&O Hotel Management System | Subsystem: Online Reservation Module - Reservation Function |
| Test Date: 20th August 2023 - 11th September 2023 | |
| Tester Name: Ma Yu Chuan | |
| Description: Test the reservation functionality of the online reservation module using valid and invalid input | |

| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
|-------------------------------|---|-------------------------------|------------------------------|----------------------------|-----------|----------------------|
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Reservation Information | | | | | | |
| 1. | The user selects the valid room type. | Room Type =Queen Room | - | - | - | - |
| 2. | The user selects the valid check-in date. | Check-in Date =2023-09-16 | - | - | - | - |
| 3. | The user selects the valid check-out date. | Check-out Date =2023-09-18 | - | - | - | - |
| 4. | The user selects the valid number of occupancy. | Number of Occupancy =3 | - | - | - | - |

| | | | | | | |
|----|--|---------------------------------|---|-------------------------|------|---|
| 5. | The user checks the valid room availability. | Room Availability =Available | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reservation successful. System navigates users to the payment page. | Same as expected result | Pass | - |

Invalid Reservation Information(i)

| | | | | | | |
|----|---|---------------------------------|--|-------------------------|------|---|
| 1. | The user selects the invalid room type. | Room Type = Null | - | - | - | - |
| 2. | The user selects the valid check-in date. | Check-in Date =2023-09-16 | - | - | - | - |
| 3. | The user selects the valid check-out date. | Check-out Date =2023-09-18 | - | - | - | - |
| 4. | The user checks the valid room availability. | Room Availability =Available | - | - | - | - |
| 5. | The user selects the valid number of occupancy. | Number of Occupancy =3 | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reservation unsuccessful. System display error message “Please select a room type.”. | Same as expected result | Fail | - |

Invalid Reservation Information(ii)

| | | | | | | |
|----|---------------------------------------|--------------------------|---|---|---|---|
| 1. | The user selects the valid room type. | Room Type =Queen Room | - | - | - | - |
| 2. | The user selects the invalid | Check-in Date | - | - | - | - |

| | | | | | | |
|----|---|---------------------------------|---|-------------------------|------|---|
| | check-in date. | =Null | | | | |
| 3. | The user selects the valid check-out date. | Check-out Date =2023-09-18 | - | - | - | - |
| 4. | The user selects the valid number of occupancy. | Number of Occupancy =3 | - | - | - | - |
| 5. | The user checks the valid room availability. | Room Availability =Available | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reservation unsuccessful. System display error message “Please select a check-in date.”. | Same as expected result | Fail | - |

Invalid Reservation Information(iii)

| | | | | | | |
|----|---|----------------------------------|--------------|------------------|------|---|
| 1. | The user selects the valid room type. | Room Type =Queen Room | - | - | - | - |
| 2. | The user selects the valid check-in date. | Check-in Date =2023-09-16 | - | - | - | - |
| 3. | The user selects the invalid check-out date. | Check-out Date =Null | - | - | - | - |
| 4. | The user selects the valid number of occupancy. | Number of Occupancy =3 | - | - | - | - |
| 5. | The user checks the room availability. | Room Availability = Available | - | - | - | - |
| 6. | The user clicks the “Pay” | | Reserveation | Same as expected | Fail | - |

| | | | | | | |
|-------------------------------------|---|----------------------------------|---|-------------------------|------|---|
| | button. | | unsuccessful. System display error message “Please select a check-out date.”. | result | | |
| Invalid Reservation Information(iv) | | | | | | |
| 1. | The user selects the valid room type. | Room Type =Queen Room | - | - | - | - |
| 2. | The user selects the valid check-in date. | Check-in Date =2023-09-16 | - | - | - | - |
| 3. | The user selects the valid check-out date. | Check-out Date =2023-09-18 | - | - | - | - |
| 4. | The user selects the invalid number of occupancy. | Number of Occupancy =Null | - | - | - | - |
| 5. | The user checks the room availability. | Room Availability = Available | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reserveation unsuccessful. System display error message “Please select a number of occupancy.” | Same as expected result | Fail | - |
| Invalid Reservation Information(v) | | | | | | |
| 1. | The user selects the valid room type. | Room Type =Queen Room | - | - | - | - |
| 2. | The user selects the valid | Check-in Date | - | - | - | - |

| | | | | | | |
|----|---|------------------------------------|--|-------------------------|------|---|
| | check-in date. | =2023-09-16 | | | | |
| 3. | The user selects the valid check-out date. | Check-out Date =2023-09-18 | - | - | - | - |
| 4. | The user selects the valid number of occupancy. | Number of Occupancy =3 | - | - | - | - |
| 5. | The user checks the room availability. | Room Availability = Unavailable | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reservation unsuccessful. System display error message “The room type you selected is all occupied, Please select another room type or date.” | Same as expected result | Fail | - |

3.3.2 Module Testing

3.3.2.1 Registration module

| | |
|--|---|
| System: E&O Hotel Management System | Subsystem: User Management Module - Register Function |
| Test Date: 27th July 2023 - 23th August 2023 | |
| Tester Name: Ong Zu Liang | |

| | | | | | | |
|--|--|--|--|--|--|--|
| Description: Test the register functionality of the user management module using valid and invalid input | | | | | | |
|--|--|--|--|--|--|--|

| Description: Test the register functionality of the user management module using valid and invalid input | | | | | | |
|--|---|----------------------------------|--|----------------------------|-----------|----------------------|
| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Register Information | | | | | | |
| 1. | The user enters the valid first name. | First Name = “Andrew” | - | - | - | - |
| 2. | The user enters the valid last name. | Last Name = “Ma” | - | - | - | - |
| 3. | The user enters the valid email address. | Email address = “Wish@gmail.com” | - | - | - | - |
| 4. | The user enters the valid phone number. | Phone Number = “0123456789” | - | - | - | - |
| 5. | The user enters the valid password. | Password = “wish123” | - | - | - | - |
| 6. | The user clicks the ‘Register’ button. | | Register successful. System display successful message “Welcome, Andrew Ma” and navigate users to the login | Same as expected result | Pass | - |

| | | | | | | |
|--|--|--|-------|--|--|--|
| | | | page. | | | |
|--|--|--|-------|--|--|--|

3.3.2.2 Login module

| | |
|---|--|
| System: E&O Hotel Management System | Subsystem: User Management Module - Login Function |
| Test Date: 27th July 2023 - 23th August 2023 | |
| Tester Name: Lim Yong Guo | |
| Description: Test the login functionality of the user management module using valid and invalid input | |

| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
|-------------------------|---|---------------------------------|------------------------------|----------------------------|-----------|----------------------|
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Login Information | | | | | | |
| 1. | The user enters the valid email address. | Email Address= "Wish@gmail.com" | - | - | - | - |
| 2. | The user enters the valid password. | Password=wish123 | - | - | - | - |
| 3. | The user clicks the | | Login successful. | Same as expected result | Pass | - |

| | | | | | | |
|--|----------------|--|---|--|--|--|
| | 'Login" button | | System display successful message " Welcome back, Andrew Ma" and navigate users to the home page. | | | |
|--|----------------|--|---|--|--|--|

3.3.2.3 Online Reservation Module

| | |
|--|---|
| System: E&O Hotel Management System | Subsystem: Online Reservation Module - Reservation Function |
| Test Date: 20th August 2023 - 11th September 2023 | |
| Tester Name: Ma Yu Chuan | |
| Description: Test the reservation functionality of the online reservation module using valid and invalid input | |

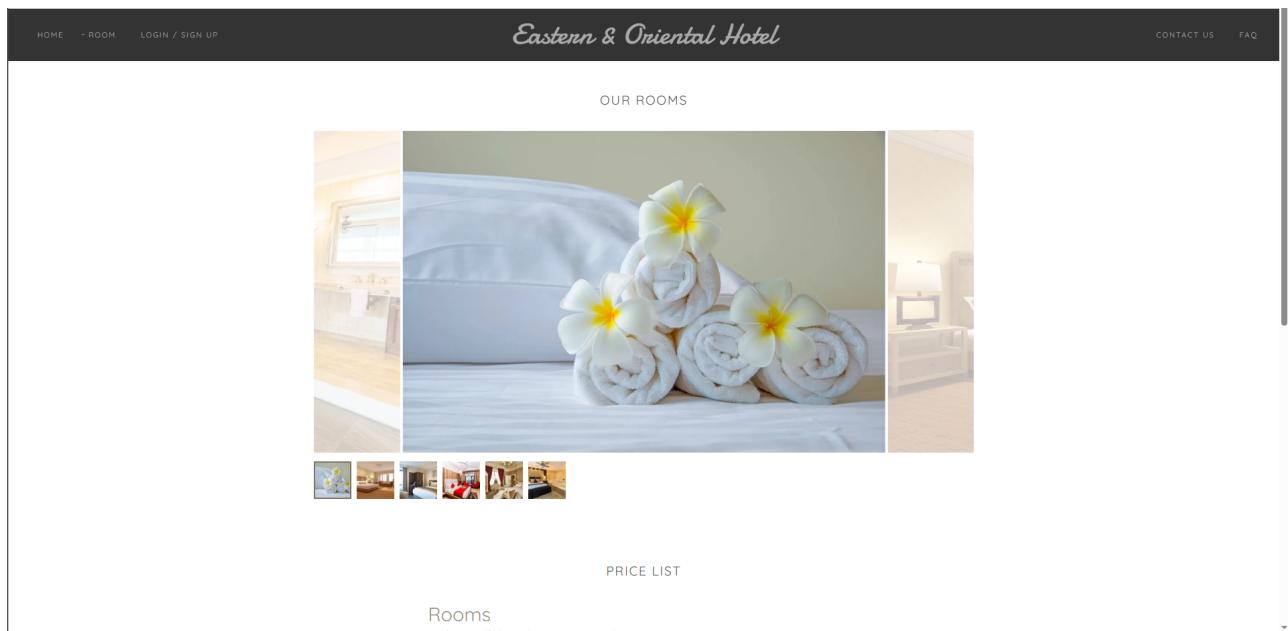
| No. | Actions | Test Data | Expected Result/ Response | Actual Result/ Response | Pass/Fail | Remarks/ Comments |
|-------------------------------|---|------------------------|------------------------------|----------------------------|-----------|----------------------|
| | The system shall require the customers to fill in their personal information correctly. | | | | | |
| Valid Reservation Information | | | | | | |
| 1. | The user selects the valid room type. | Room Type = Queen Room | - | - | - | - |
| 2. | The user selects the valid | Check-in Date | - | - | - | - |

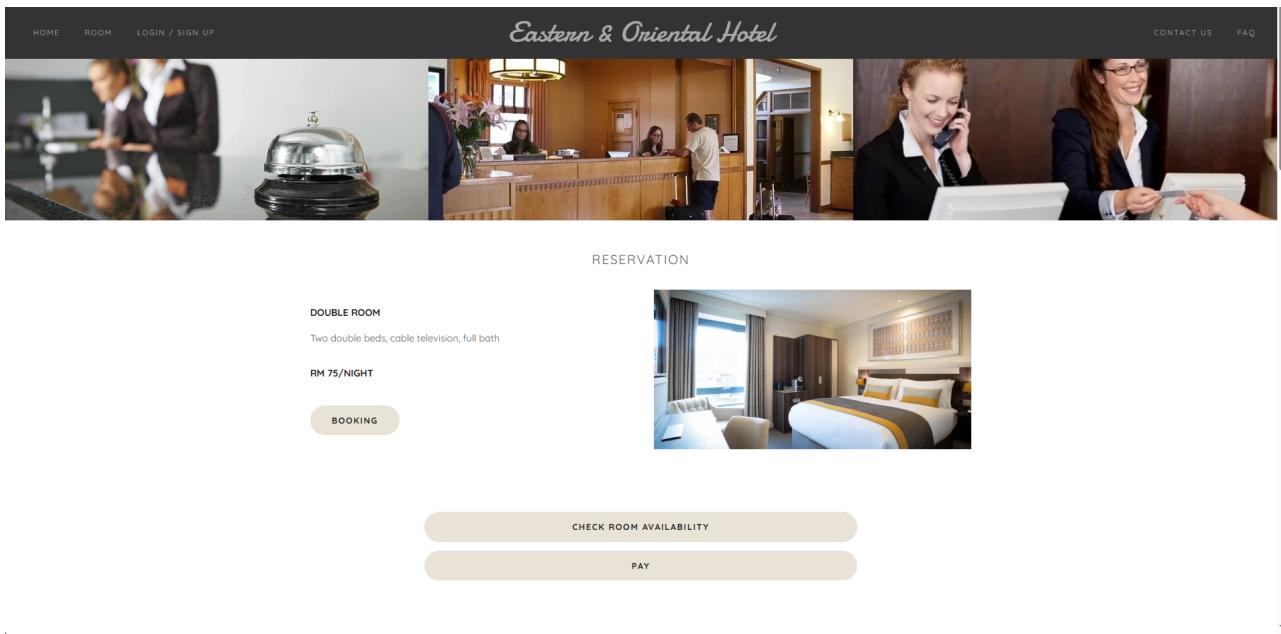
| | | | | | | |
|----|---|----------------------------------|--|-------------------------|------|---|
| | check-in date. | = 2023-09-16 | | | | |
| 3. | The user selects the valid check-out date. | Check-out Date = 2023-09-18 | - | - | - | - |
| 4. | The user selects the valid number of occupancy. | Number of Occupancy = 3 | - | - | - | - |
| 5. | The user checks the valid room availability. | Room Availability = Available | - | - | - | - |
| 6. | The user clicks the “Pay” button. | | Reserve successful. System navigates users to the payment page. | Same as expected result | Pass | - |

3.3 User Interface Design Principles

3.3.1 Consistency

Consistency is one of the important principles in the user interface design of a system. Having a uniform experience throughout the whole system by implementing consistent elements, interactions and also visual aesthetics could reduce the cognitive load of the system, and also foster familiarity for individuals who are using the system. With a consistent user interface design, users can learn the system more easily and efficiently as they can depend on their prior knowledge of the system. Consistency in a user interface design can also reduce the occurrence of errors and mistakes made by the users when they are using the system. Having consistent patterns or user interface design in a system can prevent users from making accidental mistakes or actions, minimising their confusion and misunderstandings towards the system.





In the diagram above, It shows that the user interfaces of the system for viewing room pages and reservation pages follow a consistent colour scheme visual arrangement for words with identical navigation bars on top of each page. By having a consistent layout, the users of the system are able to learn the system quickly. This allows the users to have an easier time when completing tasks such as making reservations and payments. With the consistent design, it can also improve the overall flow of navigation of the user.

3.3.2 User Familiarity

User familiarity describes the level of comfort and ease users experiences when connecting with an application. It is accomplished by using constant design elements, interactions and patterns that people are familiar with from previous interactions. Users are able to understand and handle the application easily with a familiar interface by utilising their past knowledge and mental models. User familiarity promotes efficiency , confidence and a positive user experience by lowering the learning curve and cognitive load.

RESERVATION

DOUBLE ROOM

Two double beds, cable television, full bath

RM 75/NIGHT

[BOOKING](#)



[CHECK ROOM AVAILABILITY](#)

[PAY](#)

QUEEN ROOM

One queen bed, cable television, full bath

RM 85/NIGHT

[BOOKING](#)



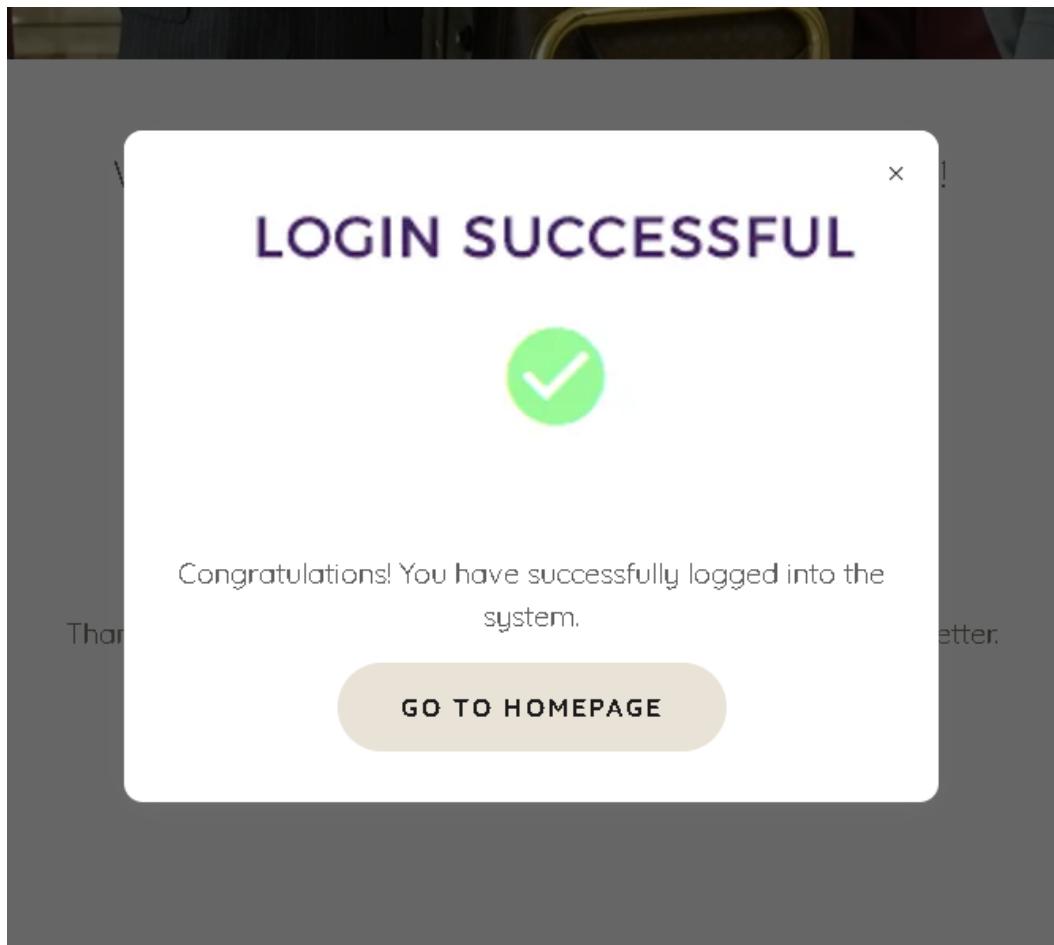
[CHECK ROOM AVAILABILITY](#)

[PAY](#)

The diagram above shows the list of the rooms available for reservation. Each room listed is aligned properly with a constant element of check room availability and booking that is commonly available in a standard hotel reservation webpage.

3.3.3 Minimal Surprises

Users should only experience a limited amount of unexpected or surprising behaviour when interacting with a system or programme, according to the "minimal surprise" principle of user interface design. It provides attention on designing intuitive interfaces that are consistent, lowering cognitive load and enhancing user experience in general.



In the diagram above, It shows the successful message after the user login their account. It is important to notify the user that their login is successful so they will feel that the system flow is logical and contains minimal surprises. Other than that ll the navigation button will direct to the correct page without any interception or changes.

3.3.4 Recoverability

Recoverability is an important concept that focuses on giving users the ability to recover from faults or mistakes they might make when interacting with a system. Users' errors and the possibility of mistakes happening during interactions are acknowledged. To help users reestablish control and effortlessly carry out their duties, recoverability aims to reduce the negative effects of these failures.



Press button below to go back reservation page.

[BACK TO RESERVATION PAGE](#)

In the diagram above, It shows the user interfaces of the system for viewing room availability by

providing a back button with a guidance above it. This allows the users to go back to the previous page if the user wants to quit from this page to view the availability for another room.

3.3.5 User Guidance

In user interface design, user guidance refers to giving people clear and understandable directions, messages and support when they interact with a system. It assists users in understanding, interacting with and completing tasks inside an interface. The improvement of usability, the reduction of confusion, and the enhancement of the user experience all depend heavily on user guidance.



Welcome

Press button below to reach the reservation page.

BOOK NOW

Login to Your Account

Email : (JohnDoe@gmail.com)*

Please enter a valid email address.

In the diagram above, there are guidance messages with light colour highlighted. This allows the user, especially novice users, to know how to interact with the system well. For example, with the description provided the user will know that the book now button is used to navigate the user to the reservation page. Other than that, there are useful error messages that will pop up to indicate that users have made a mistake when entering the email address.

3.3.6 User Diversity

User diversity in user interface design refers to recognising and dealing with the large variety of users with different abilities, needs, preferences and backgrounds. It emphasises the value of inclusion and making sure that the interface is functional, entertaining, and accessible for all users, regardless of their age, gender, physical or cognitive limitations, language ability, cultural background, or technological knowledge.

FREQUENTLY ASKED QUESTIONS

Please reach us at [if you cannot find an answer to your question.](#)

At what time can we check into our room? ^

Guests can check into their room in the afternoon at around 1PM.

Is there Wi-Fi in every room? ▼

Are there any restaurants that are nearby the hotel? ▼

Are we able to park our vehicles in the hotel? ▼

Can we bring our pets into the hotel? ▼

Can I request for additional stuff in the hotel room? ▼

FREQUENTLY ASKED QUESTIONS

Please reach us at if you cannot find an answer to your question.

Pukul berapa kita boleh mendaftar masuk ke bilik kita? ^

Jawapan: Tetamu boleh mendaftar masuk ke bilik mereka pada petang, kira-kira jam 1 petang.

Adakah Wi-Fi di setiap bilik? ^

Adakah restoran yang berdekatan dengan hotel? ^

Bolehkah kami meletakkan kenderaan kami di hotel? ^

Bolehkah kami membawa haiwan ke dalam hotel? ^

Bolehkah saya meminta barang tambahan di dalam bilik hotel? ^

In the diagram above, it shows the user diversity of accommodating different languages into the system. This allows users who have difficulty to understand a specific language or users who prefer to use other languages to be able to have the option to change the language of the system to a based on their preferences.