

**System Analysis and Design****AAPP007-4-2-SYAD****Group Assignment****Company Name : Riverscapes****GROUP MEMBERS :**

NO.	NAME	TP NUMBER
1.	LAI ZHAO WEI	TP070225
2.	GOH XIN TONG	TP069712
3.	LIM WEI LUN	TP069058
4.	JENNA CAITLIN DASS	TP070346
5.	AMIRHOSSEIN HAYATGHEIBI	TP069095
6.	JOSHUA EMMANUEL KC SATHASIVAM	TP070067

**INTAKE CODE : UCDF2207ICT(SE)****LECTURER : SALASIAH BINTI SULAIMAN****SUBMISSION DATE : 29/12/2023**

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## **1.0 Introduction**

### **1.1 Name & Logo**



Riverscapes is a website developed for the River Cruise company to manage their customers' bookings, reservations and rentals digitally. Relying on a manual system can lead to many human errors which could affect River Cruise dramatically, leading to lack of customers, financial loss, and inevitably bad reviews. With a website like Riverscapes, where customers and staff are the end-users, we aim to improve River Cruise's management and overall business process as well as ease the work of Tifanny and James.

## 1.2 Vision & Mission

### 1.2.1 Vision

To ease the reservation process to create a convenient and memorable experience for our customers, allowing them to connect with the natural beauty of the Melaka River while fostering a sense of environmental stewardship and sustainable tourism.

### 1.2.2 Mission

Riverscapes is dedicated to delivering memorable and educational adventures along the Melaka River, inspiring environmental awareness, and fostering a sense of responsibility among our guests towards the conservation of this precious waterway.

## 1.3 Motto

“Escape to A Better Place”

The motto is a catchy phrase that complements the company's vision and mission which is to give their customers a chance to escape from their daily lives by connecting with mother nature (a better place). Customers also get a chance to experience the beauty of nature and learn to appreciate it more than usual.

## 1.4 Overview of the Present Operational Process

### **Customer Acquisition:**

- Customers find River Cruise through social media advertisements.

### **Reservation Management:**

- Customers make reservations for scheduled cruise tours or walk-in kayak rentals.
- Reservations are recorded in a loose-leaf binder with separate tabs for each business activity.
- Tiffany enters reservation details into a Microsoft Access database, generating a daily reservation list.
- Kayak availability is displayed on a wall-mounted board using color-coded magnets.

### **Rental Process:**

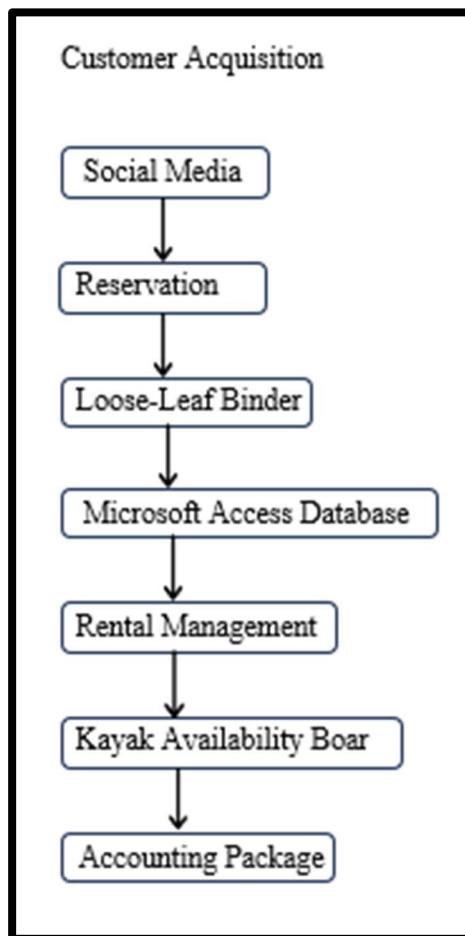
- Customers rent kayaks from RC's marina location.
- Tiffany or Devi handles rentals when James is giving lessons or busy with a tour group.
- Kayaks are checked in and out manually.
- Kayak availability is displayed on a wall-mounted board with color-coded magnets.

### **Inventory Management:**

- RC maintains three cruise ships, ten rental kayaks, eight car-top carriers, and a variety of accessories and safety equipment.
- Tiffany considers adding books and videos about kayaking and ecotourism based on customer requests.

**Assumptions:**

- RC's current system is manual and relies on paper-based records.
- The Microsoft Access database is only used for scheduled reservations.
- The accounting package is used to track financial transactions, not customer information.
- There is no integration between the reservation system, the rental system, and the accounting system.
- Tiffany handles most administrative tasks, including reservations, rentals, and financial management.
- James focuses on providing kayaking instruction and leading guided tours.

**Diagram:**

## **2.0 Problems Identification and Proposed Solutions**

### **2.1 Problems**

#### **2.1.1 Manual Reservation**

##### **Cause:**

The manual reservation system, which involves customers calling in and having their information recorded in a loose-leaf binder before it is transferred to a board using magnets with color coding, may result in transcription errors and communication breakdowns because verbal information is prone to misinterpretation during the phone booking process, and the manual recording process itself adds another level of complexity.

##### **Effect:**

Due to the increased likelihood of double reservations, scheduling errors, and inaccurate personnel counts, this manual method poses operational risks that might result in delays and disgruntled customers. In addition to impeding individualized services and possibly denying customers the ease of online booking, the absence of a centralized system also lowers effective customer management, which lowers the cruise industry's overall productivity and competitiveness.

### 2.1.2 Lack of Customer Data

#### **Cause:**

One of the main disadvantages of the manual reservation system is a lack of customer data. Accurately gathering and organizing crucial client information is complicated by handwritten records and a complex, difficult-to-navigate database. Errors are introduced by the manual nature of data entry, and maintaining an extensive and easily accessible customer dataset is made more difficult by the absence of a well-designed database structure.

#### **Effect:**

This leads to difficulties in analyzing data which ends up reducing their effectiveness as they are unable to come up with effective business marketing strategies since they are unaware of their customer preferences and other things like renting preferences.

### 2.1.3 Scheduling Conflicts

#### **Cause:**

One of the contributing factors to schedule difficulties is that the manual reservation system requires Tiffany and James to stay tied to their workplace. They are forced to spend more time to administrative duties in order to avoid missing out on bookings and reservations, which restricts their availability for actively monitoring ongoing reservations. This limitation stems directly from the fact that the system depends on human inputs and real-time updates, both of which must be always present to guarantee accurate and current data.

#### **Effect:**

This requirement causes schedule difficulties, which lead to lost possibilities for simple income. Due to the burden of maintaining manual reservations, Tiffany and James are unable to devote as much time to the dynamic parts of customer service and actively interacting with customers. This makes it more difficult for them to take advantage of unplanned revenue-generating possibilities and raises the possibility that customers would become dissatisfied as a result of receiving impersonal or delayed responses. As a result, the company faces two challenges: a possible drop in client satisfaction and a loss of potential revenue, both of which add to total operating inefficiencies.

### 2.1.4 Limited Financial Management

**Cause:**

One of the main causes of limited financial management capabilities is the use of a basic accounting system designed for a small-scale business. Though efficient for the current scale of the company, the system's simplicity is insufficient to handle the financial intricacies that would come with expansion. The present system's inability to scale and incorporate sophisticated financial analysis functionalities makes it more difficult to handle the rising costs linked to business growth.

**Effect:**

Growth of the company may be impeded by depending on an outdated accounting system. The company's limited financial management capabilities become more and more obvious as it grows. Gaining a thorough understanding of the company's cost structures, profitability trends, and financial health will be difficult without strong financial analysis tools. This lack of information can make it difficult to make well-informed decisions and make it more difficult to spot areas for improvement and expansion. Due to a limited financial vision, the company may miss out on possible expansion opportunities, which could negatively impact its competitiveness and long-term sustainability.

### 2.1.5 Missed Business Opportunities

#### **Cause:**

Missed opportunities are a result of the business's operational demands and busy schedule. Continuous involvement in daily tasks does not provide much opportunity for strategic enhancements or the acquisition of thorough business data. This neglect of information gathering, and system improvement reduces the company's ability to adjust and respond to changes in the industry, which could impede growth.

#### **Effect:**

The business's inability to set aside time for thorough data collection and system upgrades results in lost advertising opportunities. Their advertising efforts lack focus and are unable to adequately address current issues since they are unable to gather comprehensive customer information and modify strategies in response to market demands. This restriction not only lessens the effect of marketing campaigns but also makes the company less competitive in the marketplace, which could impede its development and cause it to miss out on important expansion prospects.

## 2.2 Solutions

### 2.2.1 Digital Reservations

Making the switch to a user-friendly booking website or app not only eliminates mistakes that come with manual processes but also guarantees customer accountability—the customer bears the responsibility for any errors. This automated system reduces the possibility of double bookings and maintains reservations in real-time, resulting in a more effective and error-free booking process.

### 2.2.2 Customer Profile and Database

Creating a unique customer profile for every customer is essential to addressing the current deficiency of thorough customer data. This profile meticulously keeps track of and compiles all previous reservations and rentals since it is integrated with the new reservation system. By utilizing this centralized database of customer interactions, the business is able to improve service accuracy while also gaining valuable insights into its customer base. This allows the company to better tailor its offerings and strategies to meet the needs and preferences of its customers.

### 2.2.3 Digital Scheduler

Using a digital scheduler helps Tiffany and James manage their time more effectively and reduce scheduling conflicts. This digital tool not only keeps their schedules from colliding, but it also gives customers transparency by letting them see Tiffany and James's availability in advance. By preventing surprises and ensuring customers are informed, this proactive approach promotes a more structured and customer-focused scheduling process.

#### 2.2.4 Accounting System

The solution to the problem of inadequate financial management is to put in place a thorough accounting system that is coupled with reliable database management. This sophisticated system guarantees accurate financial tracking and gives the business the ability to make decisions based on real-time information about profits and losses. This solution serves as the basis for both strategic planning and efficient financial management since it offers a precise assessment of the company's financial situation.

#### 2.2.5 Automated System

The company can conduct a faster and more efficient analysis by implementing a fully automated system, which also relieves schedule pressure. Because of this increased efficiency, problems can be identified more quickly and effective solutions can be developed more quickly. The automated system streamlines operations, which not only increases productivity but also puts the company in a position to take advantage of opportunities that were previously overlooked. This encourages a more flexible and problem-solving approach to business endeavors.

## 2.3 Aim & Objectives

The Riverscapes development team is committed to altering the business operations of River Cruise using the help of a new, more modern system. Our primary aim is to eliminate the inefficiencies associated with manual processes, such as manual reservations and limited financial management, by delivering intuitive and automated systems. The main goal is to enhance customer experiences by introducing user-friendly websites and apps that not only prevent errors but also allow customers to take charge of their bookings. Furthermore, we aim to provide comprehensive solutions, including individualized customer profiles and digital schedulers, addressing challenges like scheduling conflicts and a lack of customer data. With the implementation of advanced accounting systems, we aim to equip the business with the tools needed for accurate financial analysis, allowing more informed decision-making. Ultimately, our objectives center on optimizing efficiency, reducing operational complexities, and positioning River cruise for growth and success.

## **3.0 Project Planning**

### **3.1 System Development Life Cycle (SDLC)**

The System Development Life Cycle (SDLC) is a project management conceptual model that outlines the steps of a system development project, from early feasibility studies to application maintenance. SDLC may be used to develop both technical and non-technical systems. SDLC is used to specify the stages and tasks essential for the development of a system by providing a formal structure and framework. A successful System Development Life Cycle (SDLC) will likely end in a high-quality system that fulfils customer requirements, is completed within time and cost estimations, and performs seamlessly and productively. The SDLC is used as system development framework in our project to have an in-depth understanding of the whole project, including requirements and specifications engaged, expected expenses, and time frames to come up with a satisfactory system for River Cruise (RC) (Gillis, 2020).

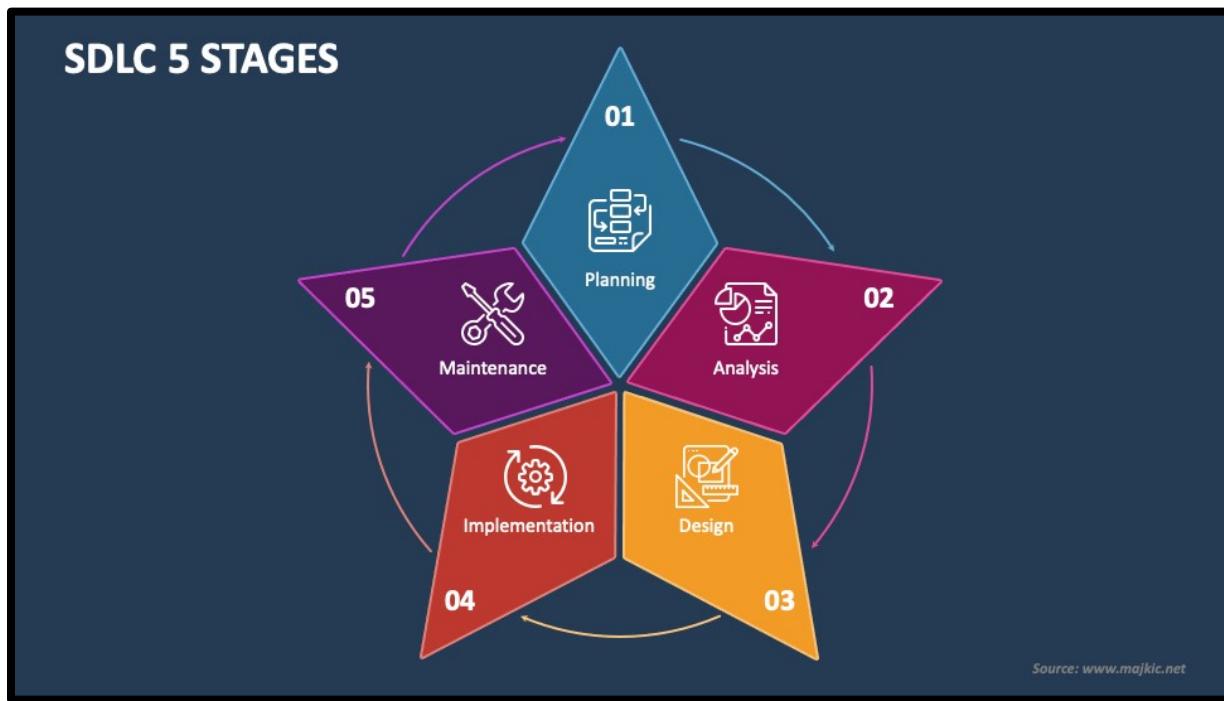


Figure 1: SDLC Stages

### 3.1.1 Planning

The Planning phase establishes the framework for the whole SDLC. It includes determining the system's problem, goals, identifying project scope, creating objectives, scheduling agendas, and assessing available resources. Threats, restrictions, system integration, and security are all evaluated during this phase. Planning guarantees the development process corresponds with organizational requirements and provides an overview of the following stages. At the end of this phase, a feasibility report for the entire project is produced (Gupta, 2023).

In our project, the planning stage is accomplished by group members defining the exact goals and objectives of the project and specifically outlining what enhancements are anticipated from the system. At the same time, assigning resources such as budget, workforce, and technology to various areas of the project. Additionally, constructing an organized project timeline with milestones and completion dates for each stage of the project to guarantee a seamless workflow.



Figure 2: Planning Stage

### 3.1.2 Analysis

The analysis phase comes after the planning phase, and the focus throughout the analysis stage is on obtaining and comprehending the system's requirements. This involves assessing end-user information needs and improving the system goal, evaluating current procedures, and determining stakeholders' demands. The information acquired serves as the foundation for developing a system that matches user expectations while also addressing organizational obstacles. At the end of this phase, a Software Requirement Specification (SRS) document is generated that outlines the system's software, hardware, network requirements, functional and non-functional requirements (Gupta, 2023).

The analysis stage of our project is accomplished by group members comprehending the existing system, determining consumer requirements, and analyzing data. This can be achieved by conducting requirement gathering or fact-finding techniques with Tiffany, James, and other stakeholders, such as interviews, document review, observation, sampling, research, survey and questionnaires, to gather significant requirements and information to aid in the development of the proposed system. Furthermore, group members can evaluate the advantages and disadvantages of the previous system while prioritizing requirements based on their influence on RC's business and identifying data requirements for the proposed system.

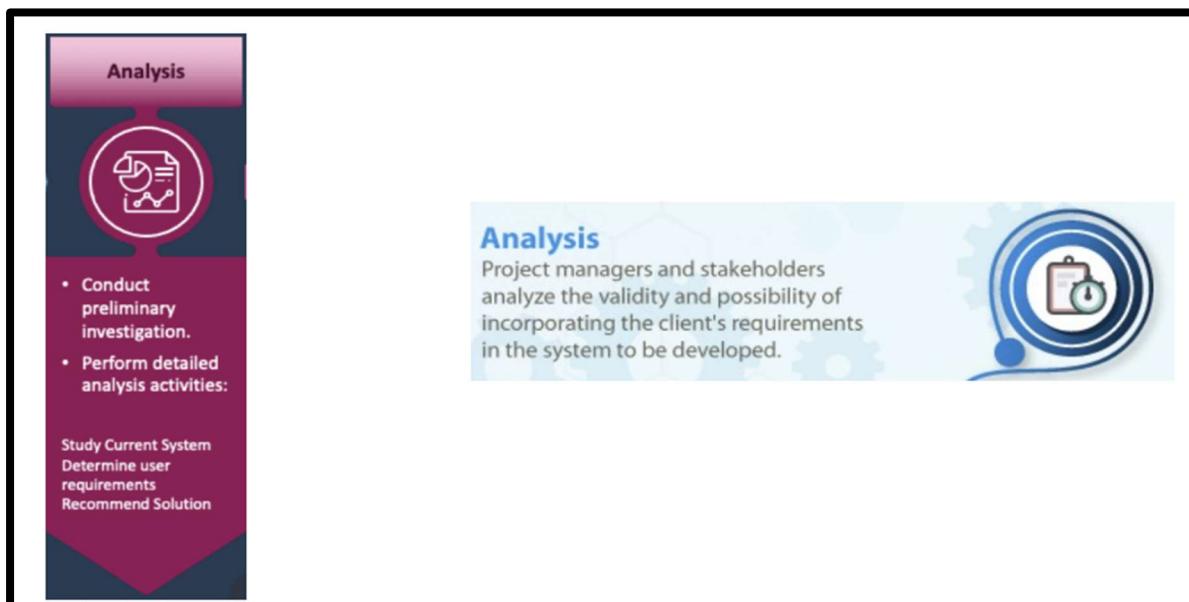


Figure 3: Analysis Stage

### 3.1.3 Design

As a premise of the implementation phase, system design would be conducted to create a structure for various components and provide data that would be helpful in the system. Also, the system would be designed based on the customer's needs. System design consists of four steps, which include user interface design, system interface design, database design, and system control and security design.

Starting with design user interface, inputs and outputs for functions are created to allow users to view and interact with them. Not to mention, user experience and visual design would be involved in designing the system interface. Then, group members would convert the system inputs into outputs that could be displayed on the user interface. Terms such as security, performance, and scalability would also be considered when designing the system interface (George, 2023). Unlike with the user interface, which is visible and interactive, the system interface is not visible as it operates behind the user interface. Next, a database is created using the physical and logical design models. Finally, system control and security measures are also implemented to ensure the stability and functionality of the system for the users.

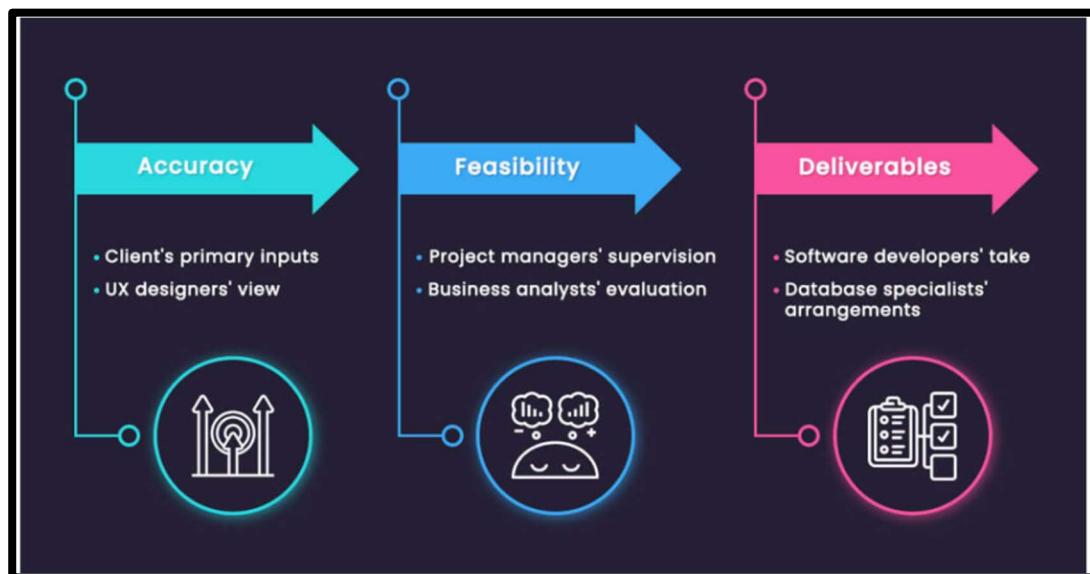


Figure 4: Design Stage

### 3.1.4 Implementation

When it comes to the fourth phase in SDLC, system implementation, a new and improved system is created to replace the outdated one. Meanwhile, the activities involved in the implementation phase include coding, creating a user manual, and software testing.

A new system always starts with coding, where each group member is assigned a module to program. The design and details of each module are based on the previous phase. Then, when a particular module is completed, the team member would conduct unit testing to ensure that the module can be run smoothly based on James and Tiffany expectation. Besides, unit testing should also be conducted to ensure that all the functions are working correctly and are free from logical and syntax errors. Not only correct data will be used during testing the modules, but also some errors and incorrect data will be used to validate the modules in order to simulate all possible situations that may occur. Integration testing would then be performed by the team members to test the interface between two modules. Other than the interfaces, the data flow and data exchange between the modules will also be tested and observed. Similar to unit testing, integration testing allows team members to identify and become familiar with errors and bugs that may arise from the interaction of modules, enabling early changes to be made.

The software testing will be completed with system testing, where all the modules are tested. In the system testing, there are two phases. The first phase involves the team members, followed by the participation of the end users, Tiffany and Janes. System testing would normally involve testing all the modules in the system at the same time to ensure that the interface, functions, and procedures in the system work and meet the requirements of the end users. In addition, the member would also need to clarify that the system's design and behaviour are user-friendly and easy to understand for Tiffany, James, and their other employees. Next, during the second phase of system testing, the end users will provide their suggestions and feedback regarding usability and their requirements to the team members as they test the system. Last but not least, the members would also create a user manual to provide assistance and guidance to the end user.

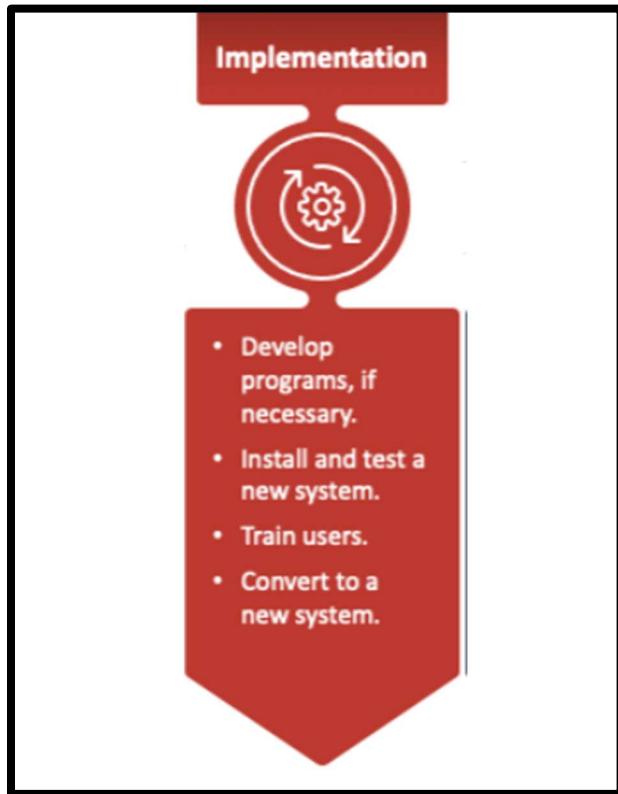


Figure 5: Implementation Stage

### 3.1.5 Security and Support

Finally, system support and security are the last phase in the SDLC, which ensures system protection and ongoing maintenance. Starting with system security, the team members implemented various measures such as authentication and firewalls to safeguard the system against physical attacks. Authentication is a crucial measure that ensures that private information and details can only be accessed by authorized personnel. Firewalls can be used to protect the system by controlling network traffic based on security policies. Not to mention, passwords are commonly used as a means of protection.

On the other hand, the group members would need to gather feedback from the end users after using the system for a certain period of time. This is when corrective software maintenance would be carried out. After receiving the bug reports, the team members would identify whether the bug has affected the software system in terms of design and functionality. Then all the bugs would be fixed and eliminated.

Not only is fixing bugs considered system maintenance, but perfective software maintenance, which implements new updates and improvements, is also considered one of the maintenance tasks. This type of maintenance aims to impress end users and modify the application software. For example, Tiffany and James might need to update the old features or add new features as their business grows. Meanwhile, some features might also be removed and deleted when it is realized that the feature does not actually increase the efficiency of their business.

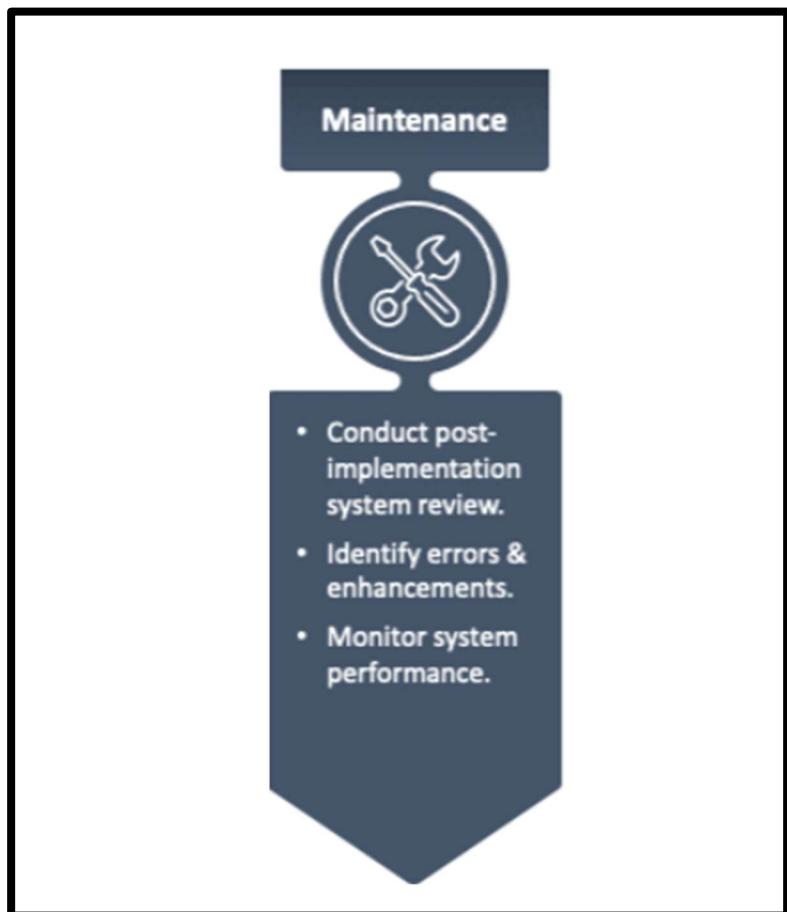
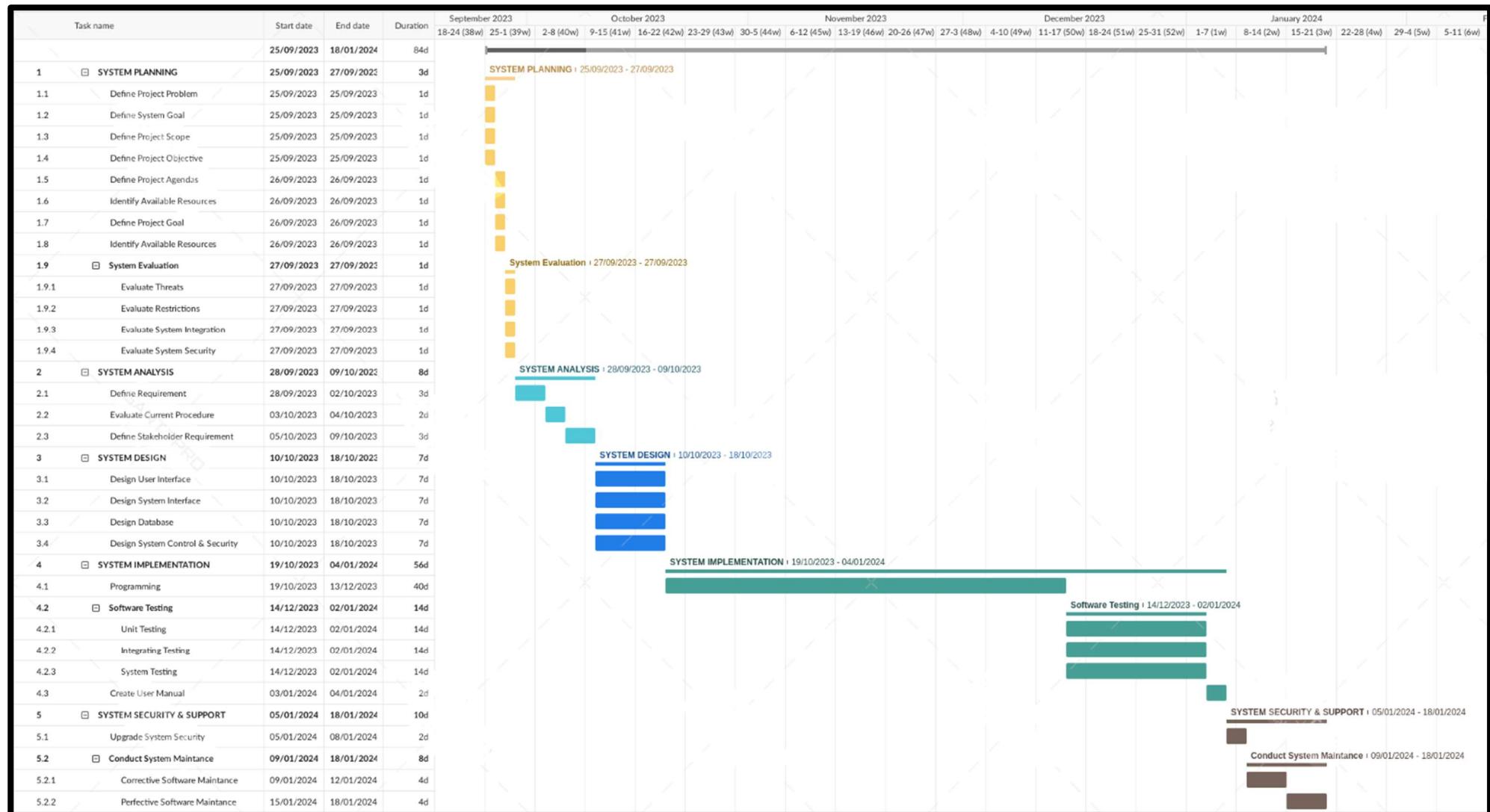


Figure 6: Maintenance Stage

### 3.2 Gantt Chart



3.3 Workload Matrix

ASIA PACIFIC UNIVERSITY OF TECHNOLOGY AND INNOVATION SYAD Student Coursework Workload Matrix - Grades and Feedback Attachment								
INTAKE: UCDF2207ICT(SE)		STUDENT NAME	JOSHUA EMMANUEL KC SATHSIVAM	GOH XIN TONG	LIM WEI LUN	LAI ZHAO WEI	JENNA CAITLIN DASS	AMIRHOSSEIN HAYATGHEIBI
System Name: RiverScapes		TP NO.	TP070067	TP069712	TP069058	TP070225	TP070346	TP069095
<b>A. Group Component</b>								
CLO	ASSIGNMENT COMPONENT		CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE
1	Introduction		17.00	17.00	17.00	17.00	16.00	16.00
2	Problems and Proposed Solutions		17.00	17.00	16.00	16.00	17.00	17.00
3	Project Planning		16.00	16.00	17.00	17.00	17.00	17.00
4	Feasibility Study		17.00	17.00	17.00	17.00	16.00	16.00
5	System Analysis		16.00	17.00	17.00	17.00	16.00	17.00
6	Design Diagram (Context Diagram, DFD 0, ERD)		17.00	17.00	16.00	17.00	17.00	16.00
7	Interface Design		17.00	16.00	16.00	17.00	17.00	17.00
Total Marks and Contribution			17%	17%	17%	17%	17%	17%
Signature								

## **4.0 Feasibility Study**

### **4.1 Operational Feasibility (PIECES Framework)**

Operational feasibility studies help in evaluating a system whether the system is feasible and practical in terms of how it will solve the problems, seize opportunities, and alter the business environment. Operational feasibility studies must be conducted by the Riverscapes development team to assess the capability of the project to fulfil the goals and objectives. Besides that, it is crucial for informed decision-making and risk mitigation.

Before developing the system, the Riverscapes development team conducted operational feasibility studies to ensure the project is viable. The team breaks the operational feasibility into six parts, known as PIECES: Performance (P), Information (I), Economic (E), Control (C), Efficiency (E) and Service (S).

#### **4.1.1 Performance (P)**

Performance (P) is a very crucial part of operational feasibility. It aims to evaluate the system's performance, determining if it is functioning correctly or not (Fatoni et al., 2020). By conducting performance studies, the development team are able to assure the quality of the end products and the level of satisfaction of end users, Tiffany and James. After some research, the development team found out the **performance and processing speed of Microsoft Access will become slow** when handling large dataset, and this can be proved the review by Lateralusx777 (Lateralusx777l, 2021). Thus, changing alternative database management applications that offer faster speed will be the main focus of the development team. After some research and experiments, they found that using MySQL will **increase the speed and accuracy** of the database significantly. Therefore, it proved that the proposed system with alternative database will help in managing reservations and business operations for River Cruise more efficiently.

#### 4.1.2 Information (I)

Information feasibility studies were conducted by the development team to determine if the proposed system can provide timely information to the end user or not. Besides, the team will also need to identify and verify the correctness and accuracy of the data and information. The way data and information being managed in the system will be identified in this part as well. Since the **current system will provide conflict information** about the reservations for guided tours or instruction sessions with Tiffany's or James's availability, it proved that the current system is not able to provide a real time and up-to-date information. Therefore, the main aim of the proposed system is to solve this issue to avoid conflicting information from happening again. To verify that changing existing database, Microsoft Access to MySQL, the development team has created some test cases to verify the accuracy and correctness of information provided. After a series of testing, the development team made a conclusion that the **data provided by MySQL will be much more accurate** compared to the data provided by Microsoft Access. Besides, the development team also found that the data security of MySQL will be better than Microsoft Access as well.

#### 4.1.3 Economic (E)

The development team conducted economic feasibility studies to identify and evaluate if the proposed system is cost-effective than the current system. All the costs including developing, implementing, and maintaining need to be included. Since Tiffany and James only provided RM60,000 for the whole team to develop the prototype, the development team should have been planning the project and costs more carefully and wisely to ensure that the project could be implemented without over the budget. After the interview, the development team discovered that the **lack of cost-effectiveness** is one of the biggest issues with the existing system. When conducting economic operational feasibility studies, the development team found out that the new system would **help in revenue generation**. This is due to the reason that the sales processes can be improved, as well as the introduction of new sales channels. Moreover, the existing system requires a lot of resources such as manpower and maintenance costs to maintain it, therefore, the development team also focus on **developing a system with a lower maintenance cost**.

#### 4.1.4 Control (C)

Control components define the security of the system whether the system has the ability to guarantee data and information safely and provides security against scams and other attacks (ProfessorProtonJellyfish136, 2020). When designing and developing the system, the security of the data will become the most crucial element as failing to do so will cause the leaking of customer information, and cause customers to lose confidence when using the system. Since the **existing system is not able to provide strong security** to protect the system, therefore the development team has focused on security issues when developing Riverscapes. Furthermore, the **data's accuracy cannot be guaranteed**, as the current system may generate conflicting information. To enhance security, the development team decided to **implement firewalls** to control incoming and outgoing network traffic. Besides, the development team also implemented **multi-factor authentication (MFA)** in Riverscapes as it can act as an extra layer to protect against the system.

#### 4.1.5 Efficiency (E)

For the current system, Tiffany has to **enter information such as reservation data and details, customer information, and so on into Microsoft Access manually, it has been demonstrated that the existing system fails to optimize the utilization of available resources**. Entering the data into the table manually is very time-consuming and not effective. Therefore, the development team has to develop and create a system that will automatically enter the information into the database. This can utilize the time and minimize time wastage. In the proposed system, the development team has decided to develop an automated record data system, which means Tiffany **does not need to print daily reports** manually anymore. This will decrease the burden of Tiffany in entering the data into the database manually. Besides, the reservation process can be simplified as well by using the new system as the customers will be able to make reservations by themselves. As the Riverview system is more complex than the existing system, it is inevitable that **more staff will need** to be recruited to effectively manage the increased demands of the new system.

#### 4.1.6 Service (S)

Lastly, the development team should also evaluate the service components in the proposed system. Service components focus on how the system delivers services to the end users. It also focuses on the user experience of the end user. Since the **current system will provide inconsistency and inaccurate data** for Tiffany and James, therefore, the development team needs to focus on developing a system that will provide accurate data for them. To enhance the efficiency in conducting daily business operations, the Riverscapes development team has designed a very user-friendly system. The new system simplified a lot of processes, and it is easily understandable. Therefore, the learning path of the new system will be shorter, resulting in increased productivity of users. This not only enhances user satisfaction but also facilitates a smoother transition, allowing the organization to capitalize on the benefits of the new system sooner. Besides, the new system is also **flexible**, which means the developers can upgrade the system easily as well as fix the bugs.

## **4.2 Technical Feasibility**

Technical feasibility is a process of assessing whether the proposed project can be implemented efficiently using current technology resources (Saifi, 2023). This feasibility involves evaluating in different aspects such as technical requirements, constraints, and capabilities of the proposed solution to examine whether it is feasible to develop, install, and operate the system within given constraints and available resources.

The current system of “Riverscapes” is using various technologies to operate the business, including social media platforms for advertising its services, a Microsoft Access database used to record information for reservations, and an inexpensive accounting package for financial management. However, these existing systems only provide a basic framework for technology enhancement while they also present constraints that need consideration in the evaluation of technical feasibility.

With the proposed technology, the development of a user-friendly online booking platform revolutionizes the reservation process of “Riverscapes”. By automating the reservation system through an online platform, customers can make reservations directly, which reduces the company’s responsibility for errors. This system is designed to prevent double-bookings and maintain a reliable schedule. In addition, the automated process prevents conflicts in the staff schedules and enhances transparency, allowing customers to view real-time availability information of the staff. Other than that, the implementation of an inventory management system helps in tracking the inventory, making sure the items are accessible. These practical solutions enhance the efficiency of the business process and help customers to make the reservation conveniently.

To meet the mentioned requirements, “Riverscapes” possesses necessary technical expertise, including Software Developer and IT System Analyst to build the systems required for the company. Additionally, there are a few advanced technologies that can be purchased by “Riverscapes” through various online platforms, and the product details will be illustrated in the following sections.

#### 4.2.1 Proposed Hardware Devices

##### **1. Inspiron 24 (All-in-One):**

Inspiron 24 (All-in-One) is a type of model that provides a full set of devices, such as a desktop computer, mouse and keyboard. The staff of the “Riverscapes” can utilize these devices to manage reservations, customer data, inventory, and financial tasks. For example, administrators can handle the reservations efficiently by maintaining a database of customer information, managing tour schedules to ensure a smooth execution of guided tours and kayak rentals. It also provides accounting software for accountants to manage finances of “Riverscapes” such as accounting, budget tracking, and financial analysis. These devices act as the central hub to support the daily operation of “Riverscapes” to ensure efficiency of the business process.

Diagram	Hardware Specifications	Description	Price
 <ul style="list-style-type: none"> <li><b>Processor</b>: 13th Gen Intel® Core™ i3-1315U (10 MB cache, 6 cores, 8 threads, up to 4.50 GHz Turbo)</li> <li><b>Operating System</b>: Windows 11 Pro</li> <li><b>Graphics</b>: Intel® UHD Graphics</li> <li><b>Memory</b>: 8 GB: 1 x 8 GB, DDR4, 3200 MT/s</li> <li><b>Storage</b>: 512 GB, M.2, PCIe NVMe, SSD</li> <li><b>Display</b>: 23.8", FHD 1920x1080, 60Hz, Non-Touch, Anti-Glare, InfinityEdge, Narrow Border</li> <li><b>Keyboard &amp; Mouse</b>: Wireless connectivity</li> <li><b>Stand</b>: Arch Stand</li> </ul>		RM 3,200.00	

## 2. PowerEdge T40:

PowerEdge T40 serves as the main server for “Riverscapes” system to manage and store the data generated from the business, such as customer information, staff schedules, reservation details, tour and inventory data, and financial records. Other than that, this server also provides backup and recovery mechanisms to prevent any loss of business information due to unforeseen circumstances. It ensures efficient data management and enhances the effective handling of important information of “Riverscapes”.

Diagram	Hardware Specifications	Description	Price
	<ul style="list-style-type: none"> <li>• Processor</li> <li>• Memory (RAM)</li> <li>• Storage</li> <li>• Optical Drive</li> <li>• Chassis</li> </ul>	<p>Intel Xeon E-2224G Processor (Quad Core, Up to 4.70GHz, 8MB Cache, 71W)</p> <p>8GB (1x8GB) Up to 3200MHz DDR4 UDIMM ECC</p> <p>1TB 3.5inch SATA Hard Drive (7200 RPM)</p> <p>8X Ultra Slim DVD+/-RW</p> <p>Chassis with up to 3.5inch x3 Hard Drives</p>	RM 3,500.00

### 3. Wireless Router:

Archer AX55 is also one of the essential devices that “Riverscapes” must have to access high-speed Wi-Fi network. This wireless router allows for better connectivity across various aspects of the business. For instance, the staff of “Riverscapes” required the Wi-Fi connection to access systems, while also facilitating an efficient reservation management system, customer interaction, and financial tasks. The wireless router enhances the connectivity, operational efficiency, and customer satisfaction for “Riverscapes”.

Diagram	Hardware Specifications	Description	Price
 <ul style="list-style-type: none"> <li>• <b>Wireless Performance</b></li> <li>• <b>Latency and Responsiveness</b></li> <li>• <b>Wi-Fi Coverage</b></li> <li>• <b>Security</b></li> <li>• <b>Power Efficiency</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Wireless Performance</b></li> <li>• <b>Latency and Responsiveness</b></li> <li>• <b>Wi-Fi Coverage</b></li> <li>• <b>Security</b></li> <li>• <b>Power Efficiency</b></li> </ul>	<p>2402 Mbps on 5 GHz and 574 Mbps on 2.4 GHz band</p> <p>Ultra-Low Latency</p> <p>Expanded Wi-Fi Coverage</p> <p>TP-Link HomeShield</p> <p>Improved Battery Life</p>	RM 300.00

#### 4. Epson EcoTank L3256 Printer:

The business operation of “Riverscapes” will also need printers to facilitate document printing. It provides flexibility for the staff to print reservation documents and use them for quick reference. Moreover, the printer can also be used to generate hard copies of the financial reports, printing staff schedules or administrative forms. This printer is a multifunctional asset that improves the overall effectiveness of “Riverscapes” by facilitating various essential tasks and processes.

Diagram	Hardware Specifications	Description	Price
	<ul style="list-style-type: none"> <li>• <b>Functionalities</b></li> <li>• <b>Ink System</b></li> <li>• <b>Print Features</b></li> <li>• <b>Page Yield</b></li> <li>• <b>Connectivity</b></li> </ul>	<p>Scan, Copy, Print</p> <p>High yield ink bottles, Spill-free, error-free refilling</p> <p>Borderless printing up to 4R size</p> <p>Ultra-high yield of 7,500 colored pages, Ultra-high yield of 4,500 black-and-white pages</p> <p>Wi-Fi and Wi-Fi Direct connectivity</p>	RM 350.00

## **4.3 Economic Feasibility**

An economic feasibility study is conducted to evaluate whether the proposed project can be developed within the given budget (Simplilearn, 2023). This feasibility can be used to determine the costs and profits that will be generated from the project. In economic feasibility, there are two types of tests, including Cost-Benefit Analysis, and Cash Flow Assessment that can be done to ensure the proposed system of “Riverscapes” must be aligned with the financial capabilities and strategic goals.

### **4.3.1 Cost Classifications**

As the growing of “Riverscapes”, the cost of the business will also be increasing. The cost can be categorized into various forms which are shown in the subsequent sections. The purpose of this cost-classification is to help in better financial management, budgeting, and decision-making for “Riverscapes”. By distinguishing all the costs, “Riverscapes” can have a better understanding of its financial structure which enables the business to allocate the resources efficiently.

#### **4.3.1.1 Tangible & Intangible Costs**

Tangible costs refer to the costs that can be visible or measurable (Sherman, 2019). For instance, the salaries of the “Riverscapes” employees can be calculated or assigned with value based on their working experience and academic background. The physical expenses of “Riverscapes” include computing devices, safety equipment, payment terminals, and printers that must be acquired to run the business effectively. Furthermore, intangible costs are the costs that cannot be measurable or assigned with value (Sherman, 2019). For example, customer dissatisfaction and lowered employee morale can be challenging to quantify in dollar value. Additionally, the decrease in the accessibility of business information also contributes to intangible costs as it is difficult to measure or express in numerical values.

#### 4.3.1.2 Direct & Indirect Costs

Direct costs are expenses that can be related to the development of a specific system (Schmidt, 2023). For instance, there will be a group of project team members who are developing a new system for “Riverscapes”, the purchase of hardware devices such as desktop computers, servers, wireless routers, and printers which are essential equipment required by “Riverscapes”. On the other hand, indirect costs are the management costs that are not directly linked to the development of a particular system (Schmidt, 2023). For example, the installation of network cables when setting up the wireless router, insurance expenses contribute to the risk management of the business to protect the company’s assets and liabilities. In addition, the salaries of network administrators are also considered as indirect costs for “Riverscapes” as they are responsible to maintain the network security of the company, but their work may not be directly related to the development of the system.

#### 4.1.1.3 Fixed & Variable Costs

Fixed costs are the costs that will remain constant regardless of the level of service or effort (Strydom, 2021). For example, the purchase cost of hardware devices that are proposed to “Riverscapes”, the salaries of full-time staff are the fixed costs regardless of variations in customer demand. The subscription fees for the accounting software are a fixed expense as it does not depend on the number of financial transactions or the business activity. Moreover, variable costs refer to the costs that will keep changing based on the level of activity (Strydom, 2021). For instance, the resources needed for printing documents, such as printer papers, inks are the variable costs that depend on the usage of printer. The electricity consumption of the hardware devices also contributes to the variable costs when operating the business of “Riverscapes”.

#### 4.1.1.4 Developmental & Operational Costs

Developmental costs refer to the expenses that are only incurred once the system is developed (Smith, 2017). The costs of development in “Riverscapes” system involve the salaries of people such as Software Developer and IT System Analyst. Based on the proposed hardware devices, the purchase of desktop computers, servers, routers, and printers are considered as developmental costs as the hardware expenses will be charged for once only when the system is developed. On the other hand, Operational Costs are the ongoing expenses incurred after the system is implemented (Murphy, 2022). It can be referred to the cost of daily operation to keep the business running smoothly. For instance, system maintenance fees are used to enhance the system’s functionalities and performance while ongoing training is required to facilitate the smooth onboarding of new employees. Additionally, the utility bills, office supplies, office rents are essential for daily tasks and contribute to the overall efficiency of “Riverscapes” business.

### 4.3.2 Benefit Classifications

In “Riverscapes” business, the benefits can be categorized into two major forms, including positive benefits and cost-avoidance benefits. The advantage of benefit classification is to facilitate the process of analyzing the positive outcomes, allowing the stakeholders to establish an effective allocation and strategic planning. By identifying benefits, it helps to perform a cost-benefit analysis to determine whether the “In-House System” or the “Off-Shelf System” is the preferred choice for “Riverscapes” system by comparing them with the costs mentioned earlier.

#### 4.3.2.1 Positive & Cost-Avoidance Benefits

Positive benefits refer to the outcomes directly contributed from the new information system. The examples of positive benefits can be obtained from the “Riverscapes” system, including increased revenues, enhanced customer satisfaction, improved the employee’s productivity, and enhanced services. With the new system, it facilitates the booking process, which can be beneficial to both staff and customers. As the productivity of the employee increases, this can also improve the operational efficiency, satisfying the customer requirements and leading to increased revenues. Besides that, cost-avoidance benefits involve the avoidance or reduction of certain costs that would be necessary if the new system is not developed. For instance, cost-avoidance benefits focus on avoiding unnecessary expenses, such as reducing the turnover costs by handling works with the existing staff instead of recruiting. This helps “Riverscapes” to minimize the financial burden if the current number of staffs are sufficient to manage the business operation.

4.3.3 Cost-Benefit Analysis

	In-House System	Off-Shelf System
<b>Costs:</b>		
Development Team	13,500	-
Hardware	18,000	18,000
Software	-	20,000
Subscription	-	2,500
Testing	5,000	7,500
Maintenance	1,000	1,500
Training	7,500	7,500
<b>Total Costs:</b>	45,000	57,000
<b>Benefits:</b>		
Increased Revenues	70,000	83,500
Increased Employee's Productivity	25,000	27,500
Reduction of Employee	12,500	12,500
Improved Services	*****	*****
Increased Customer Satisfaction	*****	*****
<b>Total Benefits:</b>	107,500	123,500
<b>Cost-Benefit Ratio:</b>	2.4	2.2

Based on the cost-benefit analysis above, both types of systems have greater anticipated value of benefits than the projected costs of development, providing a favorable cost-benefit outcome. According to the cost-benefit ratio, it is clearly shown that “Riverscapes” is suitable to be the In-House System. The In-House System shows a higher cost-benefit ratio at 2.4 compared to the Off-Shelf System at 2.2. The budget given for this project is RM 60,000, with total costs of RM 45,000. The profits gained from the project by deducting the costs which resulted in a profit of RM 15,000. The cash flow of the company proves to be adequate to fund the project during the development period. In comparison to the Off-Shelf System, the profits generated from the project are estimated to be RM 3,000 after the cost deduction of RM 57,000. The In-House System has a higher cost-benefit ratio and potential for greater profits make it the preferred solution for “Riverscapes” to be economically feasible.

#### **4.4 Schedule Feasibility**

Schedule Feasibility is the process to analyze whether a project can be completed successfully within its scheduled time limits (TaskManagementGuide, n.d.). If a project can be completed within the given time, it is considered feasible, but if it can't, it is considered infeasible. The schedule feasibility study is crucial as it helps to allocate all the resources such as manpower and equipment effectively, thus reducing the risk of overallocation or underutilization.

By determining if the project is feasible, the development team can break down the task into smaller parts. Breaking down tasks into smaller parts is critical because it allows the development team to gain a better, more in-depth understanding of the complexity of the project and helps to allocate resources efficiently. When breaking down tasks, the development team will refer to and create a Work Breakdown Structure (WBS). Afterward, smaller, manageable tasks will be assigned to different phases to be carried out and executed. During the development of Riverscapes, the development team divided the process into 5 main sections: System Planning, System Analysis, System Design, System Implementation, and System Security and Support. Each of these 5 major sections has its activities and timelines. It was critical to allocate the right amount of time and the right activities to these phases, otherwise, resources and manpower would have been wasted and the project would not have been completed within **4 months**.

In the System Planning phase, the development team allocated a total of 3 days to conduct this section. During this phase, two main activities will be carried out, which are defining project variables and identifying project specifications. Defining project variables and identifying project specifications are crucial as they help to clarify the objectives of the project as the identification of variables such as time, cost, etc. provides a framework for understanding what needs to be achieved. Since the activities in the System Planning phase can be accomplished within a very short period, therefore the development decided not to allocate too much time to this phase, but to allocate more time to the later phases. Besides, the developers also need to evaluate the threats, restrictions, system integration and system security in this phase as well. Moreover, system evaluation will be conducted in this phase as well, aiming in evaluating threats, restrictions, system integration and system security.

Afterward, system analysis will be carried out to define the requirements and collect all the details requirements of Riverscapes. To ensure that all the requirements of Riverscapes are gathered, the development decided to allocate a longer time, 8 days to conduct this phase compared to the last phase, System Planning. Allocating a longer time in this phase is important as the development team needs to ensure and verify all the requirements of Riverscapes to avoid the system developed not meeting the expectations and requirements of River Cruise. Furthermore, the development team also needs to assess and evaluate existing procedures and identify any existing issues.

After the System Analysis phase, the Riverscapes development team will conduct the system design phase. This phase is crucial because the activities involved in this phase are the foundation of the system. For example, the user interface, system interface, database, and system control and security will be designed in this phase. To ensure that all the components can be designed well, Riverscapes' development team has allocated 7 days to complete this phase. Allocating 7 days for this phase is reasonable because during this phase, the development team needs to create a variety of diagrams such as wireframe, prototype, and entity relationship diagrams and also ensure the correctness of the diagrams at the same time. When designing the user interface and system interface, the development team also needs to ensure that the interface designed is user-friendly.

System Implementation is the next phase after the System Design phase. The Riverscapes development team needs to code and program the whole system and develop standard operating procedures (SOP) at this phase. They also need to conduct user training for the employees of River Cruise. 56 days of timeline are allocated to conduct and complete this phase. Most time has been allocated to this phase because many activities will be carried out in this phase, for example, the programmers need to debug the system developed in this phase to avoid errors. Besides that, the development team also needs to conduct software testing to optimize the system. Moreover, a user manual is being developed to guide River Cruise employees on how to interact with the system.

The last phase is system security and support. The development team has allocated a total of 10 days to complete this phase. Upgrading system security and conducting system maintenance are the main activities that will be carried out in this phase. Since there are not many activities in this phase, the development team does not need to allocate much time to conduct this phase.

**84 days will be taken** to complete all these 5 phases, which proves that the project is schedule feasible as the project can be completed within 4 months. Besides that, the project managers also implement a lot of strategies to overcome project delays. For example, if the coders are unable to complete the system coding within 40 days, a delay of up to 7 days in the system implementation timeline is deemed acceptable, as the project can still be successfully completed with this extension. However, **no extension will be granted** if the development team is unable to complete the project within four months after discussion with the client.

Tasks	Day
<b>System Planning</b>	3 Days
<b>System Analysis</b>	8 Days
<b>System Design</b>	7 Days
<b>System Implementation</b>	56 Days
<b>System Security &amp; Support</b>	10 Days
-	<b>Total: 84 Days</b>

## **5.0 System Analysis**

### **5.1 Functional Requirements**

<b>STAFF</b>	<ol style="list-style-type: none"><li>1. <b>STAFF</b> shall be able to login using Staff ID and Password to access to the staff homepage.</li><li>2. <b>STAFF</b> shall be able to add tour and inventory by entering the details on the system.</li><li>3. <b>STAFF</b> shall be able to add reservation by entering customer booking details on the system.</li><li>4. <b>STAFF</b> shall be able to update tour and inventory by modifying the details on the system.</li><li>5. <b>STAFF</b> shall be able to view list of customer bookings by searching Customer ID on the system.</li><li>6. <b>STAFF</b> shall be able to view their schedules on the system.</li><li>7. <b>STAFF</b> shall be able to view their notifications on the system.</li></ol>
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<b>CUSTOMER</b>	<ol style="list-style-type: none"><li>1. <b>CUSTOMER</b> shall be able to register by entering customer's details to create an account.</li> <li>2. <b>CUSTOMER</b> shall be able to login by entering Customer ID and Password to access to the customer homepage.</li> <li>3. <b>CUSTOMER</b> shall be able to view staff availability on the system.</li> <li>4. <b>CUSTOMER</b> shall be able to make booking by entering booking details to proceed with the payment.</li> <li>5. <b>CUSTOMER</b> shall be able to make payment by entering the payment details to confirm the booking.</li> <li>6. <b>CUSTOMER</b> shall be able to view their current or past bookings by searching the booking details on the system.</li> <li>7. <b>CUSTOMER</b> shall be able to view their notifications on the system.</li></ol>
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<b>ACCOUNTANT</b>	<ol style="list-style-type: none"><li>1. <b>ACCOUNTANT</b> shall be able to login by entering Acct ID and Password to access to the accountant homepage.</li><li>2. <b>ACCOUNTANT</b> shall be able to view financial report generated by the system.</li></ol>
<b>DIGITAL SCHEDULER</b>	<ol style="list-style-type: none"><li>1. <b>DIGITAL SCHEDULER</b> shall be able to update staff schedule by requesting permission from the system.</li></ol>
<b>BANK</b>	<ol style="list-style-type: none"><li>1. <b>BANK</b> shall be able to generate payment receipt to the customer on the system.</li></ol>

## 5.2 Non-Functional Requirements

<b>STAFF</b>	<ol style="list-style-type: none"><li>1. <b>STAFF</b> should have responsive and smooth user experience with quick load times.</li><li>2. <b>STAFF</b> should have 24/7 accessibility for different schedules and time zones.</li><li>3. <b>STAFF</b> should be scalable enough to handle increasing numbers of staff.</li><li>4. <b>STAFF</b> should have multi-factor authentication.</li><li>5. <b>STAFF</b> should have reliable systems minimizing system crashes and unexpected downtimes.</li></ol>
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<b>CUSTOMER</b>	<ol style="list-style-type: none"><li>1. <b>CUSTOMER</b> should have responsive and smooth user experience with quick load times not exceeding 3 seconds.</li><li>2. <b>CUSTOMER</b> should 24/7 accessibility for booking and inquiries with small scheduled maintenance windows.</li><li>3. <b>CUSTOMER</b> should have high security to keep personal information and payment details secure, encrypting them during transmission and storage.</li><li>4. <b>CUSTOMER</b> should have an intuitive user interface and easy navigational structure.</li><li>5. <b>CUSTOMER</b> should have non-discriminatory accessibility for users with potential disabilities.</li><li>6. <b>CUSTOMER</b> should have access to reliable information about schedule availability and other relevant details.</li></ol>
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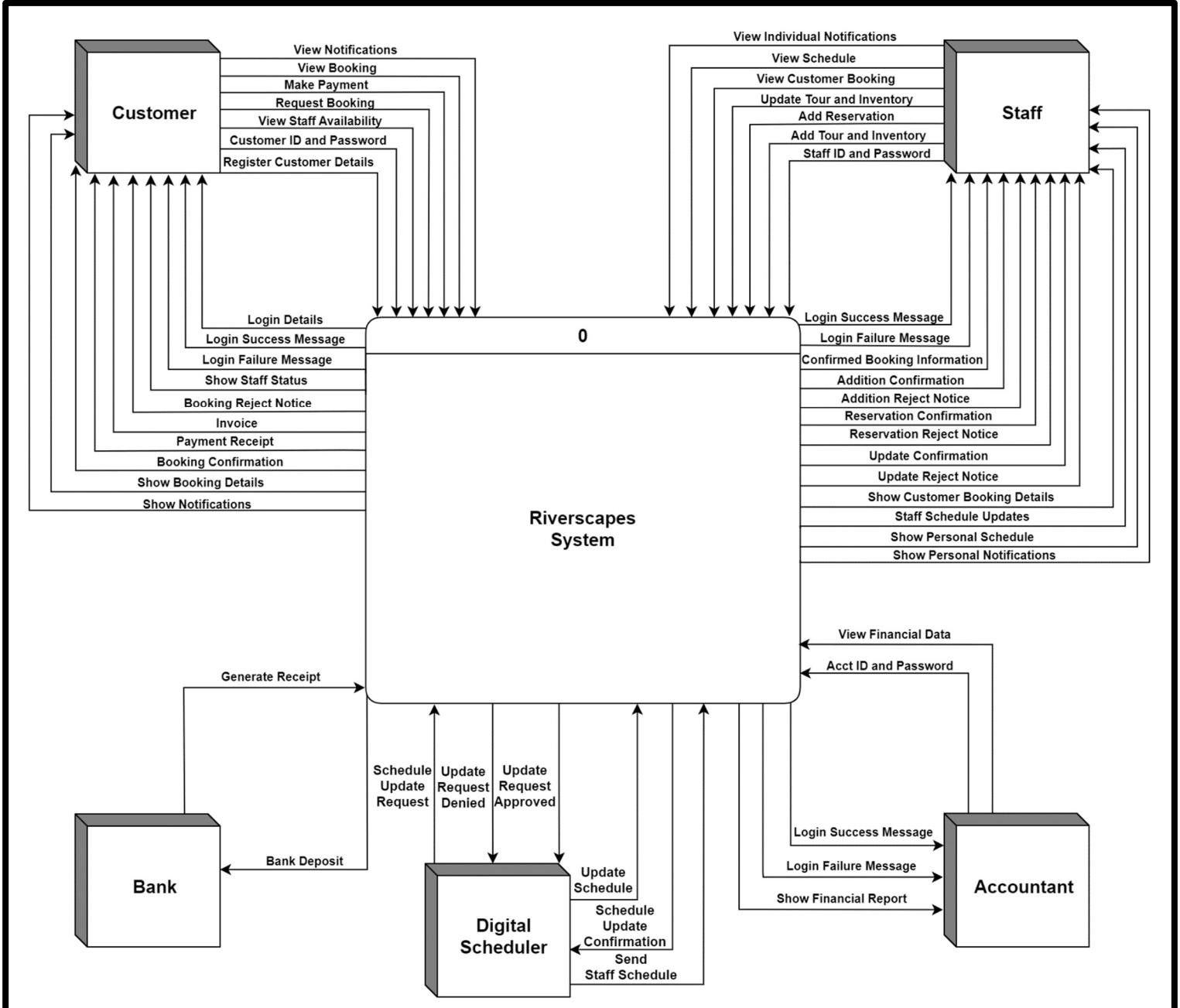
<b>ACCOUNTANT</b>	<ol style="list-style-type: none"><li>1. <b>ACCOUNTANT</b> should have access to financial information which is protected by strong authentication process.</li><li>2. <b>ACCOUNTANT</b> should have an audit trail which is very detailed to track transactions and support auditing.</li><li>3. <b>ACCOUNTANT</b> should integrate seamlessly with accountant's accounting software.</li></ol>
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<b>DIGITAL SCHEDULER</b>	<ol style="list-style-type: none"><li>1. <b>DIGITAL SCHEDULER</b> should not have any downtimes or maintenance during peak schedule times.</li><li>2. <b>DIGITAL SCHEDULER</b> should be scalable enough to handle potential business growth.</li><li>3. <b>DIGITAL SCHEDULER</b> should have an intuitive interface with paves the way for easy reservation management.</li></ol>
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<b>BANK</b>	<ol style="list-style-type: none"><li>1. <b>BANK</b> should follow security standards to ensure secure payment and private information exchanges.</li><li>2. <b>BANK</b> should have seamless integration through the payment gateway.</li><li>3. <b>BANK</b> should have a reliable system to avoid payment failures or errors.</li><li>4. <b>BANK</b> should maintain a detailed and reliable audit trail to keep track of financial transactions.</li></ol>
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## 6.0 Design Diagram

### 6.1 System Context Diagram (SCD)



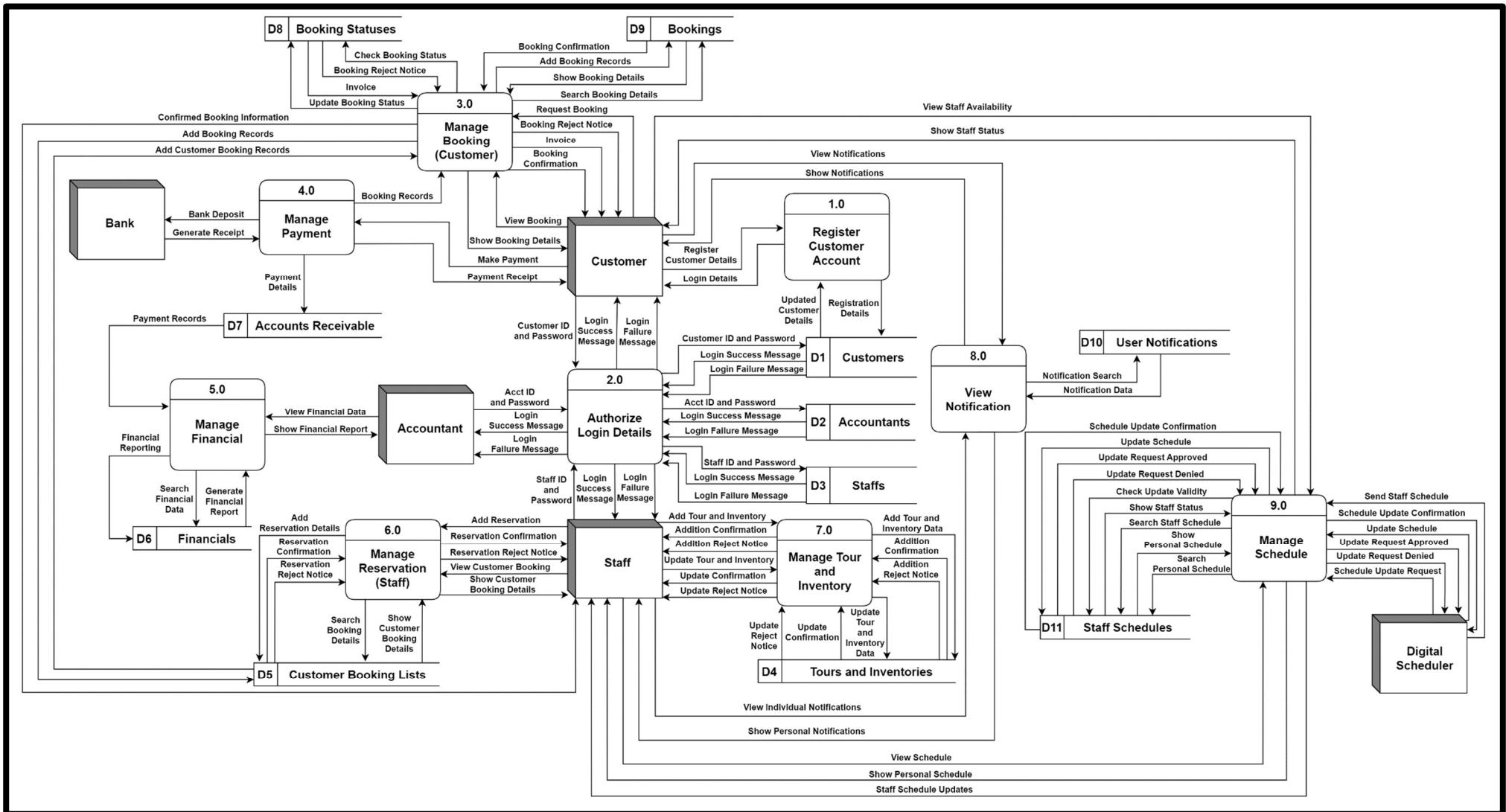
According to the context diagram above, the main process of “Riverscapes” System is to facilitate the data processing among five entities, including Customer, Staff, Bank, Digital Scheduler, and Accountant. In terms of Customer entity, the customers can create user accounts by registering their personal details, allowing them to obtain login credentials for accessing the system. The customers can use the login details, such as Customer ID and Password to log into the system and receive a login status message indicating success or failure.

After accessing the system, the customers can check staff availability, and the system displays staff status to them. Moreover, the customers can request bookings and receive booking status messages from the system. If the booking is unavailable, the system sends a booking rejection notice to the customers. If the booking is applicable, the system generates an invoice, and customers proceed with the payment. Upon payment confirmation, the bank generates a receipt for customers after receiving the deposit. At the same time, the system sends booking confirmations to the customers, and the confirmed booking information is relayed to the staff. In addition, the customers have the feature to view their bookings and notifications. The system will retrieve the information and display the details for the customers.

For the Staff entity, the staff can log in to the system using their Staff ID and Password, receiving a login status message after the system verifies the login details. Once the staff logged into the system, they can access the main functions, such as adding tours and inventories, add reservations, and updating tour and inventory details. Subsequently, the staff will receive a message, either confirmation or rejection notice, based on tasks they have performed. On the other hand, the staff are given authority to view customer bookings, and the system displays booking details to them. Additionally, the staff can access their own schedule and individual notification from the system to enhance communication, and efficiency in managing various tasks.

Other than that, the role of digital scheduler is to update the staff schedule by sending requests to the system. If the request is denied, staff schedules are not allowed to be updated. Upon approval by the system, the digital scheduler updates the staff schedules accordingly and receives confirmation from the system. Once updates are confirmed, the digital scheduler sends the staff schedule to the system, and the staff will receive their schedule updates. In the context of Accountant entity, the accountants can log in to the system by using their Acct ID and Password. The entered Acct ID and Password are validated by the system, and sends them a login status message indicating success or failure. If the accountants successfully log into the system, they can view the financial data based on customer payments. The system retrieves necessary information and shows financial reports to the accountants.

## 6.2 Data Flow Diagram (DFD) - Level 0



Based on the DFD Level-0 above, “Riverscapes” system contains nine processes to represent the functionality of the proposed system, such as 1.0 Register Customer Account, 2.0 Authorize Login Details, 3.0 Manage Booking (Customer), 4.0 Manage Payment, 5.0 Manage Financial, 6.0 Manage Reservation (Staff), 7.0 Manage Tour and Inventory, 8.0 View Notification, and 9.0 Manage Schedule. Besides that, “Riverscapes” system needs to record details into the data stores, including D1 Customers, D2 Accountants, D3 Staffs, D4 Tours and Inventories, D5 Customer Booking Lists, D6 Financials, D7 Accounts Receivable, D8 Booking Statuses, D9 Bookings, D10 User Notifications, and D11 Staff Schedules.

For the Customer Entity, the customers can register through Process 1.0 Register Customer Account, and this process transfers the registration details from the Customer Entity to Data Store D1 Customers. After storing the registration details, the data store updates customer details and sends the login details to the customers through the process. Furthermore, all system users will have their unique User ID and Password to log into the system. The Process 2.0 Authorize Login Details is to collect their Customer ID, Staff ID, Acct ID and Passwords. This process passes the login details to their respective data store, including D1 Customers, D2 Accountants, and D3 Staffs. The data store validates the entered User ID and Password and send the login status message to the users through the process.

Moreover, the customers can perform actions relating to the booking through Process 3.0 Manage Booking (Customer). The customers can request bookings, and the process checks the booking status from Data Store D8 Booking Statuses. This data store returns status messages, such as booking rejection notice or invoice, to the customers through the process. If the customers confirm their booking details, they can make payment through Process 4.0 Manage Payment. This process will collect the payment details and send them to Data Store D7 Accounts Receivable. In addition, the bank receives the deposit through the process and generates receipt for customers through the process.

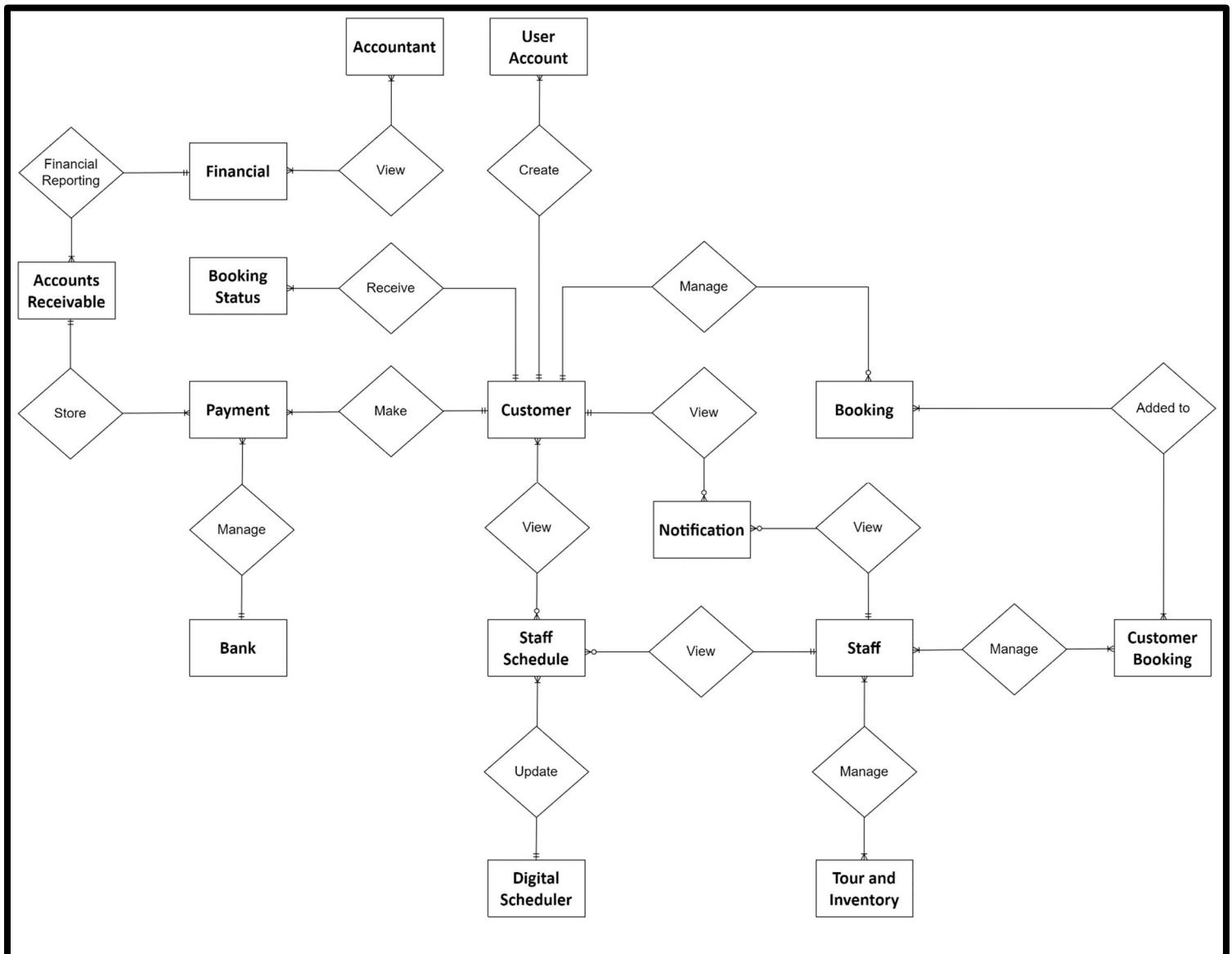
When the customers make payments, the booking records are sent to Data Store D9 Bookings through processes of 4.0 Manage Payment, and 3.0 Manage Booking (Customer). Then, the data store sends the booking confirmation back to the customers through Process 3.0 Manage Booking (Customer). Simultaneously, the booking records going through Process 3.0 Manage Booking (Customer) will need to update the booking status in Data Store D8 Booking Statuses. After storing the details in the data store, the booking records are required to be stored into the Data Store D5 Customer Booking Lists through the Process 3.0 Manage Booking (Customer). Additionally, confirmed booking information is sent to the staff through this process after collecting the booking records. Not only that, the customers can view their current or past booking by searching for booking details in Data Store D9 Bookings through Process 3.0 Manage Booking (Customer). This process retrieves information from the data store and shows the booking details to customers.

For Process 5.0 Manage Financial, it collects the payment records from Data Store D7 Accounts Receivable, and the details are processed to generate comprehensive financial reports and stored them in Data Store D6 Financials. Besides that, the accountants can view financial data by searching for details from Data Store D6 Financials through Process 5.0 Manage Financial. This process obtains the financial report generated by the data store and sends it to the accountants. Other than that, the staff can add reservations to Data Store D5 Customer Booking Lists through Process 6.0 Manage Reservation (Staff). This process returns messages, including reservation confirmation or reservation rejection notice to the accountants. If the reservation is successful, the customer booking records are added to the Data Store D9 Bookings, and booking confirmations are sent to the customers through Process 3.0 Manage Booking (Customer). Simultaneously, this process obtains customer booking records from Data Store D5 Customer Booking Lists and updates the booking status to Data Store D8 Booking Statuses. The bookings made by both customers and staff will have to synchronize the process of adding booking records and updating booking status to the data stores of D5 Customer Booking Lists, D8 Booking Statuses and D9 Bookings accordingly. Moreover, the staff can view customer bookings by searching for booking details in Data Store D5 Customer Booking Lists through Process 6.0 Manage Reservation (Staff). This process collects customer booking details and displays the information to the staff.

Furthermore, the staff can add tours and inventory through Process 7.0 Manage Tour and Inventory, this process passes the data to the Data Store D4 Tours and Inventories, and the data store returns a message, either an addition confirmation or an addition rejection notice, to the staff through the process. Similar to updating tours and inventory by the staff, the process sends modifications to the data store, and it returns a message, either an update confirmation or an update rejection notice, to the staff through the same process. For Process 8.0 View Notification, it collects requests from the customers and staff to view their notifications in Data Store D10 User Notifications. This process retrieves notification data from the data store and shows the notifications to the customers and staff respectively.

Nevertheless, the staff can view their own schedules by searching for personal schedules in Data Store D11 Staff Schedules through Process 9.0 Manage Schedule. This process retrieves schedule information from the data store accurately and shows the schedules to the staff. In addition, the customers can also view staff availability by searching staff schedules in Data Store D11 Staff Schedules through Process 9.0 Manage Schedule. This process retrieves all the staff schedules from the data store and shows the real-time availability information of the staff to the customers. Regarding staff schedules, the Digital Scheduler entity plays an important role in updating the staff schedules in the system. The Process 9.0 Manage Schedule collects update requests from the digital scheduler, and checks update validity in the Data Store D11 Staff Schedules. This process then sends a message, either an update request denied, or an update request approved, to the digital scheduler. Upon approval by the system, the digital scheduler updates the staff schedules through the process and receives schedule update confirmation. After that, the digital scheduler sends the updated staff schedule to the staff through Process 9.0 Manage Schedule.

### 6.3 Entity Relationship Diagram (ERD)



The diagram above shows the entity relationship diagram (ERD) for Riverscapes System. Having an ERD diagram is crucial for the development of a system, as it provides a clear and visual representation of the relationships between entities, as well as the ways in which they communicate and interact with each other. Besides, ERD also helps the development team to ensure the system being developed is not only technically robust but also aligned with the business requirements and objectives. A few businesses rules were developed by the development team, allowing them to have a deeper understanding of the relationship between the entities.

1. One accountant can view one or many financial reports.
2. One financial report can be viewed by one or many accountants.
3. One payment can comprise one and only one financial report.
4. One financial report can be comprised of one or many payments.
5. One payment can be managed by one and only one bank.
6. One bank can manage one or many payments.
7. One customer can make one or many payments.
8. One payment can be made by one and only one customer.
9. One customer can receive one or many booking status.
10. One booking status can be received by one and only one customer.
11. One staff schedule can be viewed by one and only one customer.
12. One customer can view zero or many staff schedules.
13. One staff can view zero or many staff schedules.
14. One staff schedule can be viewed by one and only one staff.
15. One digital scheduler can update one or many staff schedules.
16. One staff schedule can be updated by one and only one digital scheduler.
17. One customer can view zero or many user notifications.
18. One user notification can be viewed by one and only one customer.
19. One staff can view zero or many user notifications.
20. One user notification can be viewed by one and only one staff.
21. One staff can manage one or many tours and inventories.
22. One tour and inventory can be managed by one or many staff.

23. One staff can manage one or many customer bookings.
24. One customer booking can be managed by one or many staff.
25. One customer can make one or many bookings.
26. One booking can be made by one and only one customer.
27. One booking will be added into one and only one customer bookings list.
28. One customer bookings list can add one or many bookings.

In summary, creating an ERD in the process of developing a new system allows the development team to have a clearer understanding of the data model of the system. Moreover, it also helps to identify the potential challenges that might arise during the development of the software. Furthermore, it also helps in ensuring the system developed compliance with the business rules. In a nutshell, ERD is a very useful diagram in the development of a new system as it will contribute to the successful and efficient development of well-structured and powerful system.

## 7.0 Interface Design

### 7.1 Prototype

#### 7.1.1 All Users

##### 7.1.1.1 Main Page of Website

Home >

About Us

Contact

Login

**Welcome to River Cruise !**

Your Gateway to Aquatic Adventure!

Embark on scenic river journeys with our expert guides, discovering nature's wonders and creating unforgettable cruise memories.

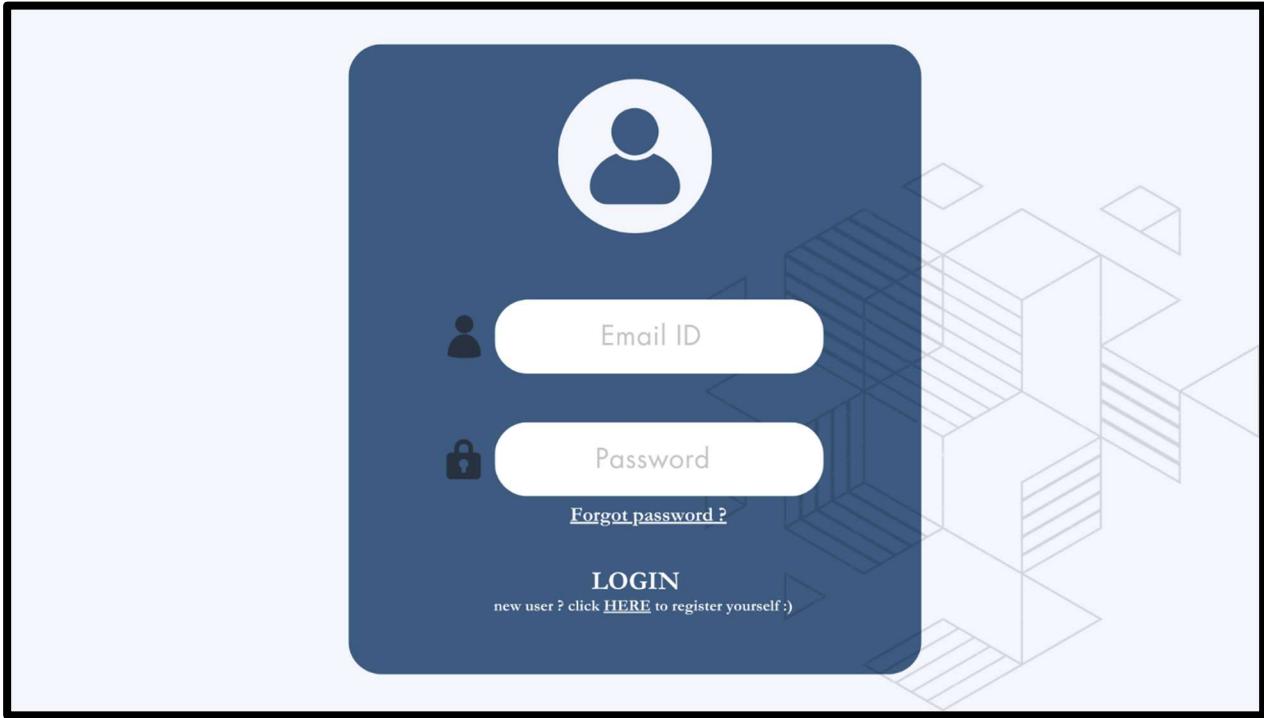
"Paddle into serenity with River Cruise. Our premium kayak rentals offer a tranquil aquatic escape for everyone."

CONTACT US: 03 - 852 8520

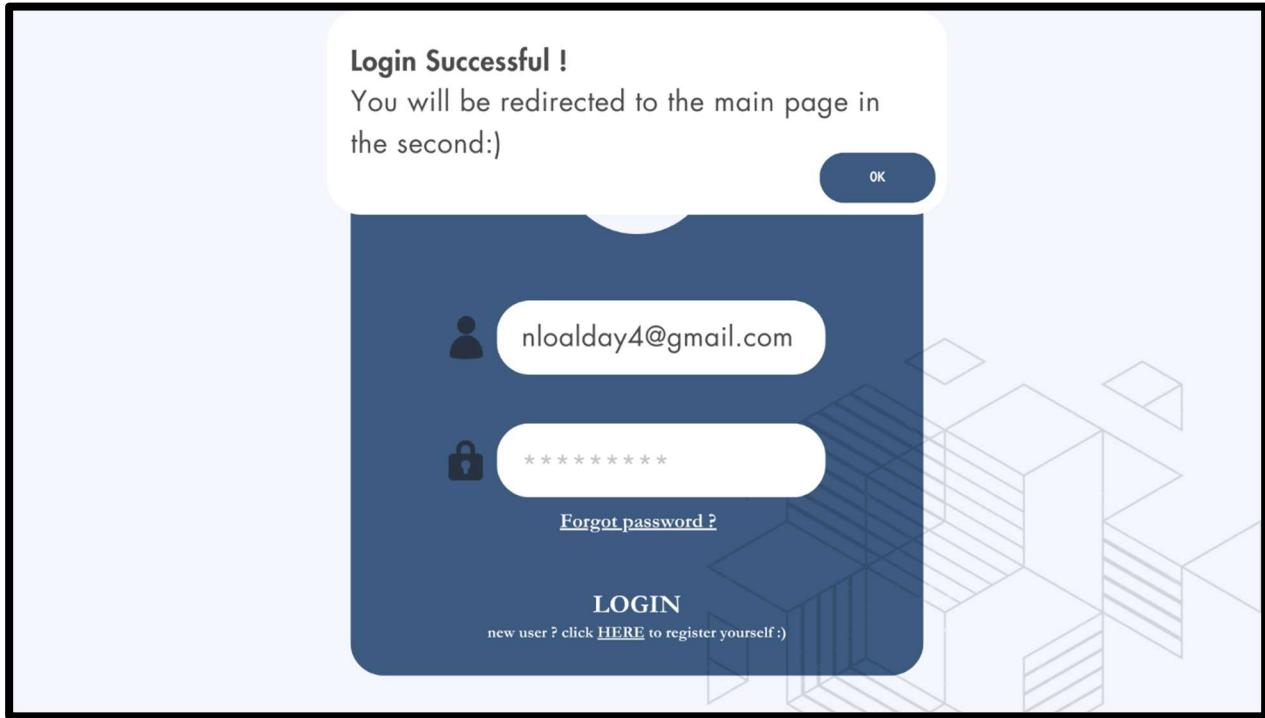
@ rivercruise

rivercruise@gmail.com

<b>SCREEN NAME</b>	Main Page of Website
<b>INPUT</b>	-
<b>OUTPUT</b>	-
<b>DESCRIPTION</b>	The main page provides an overview of the website content, allowing users to gain insights into the vision and mission of website. This page also offers a direct communication channel through "Contact", and "Login" allows users to log into the system.

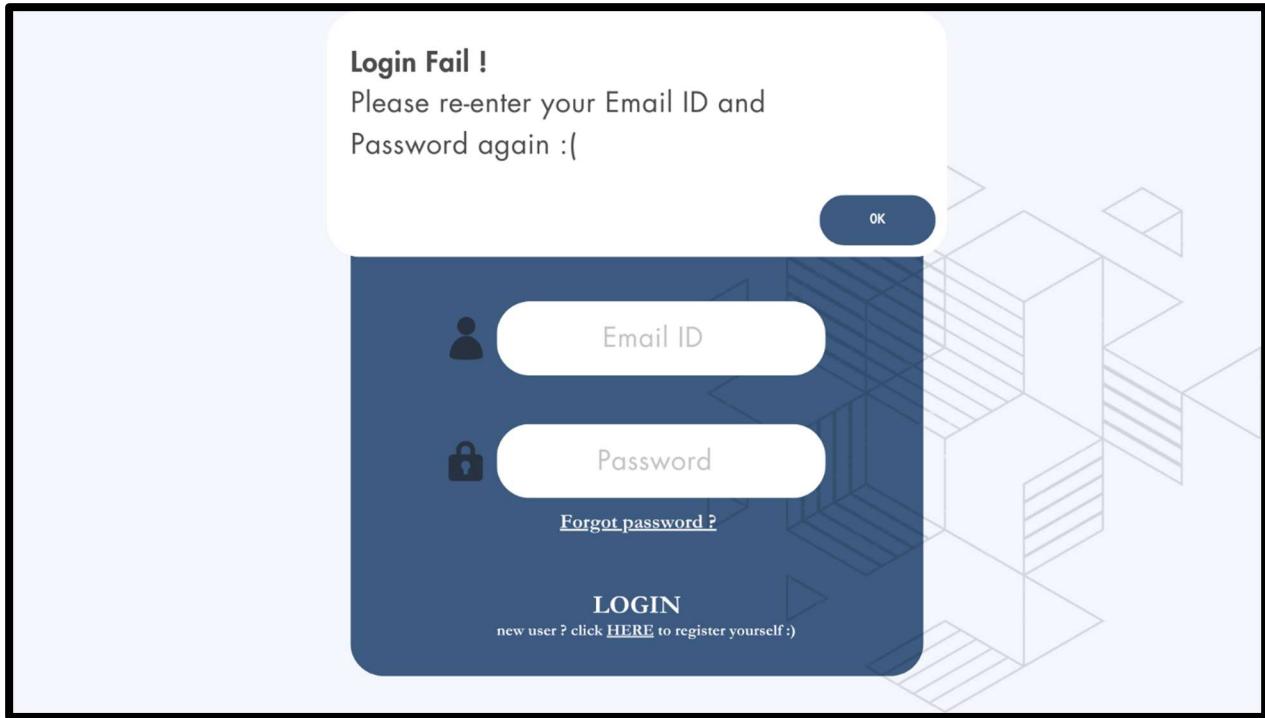
7.1.1.2 Login Page

<b>SCREEN NAME</b>	Login Page
<b>INPUT</b>	Email of the user, Password of the user
<b>OUTPUT</b>	Login Successful Page or Login Fail Page
<b>DESCRIPTION</b>	This page describes the login page that user need to login before enters to the main page. There are two inputs are required from the user, which are the email and the password. Then the “LOGIN” button will redirect the users to different page based on different scenario. If the user does not has any account, they could click the “HERE” hyperlink to register themselves.

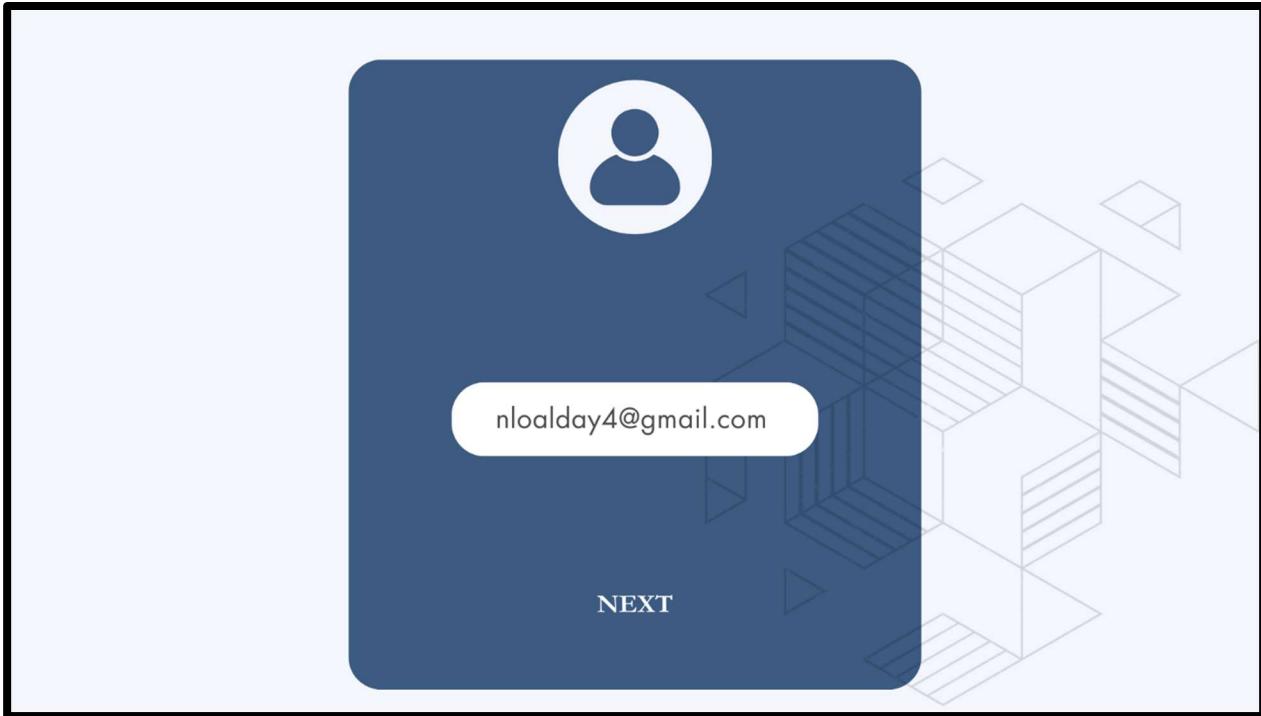
7.1.1.3 Login Successful Page

<b>SCREEN NAME</b>	Login Successful Page
<b>INPUT</b>	Email of the user, Password of the user
<b>OUTPUT</b>	Login Successful Message
<b>DESCRIPTION</b>	This page shows the login success page when the user enters the correct email and the password. Then, when the user clicks the "LOGIN" button, a login successful message will pop out, and redirect the user to the main page.

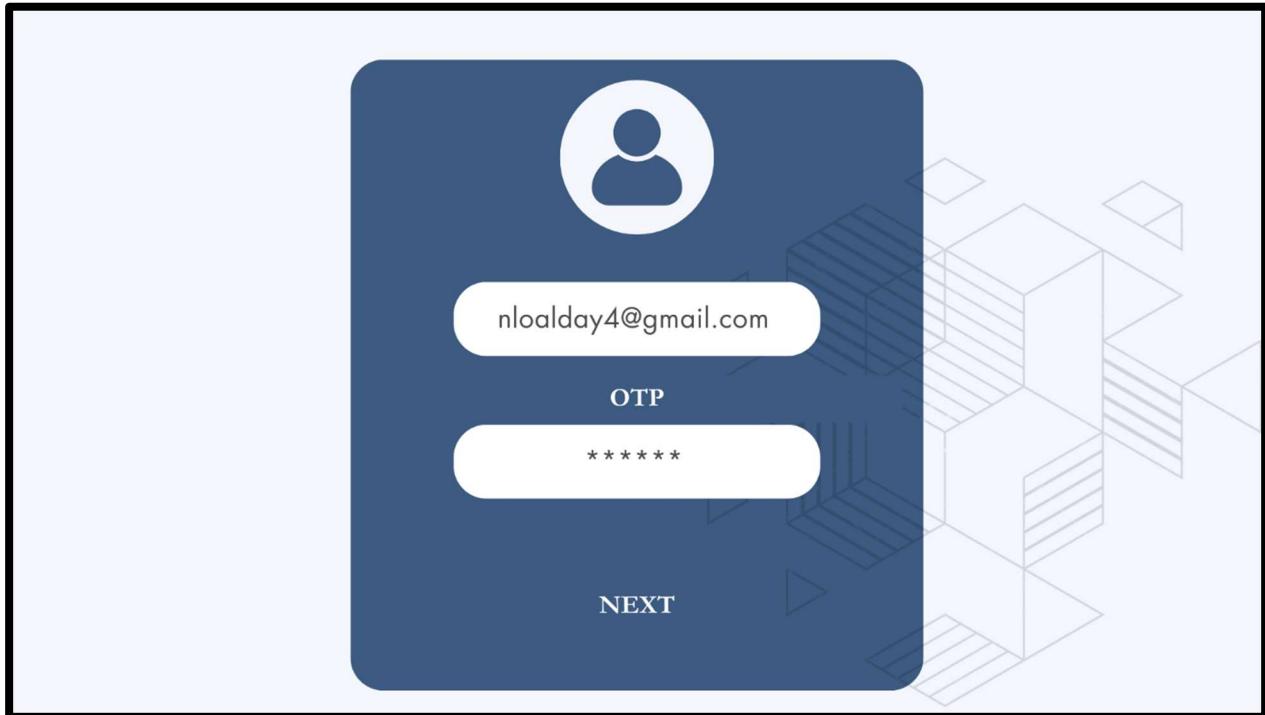
#### 7.1.1.4 Login Failure Page



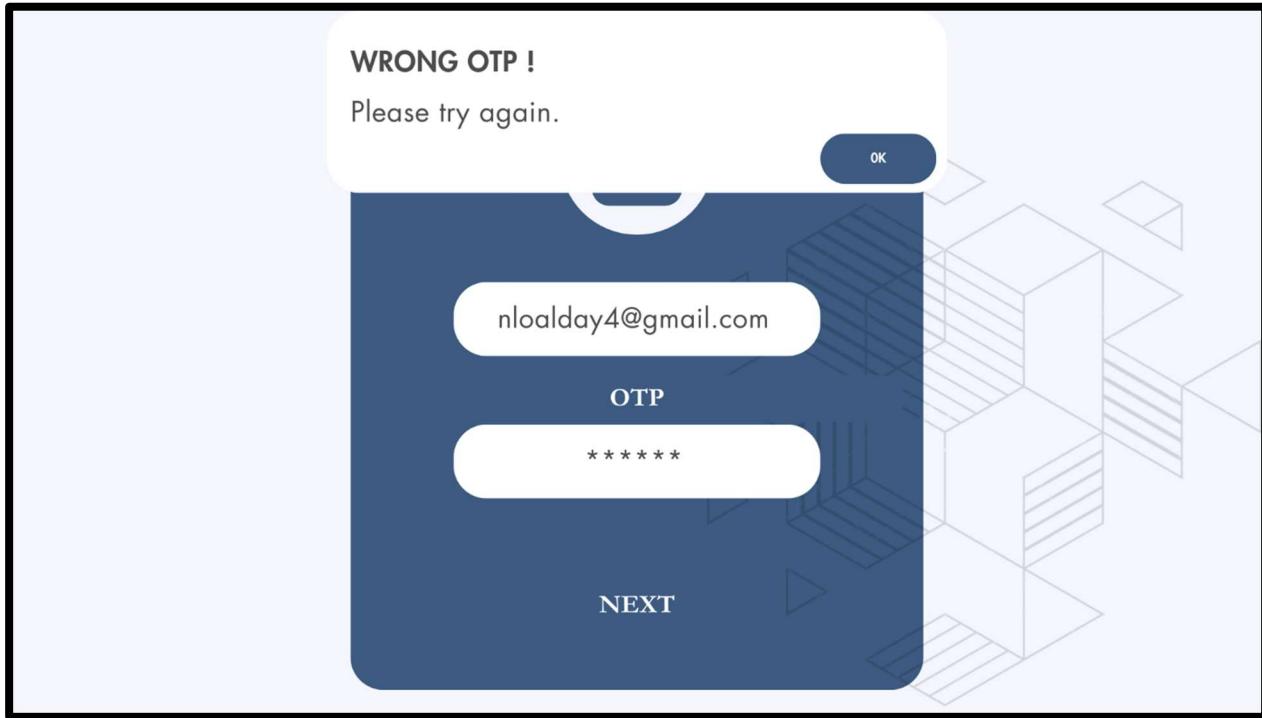
<b>SCREEN NAME</b>	Login Failure Page
<b>INPUT</b>	Email of the user, Password of the user
<b>OUTPUT</b>	Login Failed Message
<b>DESCRIPTION</b>	This page shows the login fail page when the user enters the wrong information, then a pop-up message will be shown to remind the customer. Then, the customer would be required to re-enter the email and the password again. Meanwhile, if the customer forgot their password, they could click the “HERE” hyperlink to reset their password.

7.1.1.5 Forgot Password Page

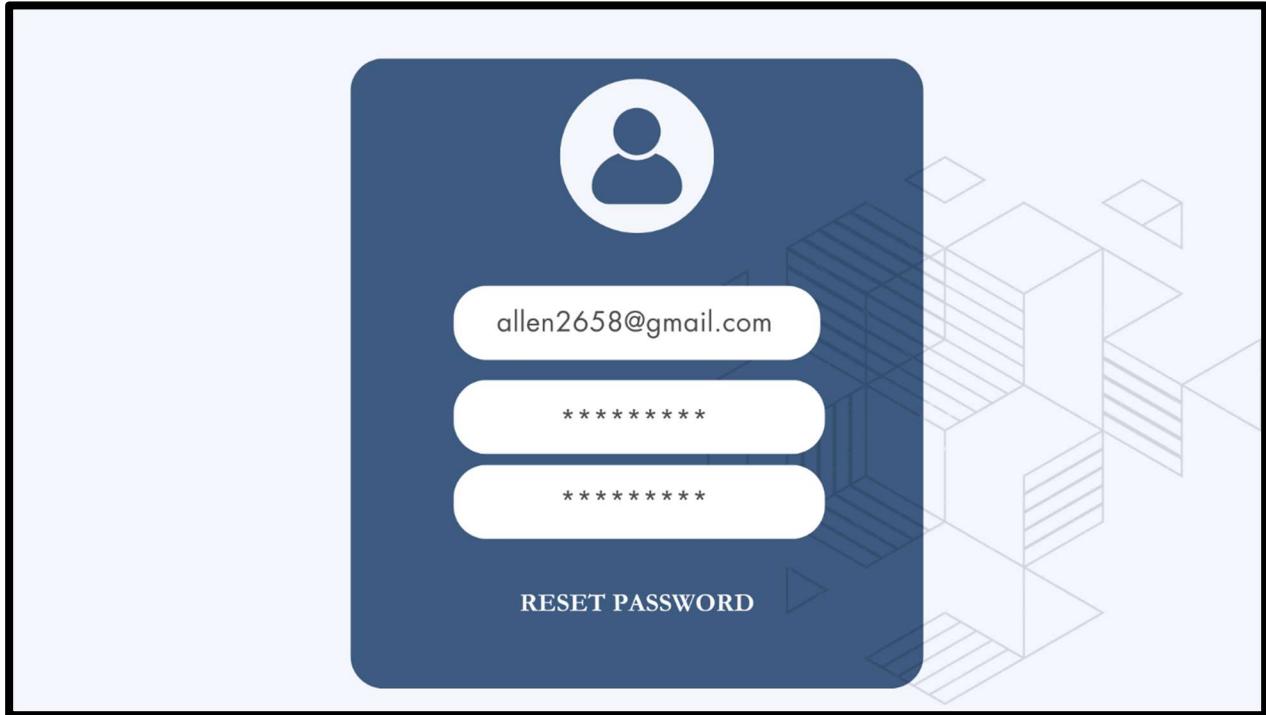
<b>SCREEN NAME</b>	Forgot Password Page
<b>INPUT</b>	Email of the user
<b>OUTPUT</b>	A new OTP will be received by user
<b>DESCRIPTION</b>	This page shows the reset password page where the customer could reset their password by entering their new password. Then, they could click the “NEXT” button to proceed.

7.1.1.6 Forgot Password Page (Enter OTP)

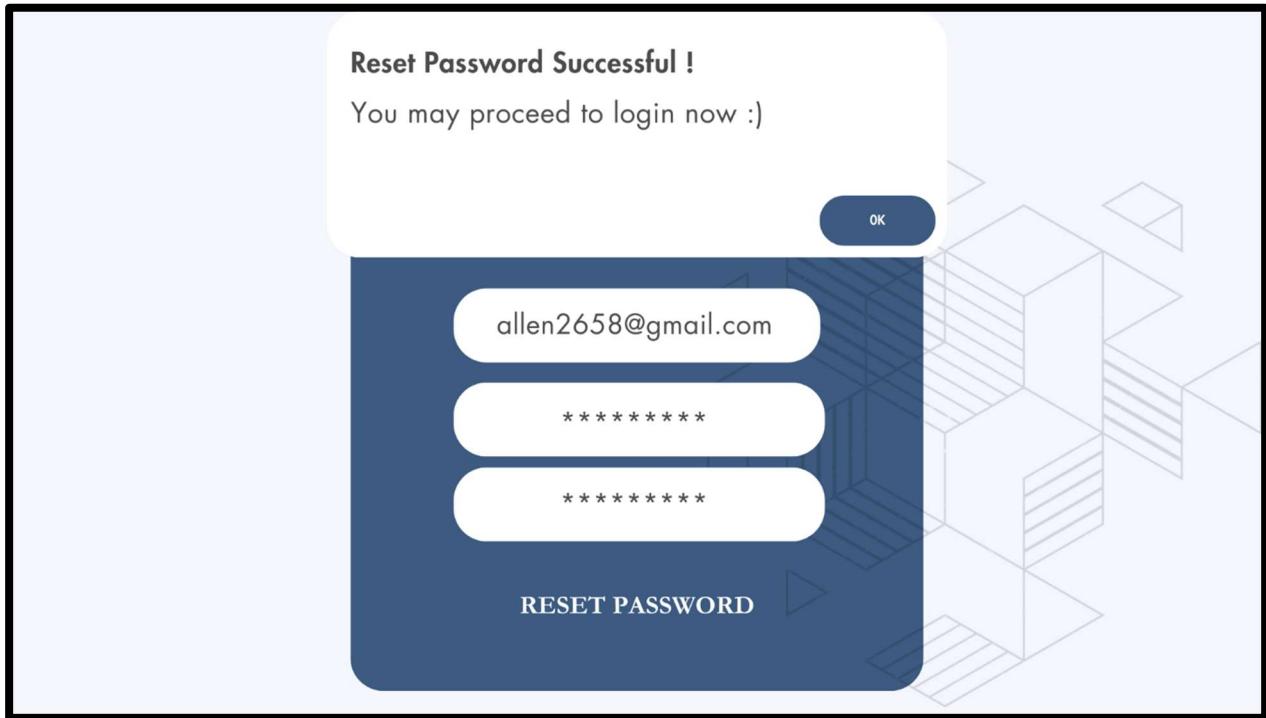
<b>SCREEN NAME</b>	Forgot Password Page (Enter OTP)
<b>INPUT</b>	Email of the user, OTP received by the user
<b>OUTPUT</b>	Enter wrong OTP message or reset password page
<b>DESCRIPTION</b>	This page shows the reset password page where the customer could reset their password by entering their new password. Then, they could click the “NEXT” button to proceed.

7.1.1.7 Forgot Password Page (Enter Wrong OTP)

<b>SCREEN NAME</b>	Forgot Password Page (Enter Wrong OTP)
<b>INPUT</b>	Email of the user, OTP received by the user
<b>OUTPUT</b>	Wrong OTP message or reset password page
<b>DESCRIPTION</b>	This page shows the incorrect OTP pop-up message that is displayed when the user enters an incorrect OTP.

7.1.1.8 Reset Password Page

<b>SCREEN NAME</b>	Reset Password Page
<b>INPUT</b>	Email of the user, OTP received by the user
<b>OUTPUT</b>	Reset Password Success Message
<b>DESCRIPTION</b>	This page shows the reset password page where the user needs to enter their new password. Then, they can click the “RESET PASSWORD” button to save their password and proceed to the login page.

7.1.1.9 Reset Password Success Page

<b>SCREEN NAME</b>	Reset Password Success Page
<b>INPUT</b>	Email of the user, New password of the user
<b>OUTPUT</b>	Reset password success message
<b>DESCRIPTION</b>	This page shows the reset password success message after they click the “RESET PASSWORD” button. Then, the new password of the user would be saved, and the user would be direct to the main page to login again.

7.1.1.10 User Registration Page

# REGISTRATION

NAME:

GENDER:

MALE       FEMALE

EMAIL:

PASSWORD:

RE-ENTER  
PASSWORD:

**SUBMIT**



<b>SCREEN NAME</b>	User Registration Page
<b>INPUT</b>	Details needed for user registration (name, gender, email, password of the customer)
<b>OUTPUT</b>	Registration success message or registration fail message
<b>DESCRIPTION</b>	This page shows the user registration page if the user clicks the “HERE” hyperlink in Login page. 5 inputs are required from the customer to register an account. After all information is written and meets its requirement, the “SUBMIT” button would save the details of the customer and redirect to the main page.

7.1.1.11 User Registration Success Page

You may proceed to login now :)

NA

**GENDER:**  
•MALE  FEMALE

**EMAIL:** allen2658@gmail.com

**PASSWORD:** \*\*\*\*\*

**RE-ENTER  
PASSWORD:** \*\*\*\*\*

<b>SCREEN NAME</b>	User Registration Success Page
<b>INPUT</b>	Personal details of the users (name, gender, email, password of the customer)
<b>OUTPUT</b>	User registration success message
<b>DESCRIPTION</b>	This page shows the user registration success page when the user enters all correct format details. Then, when the user clicks the “SUBMIT” button, the information will be saved.

7.1.1.12 User Registration Fail Page

The screenshot shows a user registration fail page. At the top left, there is a message: "Login Fail ! Please enter the correct format for the email :( The email must end with '@gmail.com'" with an "OK" button. Below this, there are fields for "GENDER" (radio buttons for MALE and FEMALE, with MALE selected), "EMAIL" (text input: allen2658), "PASSWORD" (text input: masked with asterisks), and "RE-ENTER PASSWORD" (text input: masked with asterisks). A "SUBMIT" button is located at the bottom right. The background features a stylized geometric pattern.

<b>SCREEN NAME</b>	User Registration Fail Page
<b>INPUT</b>	Personal details of the users (name, gender, email, password of the customer)
<b>OUTPUT</b>	User registration fail message
<b>DESCRIPTION</b>	This page shows the user registration fail page when the user did not fill in all the details required, or the information does not meet its requirement. Then, when the user clicks the "SUBMIT" button, a message will be shown to show that the registration is failed. The mistake would also be stated out to remind the customer. Afterwards, the customer is required to re-enter all the details to register their account again.

7.1.2 Customer7.1.2.1 Main Page

**Welcome to River Cruise !**

Your Gateway to Aquatic Adventure!

Embark on scenic river journeys with our expert guides, discovering nature's wonders and creating unforgettable cruise memories.

"Paddle into serenity with River Cruise. Our premium kayak rentals offer a tranquil aquatic escape for everyone."

**SCREEN NAME**

Main Page (Customer View)

**INPUT**

-

**OUTPUT**

-

**DESCRIPTION**

This page introduces the services provided by River Cruise. Main page would only show when the customer had login successful.

<b>SCREEN NAME</b>	Main Page (Customer View)
<b>INPUT</b>	-
<b>OUTPUT</b>	-
<b>DESCRIPTION</b>	This page introduces the services provided by River Cruise. Main page would only show when the customer had login successful.

### 7.1.2.2 Request Booking Page

<b>SCREEN NAME</b>	Request Booking Page
<b>INPUT</b>	Details required for booking (start booking date, end booking date, name, email, phone number, number of adults and children, remarks)
<b>OUTPUT</b>	Booking successful message or booking failed message
<b>DESCRIPTION</b>	This page shows the request booking page which customer can make booking by entering their personal information. 8 inputs are required from the customer to make a booking. Then, the “SUBMIT” will respond based on different situations.

### 7.1.2.3 Request Booking Success Page

**Booking Successful !**  
You will be redirected to the main page in  
CU: the second:)

NA. **OK**

**Home** CONTACT NUMBER 016 - 2568451

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**RESERVATION DETAILS:**

TYPE OF ACTIVITY	cruise tour
DURATION	5 days 4 night
START DATE	25 / 10 / 2023
ADULTS	2
PREFER GUIDE?	James
REMARKS	-
<b>SUBMIT</b>	

<b>SCREEN NAME</b>	Request Booking Success Page
<b>INPUT</b>	Details needed for booking service (start booking date, end booking date, name, email, phone number, number of adults and children, remarks)
<b>OUTPUT</b>	Booking successful message
<b>DESCRIPTION</b>	This page shows the booking success page where the customer had filled in all the 8 inputs that are required, and all the information had met its requirement, the “SUBMIT” button would save the registration message of the customer. Then, the registration record of the customer would be saved and can be viewed in “view payment page”. The record also would be shown in “make payment page” for customer to make payment.

### 7.1.2.4 Request Booking Fail Page

**Booking Fail !**  
The Phone Number must not be empty :(

CU:  
NA OK

CONTACT NUMBER Please Fill In the Phone Number

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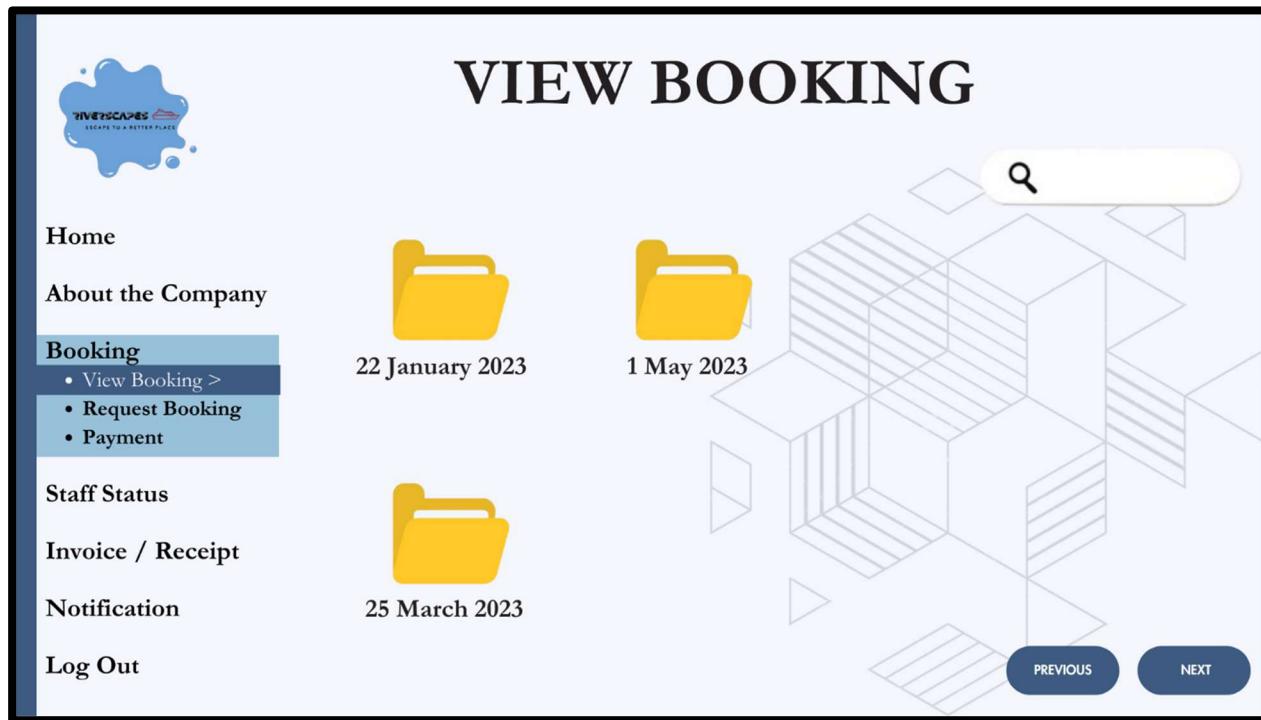
**RESERVATION DETAILS:**

TYPE OF ACTIVITY	▼
DURATION	▼
START DATE	
ADULTS	▼
PREFER GUIDE?	▼
REMARKS	

END DATE  
CHILDREN

SUBMIT

<b>SCREEN NAME</b>	Request Booking Fail Page
<b>INPUT</b>	Details needed for booking service (start booking date, end booking date, name, email, phone number, number of adults and children, remarks)
<b>OUTPUT</b>	Booking fail message
<b>DESCRIPTION</b>	This page will show the booking fail page when the customer did not enter any of the information required, or the information entered by the customer does not meet its requirement. Then, the “SUBMIT” button would remind the customer that the booking is fail, and the mistake would also be stated out to remind the customer. Afterwards, the customer is required to re-enter all the details to rebook again.

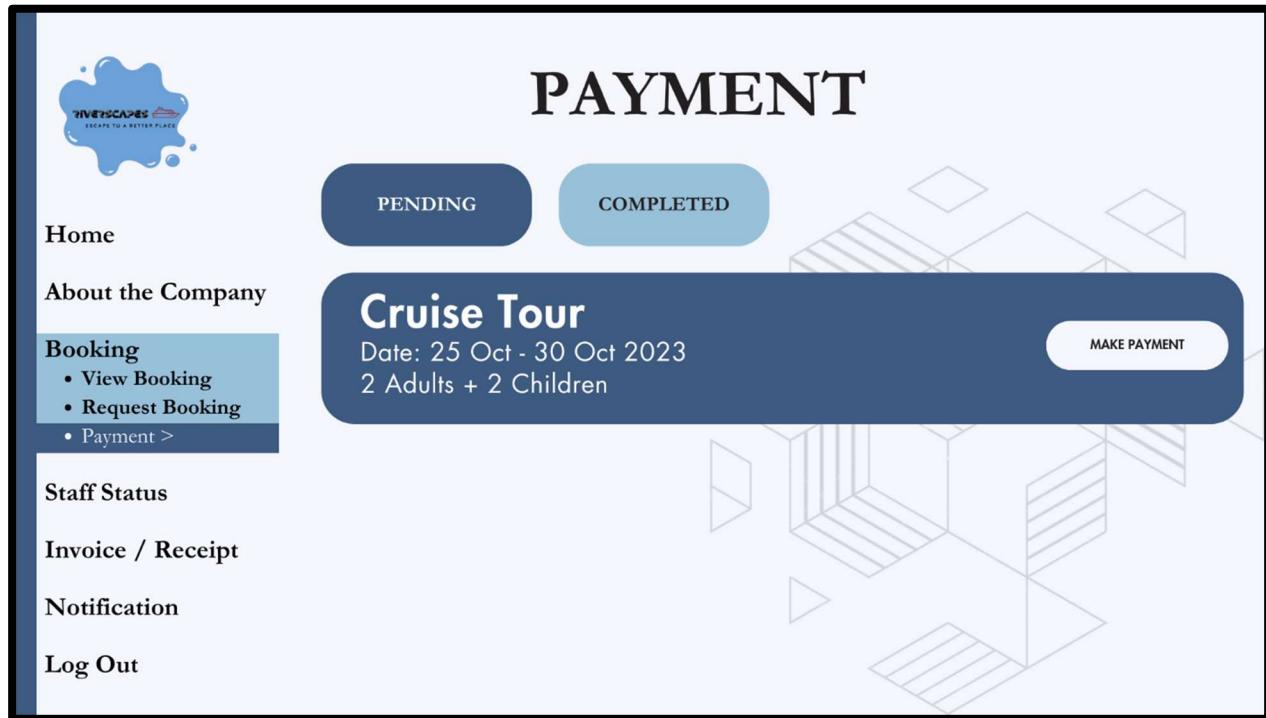
7.1.2.5 View Booking Page

<b>SCREEN NAME</b>	View Booking Page
<b>INPUT</b>	“View Booking” button at the menu bar
<b>OUTPUT</b>	Customer booking details
<b>DESCRIPTION</b>	This page shows the view booking page which all the bookings of the customer would be seen in here. When the customer clicks the different folder, different details would be shown based on the date that click by the users. If the customer enters a different date with the search bar, it would also show the folder that customer can click to view. The “PREVIOUS” and the “NEXT” button also allow the customer to scroll to view all booking details.

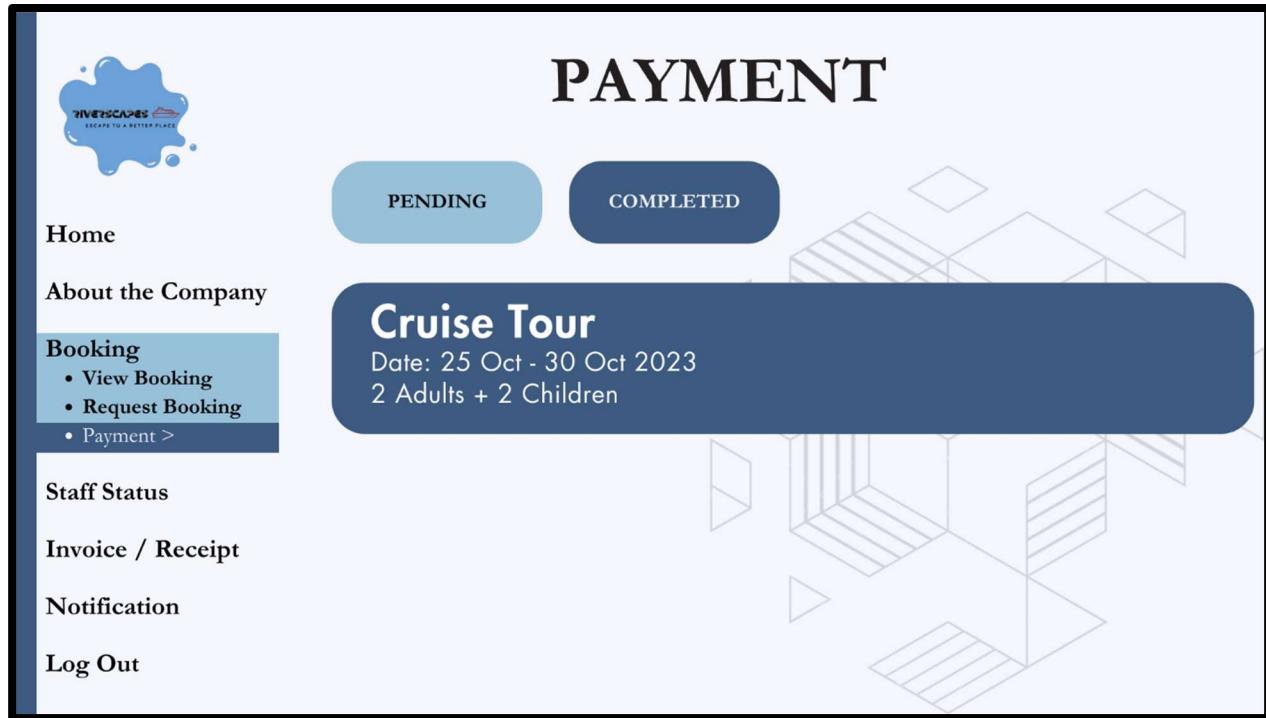
7.1.2.6 View Booking Details Page

The screenshot shows a mobile application interface for 'VIEW BOOKING'. At the top, there's a logo for 'RIVERSCAPES' with the tagline 'ESCAPE TO A BETTER PLACE'. Below the logo, the title 'VIEW BOOKING' is displayed in large, bold letters. On the left side, there's a vertical navigation menu with options: Home, About the Company, Booking (which is selected and highlighted in blue), Staff Status, Invoice / Receipt, Notification, and Log Out. Under the 'Booking' option, there are three sub-options: View Booking >, Request Booking, and Payment. The main content area on the right shows booking details for 'Allen Smith' (Booking No: B15789, Booking Date: 25 March 2023). It includes sections for 'Description' (labeled 'Cruise Tour'), travel information (Date: 1 April 2023 - 5 April 2023, Duration: 5 Days 4 Night, Adults: 2, Children: 2), and remarks. At the bottom right, it shows a total amount of 'Total: RM 5,100.00'. A 'BACK' button is located at the bottom right of the main content area.

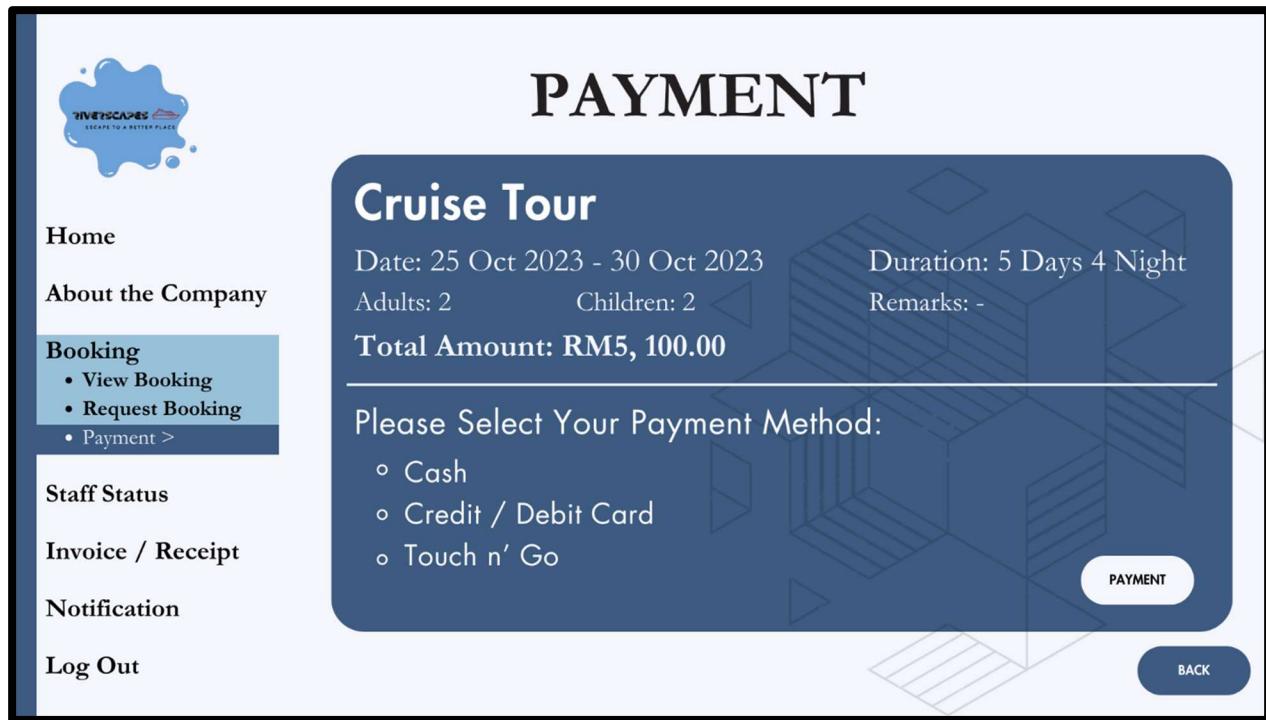
<b>SCREEN NAME</b>	View Booking Details Page
<b>INPUT</b>	Different folders in customer view booking page
<b>OUTPUT</b>	Customer booking details (name, email, phone number, booking date, booking details, total amount)
<b>DESCRIPTION</b>	In this page, it will show the details of the customer booking based on the date selected by the customer. If the customer wants to exit this page, they could exit by clicking the "BACK" button.

7.1.2.7 Make Payment Pending Page

<b>SCREEN NAME</b>	Make Payment Pending Page
<b>INPUT</b>	“Payment” button at the menu bar
<b>OUTPUT</b>	Payment that can be done by the customer
<b>DESCRIPTION</b>	This page shows the payment of the customer. There are three buttons that could be clicked, which are “PENDING” that represents the booking that haven’t paid by the customer. The customer could click the “MAKE PAYMENT” button to make payment.

7.1.2.8 Make Payment Completed Page

<b>SCREEN NAME</b>	Make Payment Completed Page
<b>INPUT</b>	“COMPLETED” button at the make payment page
<b>OUTPUT</b>	Payment that already done by the customer
<b>DESCRIPTION</b>	This page shows all the payment that already done by the customer.

7.1.2.9 Make Payment Details Page

<b>SCREEN NAME</b>	Make Payment Details Page
<b>INPUT</b>	“MAKE PAYMENT” button from make payment page
<b>OUTPUT</b>	Booking details of the customer that pending for payment
<b>DESCRIPTION</b>	This page will show the payment details of the customer which the booking details will be shown for the customer to double check. Then, after the customer selects their payment method, they could click the “PAYMENT” button to make their payment. “BACK” button is also provided if the customer would like to go back to the previous page.

7.1.2.10 Credit Card Payment Page

**PAYMENT**

**Credit / Debit Card**

Card number:

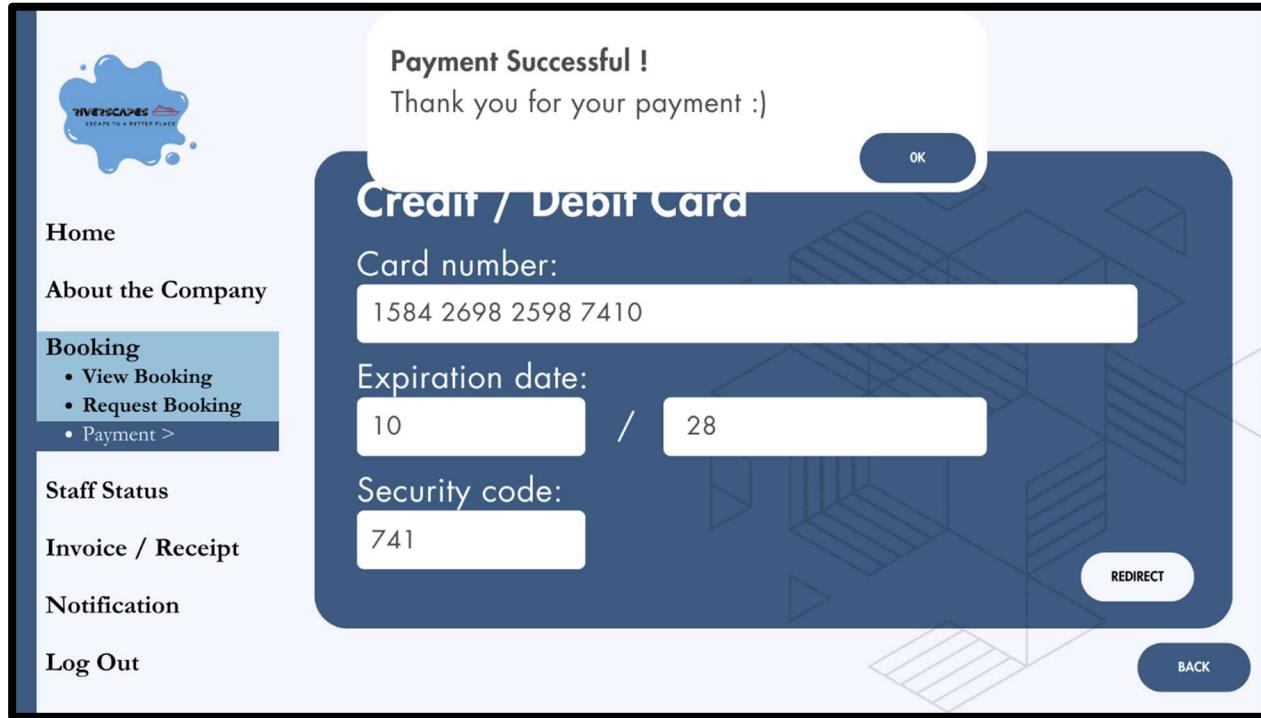
Expiration date:

Security code:

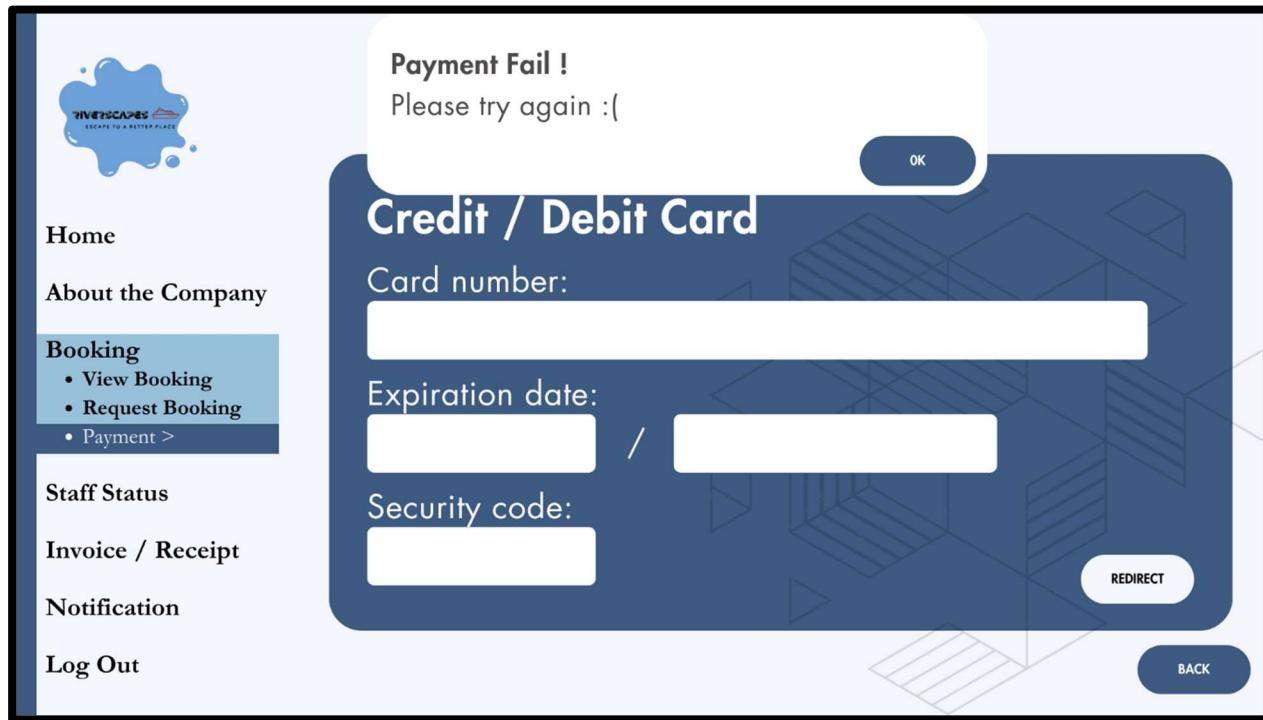
REDIRECT

BACK

<b>SCREEN NAME</b>	Credit Card Payment Page
<b>INPUT</b>	Credit or debit card details of the customer (card number, expiration date, security code)
<b>OUTPUT</b>	Payment success message or payment fail message
<b>DESCRIPTION</b>	This page shows the payment of credit card of the customer. After the user has inserted all information required, they could click the “REDIRECT” button to continue their payment. However, if they want to go back to the previous page, they could click the “BACK” button.

7.1.2.11 Credit Card Payment Success Page

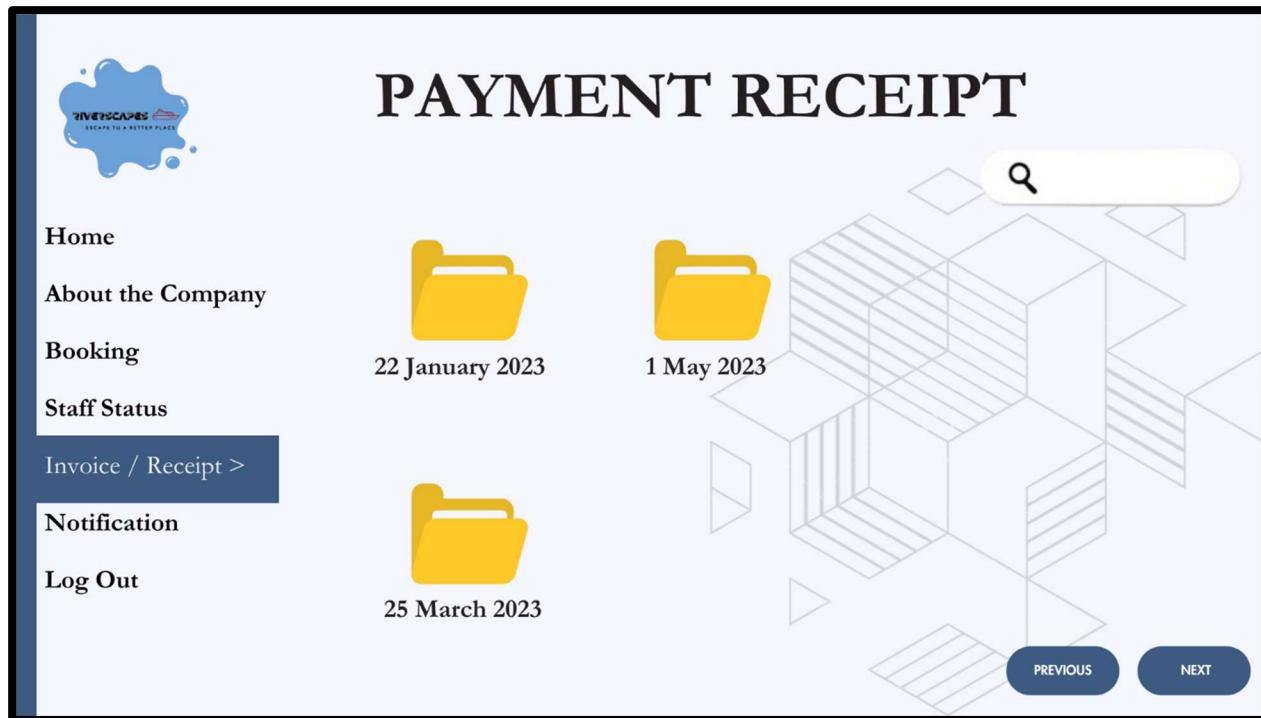
<b>SCREEN NAME</b>	Credit Card Payment Success Page
<b>INPUT</b>	Credit or debit card details of the customer (card number, expiration date, security code)
<b>OUTPUT</b>	Payment success message
<b>DESCRIPTION</b>	This page shows the payment success page when the customer enters the correct information, and the card could be proceeded for the payment. Then, when the user clicks the "REDIRECT" button, a payment success message will pop out to save the payment of the customer.

7.1.2.12 Credit Card Payment Fail Page

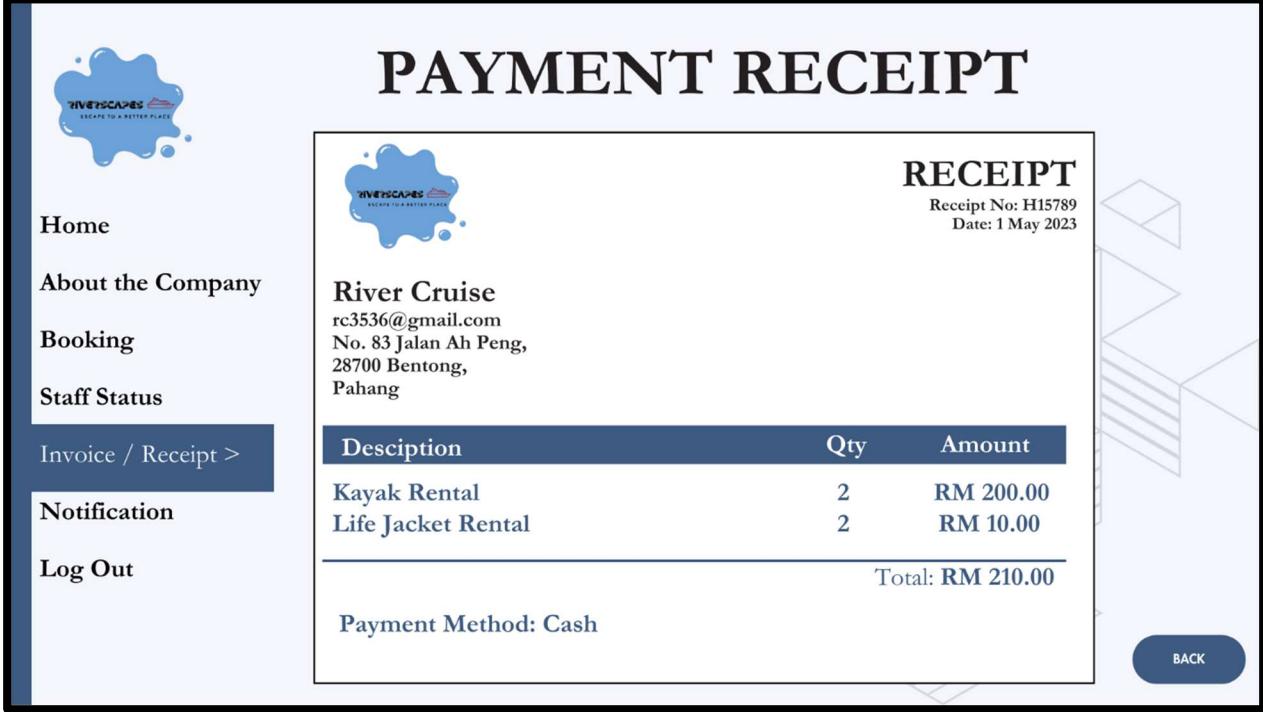
<b>SCREEN NAME</b>	Credit Card Payment Fail Page
<b>INPUT</b>	Credit or debit card details of the customer (card number, expiration date, security code)
<b>OUTPUT</b>	Payment fails message
<b>DESCRIPTION</b>	This page shows the payment fail page when the customer enters the incorrect information, or the card could not be proceeded for the payment. Then, when the user clicks the "REDIRECT" button, a payment fail message will pop out and the customer would be required to re-enter the details again.

7.1.2.13 Touch N' Go Payment Page

<b>SCREEN NAME</b>	Touch N' Go Payment Page
<b>INPUT</b>	Touch N' Go details of the customer (phone number, pin number)
<b>OUTPUT</b>	Payment success message
<b>DESCRIPTION</b>	This page shows the Touch N' Go payment method where the users would require to enter their details to continue their payment. Then, the customer needs to click the "REDIRECT" button to continue their payment. Besides, the customer could also make their payment by scanning the QR code. If the customer would like to go back to the previous page, they could click the "BACK" button.

7.1.2.14 Payment Receipt Page

<b>SCREEN NAME</b>	Payment Receipt Page
<b>INPUT</b>	“Invoice / Receipt” button at the menu bar
<b>OUTPUT</b>	Customer payment receipt details
<b>DESCRIPTION</b>	This page will show multiple folders of payment receipt that previously done by the customer. Then, the customer could see the details by clicking different folders. A search bar is provided for the customer to search for a specific date. The “PREVIOUS” and “NEXT” button also could be used by the customer to scroll.

7.1.2.15 Payment Receipt Details Page


The mockup shows a mobile application interface for a payment receipt. On the left, a sidebar menu includes Home, About the Company, Booking, Staff Status, Invoice / Receipt > (which is highlighted in blue), Notification, and Log Out. The main content area has a header "PAYMENT RECEIPT" and a logo for "RIVERSCAPES ESCAPE TO A BETTER PLACE". The receipt details are as follows:

**RECEIPT**  
Receipt No: H15789  
Date: 1 May 2023

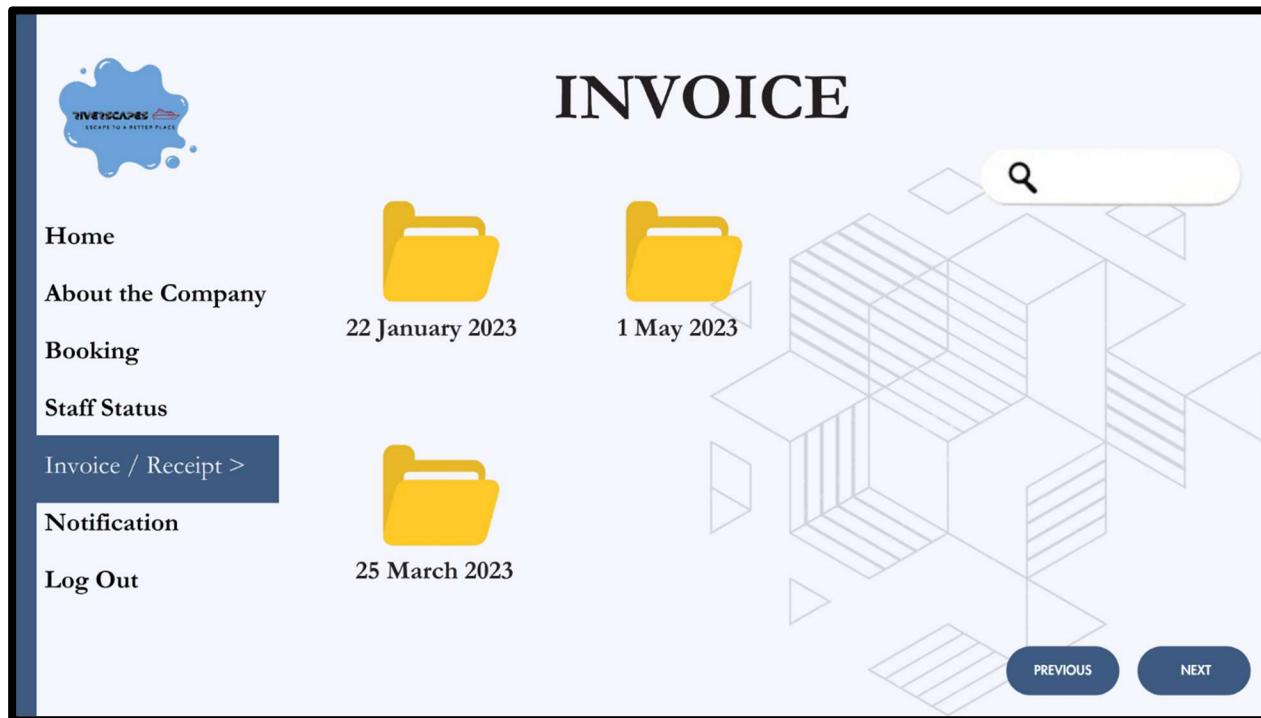
**River Cruise**  
rc3536@gmail.com  
No. 83 Jalan Ah Peng,  
28700 Bentong,  
Pahang

Description	Qty	Amount
Kayak Rental	2	RM 200.00
Life Jacket Rental	2	RM 10.00
Total: RM 210.00		

Payment Method: Cash

A "BACK" button is located at the bottom right of the main content area.

<b>SCREEN NAME</b>	Payment Receipt Details Page
<b>INPUT</b>	Different folder in payment receipt page
<b>OUTPUT</b>	Customer payment receipt details (Details of the company, payment date, description of the booking, total amount, payment method)
<b>DESCRIPTION</b>	This page will show the details of the payment receipt which the customer can view the details. The “BACK” would also be used to redirect to the main page.

7.1.2.16 Invoice Page

<b>SCREEN NAME</b>	Invoice Page
<b>INPUT</b>	“Invoice / Receipt” button at the menu bar
<b>OUTPUT</b>	Customer invoice details
<b>DESCRIPTION</b>	This page will show multiple folders of customer invoice where the customer could click to see the details. A search bar is provided for the customer which they could type a specific date to search for a specific invoice. The “PREVIOUS” and “NEXT” button also could use by the customer to scroll.

7.1.2.17 Invoice Details Page

**INVOICE**

Invoice No: A15789  
Invoice Date: 1 May 2023

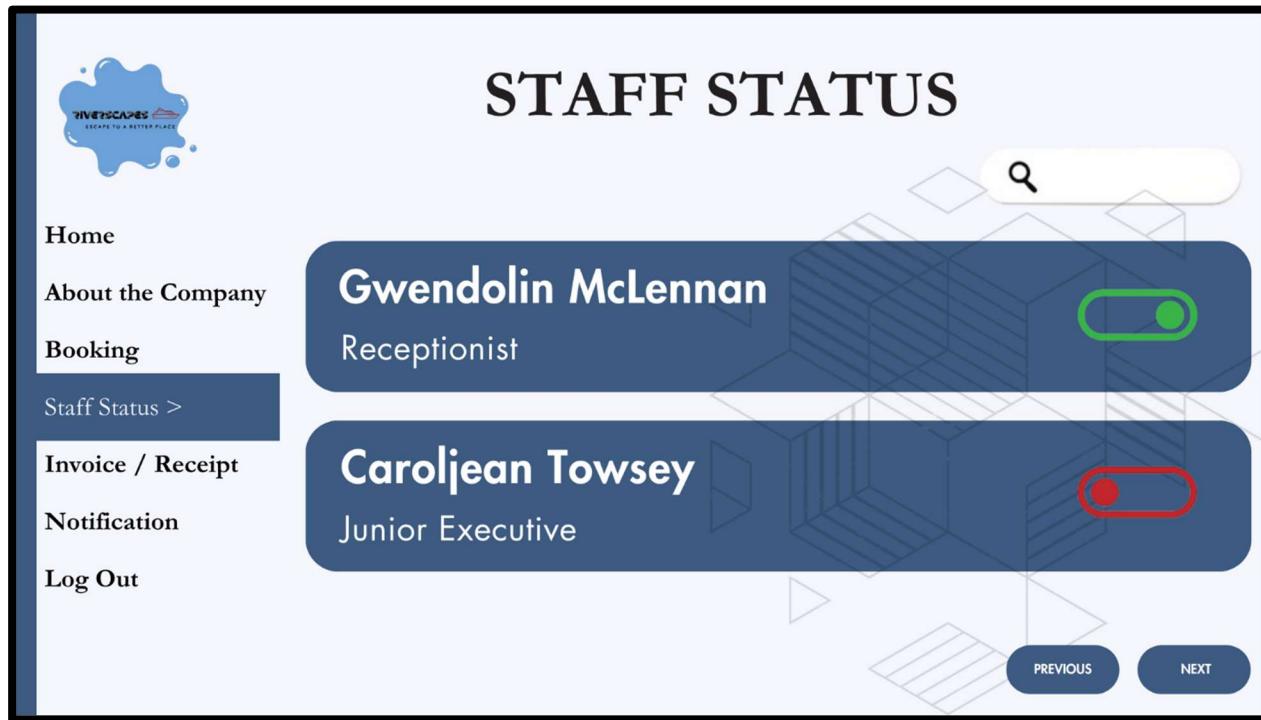
From: **River Cruise**  
rc3536@gmail.com  
No. 83 Jalan Ah Peng,  
28700 Bentong,  
Pahang

To: **Allen Smith**  
allen2658@gmail.com  
+60162568451

Description	Qty	Amount
Kayak Rental Date: 1 May 2023 to 4 May 2023 Daily Rental Rate: RM15.00	2	RM 200.00
Life Jacket Rental	2	RM 10.00
Total: RM 210.00		

**BACK**

<b>SCREEN NAME</b>	Invoice Details Page
<b>INPUT</b>	Different folder in invoice page
<b>OUTPUT</b>	Customer invoice details (Details of the company, details of the customer, payment date, description of the booking, total amount)
<b>DESCRIPTION</b>	This page will show the details of the invoice which the customer can view the details. The “BACK” would also use to redirect to the previous page.

7.1.2.18 View Staff Status Page

<b>SCREEN NAME</b>	View Staff Status Page
<b>INPUT</b>	“Staff Status” at the menu bar
<b>OUTPUT</b>	Status of the staff
<b>DESCRIPTION</b>	This page shows the status of the staff by showing different colour of the switch where green represents available, and red represents no. A search bar also provided for the customer to search for a specific date. The “PREVIOUS” and “NEXT” button also could use by the customer to scroll.

7.1.2.19 View Staff Status Details Page

The screenshot shows a web page titled "STAFF STATUS" for "Gwendolin McLennan" (Receptionist). The page displays a timetable for the week from Monday, 22 Jan to Friday, 26 Jan. The timetable is organized into two columns: "DAY" and "TIME". The "TIME" column includes a break row between Tuesday and Wednesday. A "BACK" button is located at the bottom right of the main content area.

DAY	TIME
Monday, 22 Jan	0830 - 1400 1500 - 2000
Tuesday, 23 Jan	0830 - 1400 1500 - 2000
Wednesday, 24 Jan	0830 - 1400 1500 - 2000
Thursday, 25 Jan	0830 - 1200 1300 - 1700
Friday, 26 Jan	OFF

<b>SCREEN NAME</b>	View Staff Status Details Page
<b>INPUT</b>	Different name of the employees
<b>OUTPUT</b>	Timetable of the specific employee
<b>DESCRIPTION</b>	This page shows the detailed timetable of the employee for the customer to view. A "BACK" button is also provided to redirect to the main page.

7.1.2.20 View Notification Page

**NOTIFICATION**

**CHRISTMAS PROMOTION 2023**  
December 15, 2023 11:14AM

**TOUR AND INVENTORY UPDATE**  
December 1, 2023 9:15AM

**Navigation:**

- Home
- About the Company
- Booking
- Staff Status
- Invoice / Receipt
- Notification >
- Log Out

**Search:**

**Buttons:** PREVIOUS, NEXT

<b>SCREEN NAME</b>	View Notification Page
<b>INPUT</b>	“Notification” button at the menu bar
<b>OUTPUT</b>	List of notifications given by RC management
<b>DESCRIPTION</b>	This page will show a list of notifications for the customer to view. A search bar also provided for the customer to search for a specific date. The “PREVIOUS” and “NEXT” button also could use by the customer to scroll.

7.1.2.21 View Notification Details Page

The screenshot shows a mobile application interface for 'River Escapes'. At the top left is the company logo 'RIVERESCAPES ESCAPE TO A BETTER PLACE'. On the left side, there is a vertical navigation menu with the following items: Home, About the Company, Booking, Staff Status, Invoice / Receipt, Notification >, and Log Out. The 'Notification >' item is highlighted with a dark blue background. The main content area has a dark blue header with the word 'NOTIFICATION' in large white letters. Below the header, it says 'CHRISTMAS PROMOTION 2023 December 15, 2023 11:14AM'. The body of the notification starts with 'Dear Valued Guests,' followed by a promotional message: 'As the festive season approaches, we are thrilled to announce our spectacular Christmas Sales for the most enchanting river cruises! 🎅🌟 Embrace the magic of the holidays as you sail along breathtaking rivers, surrounded by festive decorations and the warmth of the season.' Below this, there are three sections: 'LIMITED-TIME OFFERS:', 'EARLY BIRD SPECIAL:', and 'FAMILY & FRIENDS BUNDLE:'. At the bottom right of the main content area is a 'BACK' button.

<b>SCREEN NAME</b>	View Notification Details Page
<b>INPUT</b>	Specific notification from the notification page
<b>OUTPUT</b>	Notification details
<b>DESCRIPTION</b>	This page will show the details of the specific notification for the customer to understand and know. A "BACK" button is also provided to redirect to the previous page.

7.1.3 Staff7.1.3.1 Home Page

<b>SCREEN NAME</b>	Main Page (Staff View)
<b>INPUT</b>	-
<b>OUTPUT</b>	-
<b>DESCRIPTION</b>	This page introduces the services provided by River Cruise. Main page would only show when the staff had login successful.

7.1.3.2 Show Personal Notification Page

<b>SCREEN NAME</b>	Show Personal Notification Page
<b>INPUT</b>	“Notifications” button at menu bar
<b>OUTPUT</b>	List of notifications given my RC management
<b>DESCRIPTION</b>	This page will show a list of notifications for the customer to view. A search bar also provided for the customer to search for a specific date. The “PREVIOUS” and “NEXT” button also could use by the customer to view latest or previous notifications.

7.1.3.3 View Individual Notification Page

**RIVERSCAPES** ESCAPE TO A BETTER PLACE

# NOTIFICATION

**RIVERSCAPES**

NAME : JEFFREY TOH  
NRIC :

END PAYMENT - NOVEMBER 2023

EMPLOYEE NO : JEFF001  
POSITION : Sale Executive

EARNINGS	DEDUCTIONS
BASIC PAY	3,000.00
DAILY ATTENDANCE	23.07
MEAL	93.00
NIGHT SHIFT ALLOWANCE	10.00
NORMAL OT	86.54
REST OT	734.44
TOTAL EARNINGS	3,947.05
EMPLOYER EPF	377.00
EMPLOYER SOCOSO	67.35
EMPLOYER EIS	7.70
TOTAL DEDUCTIONS	460.44
NET SALARY	3,486.61

CHECKED BY : \_\_\_\_\_ APPROVED BY : \_\_\_\_\_ RECEIVED BY : \_\_\_\_\_

**BACK**

<b>SCREEN NAME</b>	View Individual Notification Page
<b>INPUT</b>	Specific notification from the show personal notification page
<b>OUTPUT</b>	Details of specific notification chosen by the staff
<b>DESCRIPTION</b>	This page will show the details of the specific notification to keep staff updated about the business. A “BACK” button is also provided to redirect to the previous page.

7.1.3.4 View Schedule Page

**RIVERSCAPES ESCAPE TO A BETTER PLACE**

**VIEW SCHEDULE**

**Gwendolin McLennan**  
Receptionist

DAY	TIME
Monday, 22 Jan	0830 - 1400 1500 - 2000
Tuesday, 23 Jan	0830 - 1400 1500 - 2000
Wednesday, 24 Jan	0830 - 1400 1500 - 2000
Thursday, 25 Jan	OFF
Friday, 26 Jan	0830 - 1200 1300 - 1700

**APPROVE**      **BACK**

<b>SCREEN NAME</b>	View Personal Schedule
<b>INPUT</b>	“Schedule” button at menu bar
<b>OUTPUT</b>	Staff’s name, job position, working days, date, and time
<b>DESCRIPTION</b>	When the staff clicks on the “Schedule” button at the menu bar, the page will immediately show the staff their personal schedule for the week.

7.1.3.5 Update Schedule Request Page

**UPDATE SCHEDULE**

NAME:

POSITION:

CLOCK-IN TIME: 8.30 A.M.

CLOCK-OUT TIME: 5.30 P.M.

DAY-OFF:

**SUBMIT**

<b>SCREEN NAME</b>	Update Schedule Request Page
<b>INPUT</b>	“Request Update” button at the menu bar under “Schedule”
<b>OUTPUT</b>	Input boxes to add in staff details such as name, position, clock-in and clock-out time, day off, and a “SUBMIT” button
<b>DESCRIPTION</b>	This page allows the staff to enter the details necessary for the digital scheduler to update the staff’s schedule as requested. Staff should click the “SUBMIT” button to send the request and wait for further response.

7.1.3.6 Update Schedule Request Success Page

**Update Request Sent Successful !**  
Your request has been sent :)

NAME: Swendom Mcleman

POSITION: Receptionist

CLOCK-IN TIME: 8.30 A.M.

CLOCK-OUT TIME: 5.30 P.M.

DAY-OFF: Thursday

**SCHEDULE**

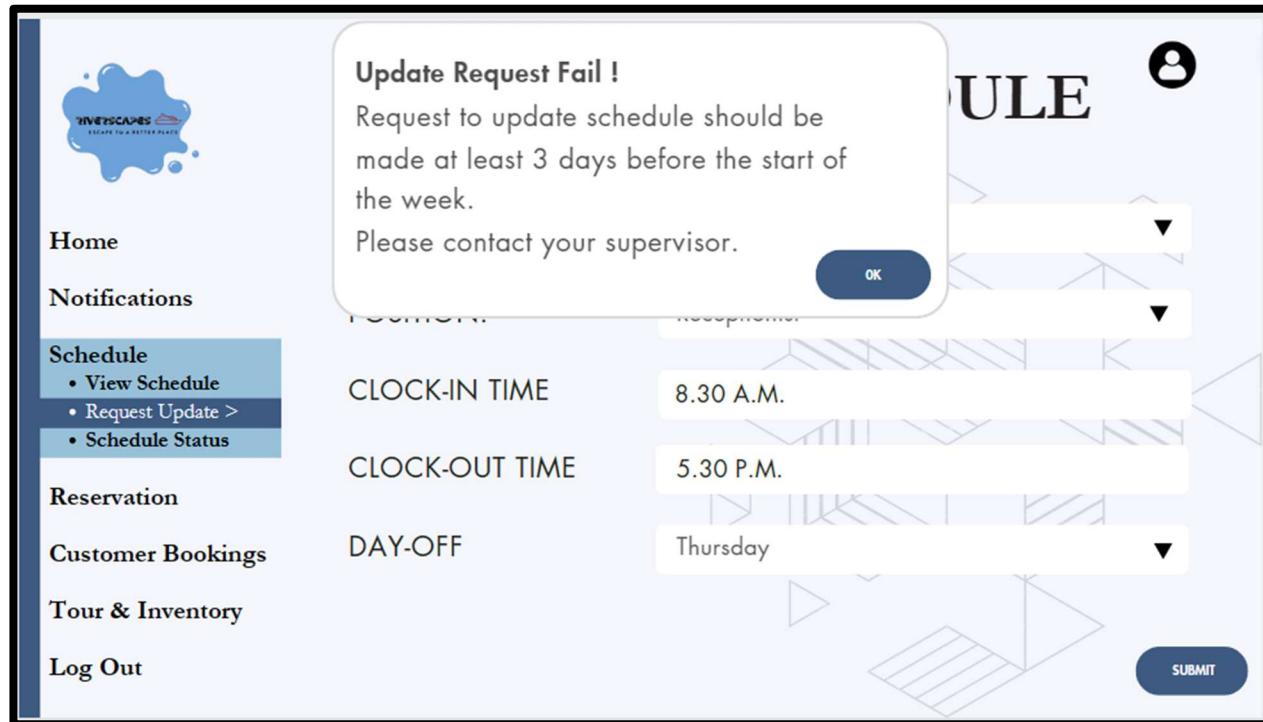
- View Schedule
- Request Update >
- Schedule Status

**Log Out**

**SUBMIT**

<b>SCREEN NAME</b>	Update Schedule Request Success Page
<b>INPUT</b>	Staff details such as name, position, clock-in and clock-out time, day off, and “SUBMIT” button
<b>OUTPUT</b>	A pop out success message
<b>DESCRIPTION</b>	Once the staff clicks on “SUBMIT”, a pop out message will be displayed to inform the staff that the request has been sent successfully to the digital scheduler.

### 7.1.3.7 Update Schedule Request Rejected Page



<b>SCREEN NAME</b>	Update Schedule Request Rejected Page
<b>INPUT</b>	Staff details such as name, position, clock-in and clock-out time, day off, and “SUBMIT” button
<b>OUTPUT</b>	A pop out failure message
<b>DESCRIPTION</b>	Once the staff clicks on “SUBMIT”, a pop out message will be displayed to inform the staff that the request has failed to be sent to the digital scheduler.

7.1.3.8 Update Schedule Status Approved Page

<b>SCREEN NAME</b>	Update Schedule Status Approved Page
<b>INPUT</b>	“Schedule Status” button at the menu bar
<b>OUTPUT</b>	Staff schedule that has been approved after requesting update
<b>DESCRIPTION</b>	This page shows the staff’s schedule that has been approved and successfully updated. There are three buttons above that represent two different statuses of the schedule, which are “PENDING” and “APPROVED”. A “REFRESH” button also could be clicked to refresh the status of the schedule.

7.1.3.9 Update Schedule Status Pending Page

<b>SCREEN NAME</b>	Update Schedule Status Pending Page
<b>INPUT</b>	“Schedule Status” button at the menu bar
<b>OUTPUT</b>	Staff schedule that is pending to be updated after requesting update
<b>DESCRIPTION</b>	This page shows the staff's schedule that is pending for update approval. There are three buttons above that represent two different statuses of the schedule, which are “PENDING” and “APPROVED”. A “REFRESH” button also could be clicked to refresh the status of the schedule.

7.1.3.10 Add Reservation Page

<b>SCREEN NAME</b>	Add Reservation Page
<b>INPUT</b>	“Reservation” at the menu bar
<b>OUTPUT</b>	Input boxes to add details such as customer name, gender, email, number of guests, phone number, date, and time, for reservation
<b>DESCRIPTION</b>	This page allows staff to add in details for a customer to help the customer book a reservation. This is done by the staff filling in all the details then clicking “ADD”.

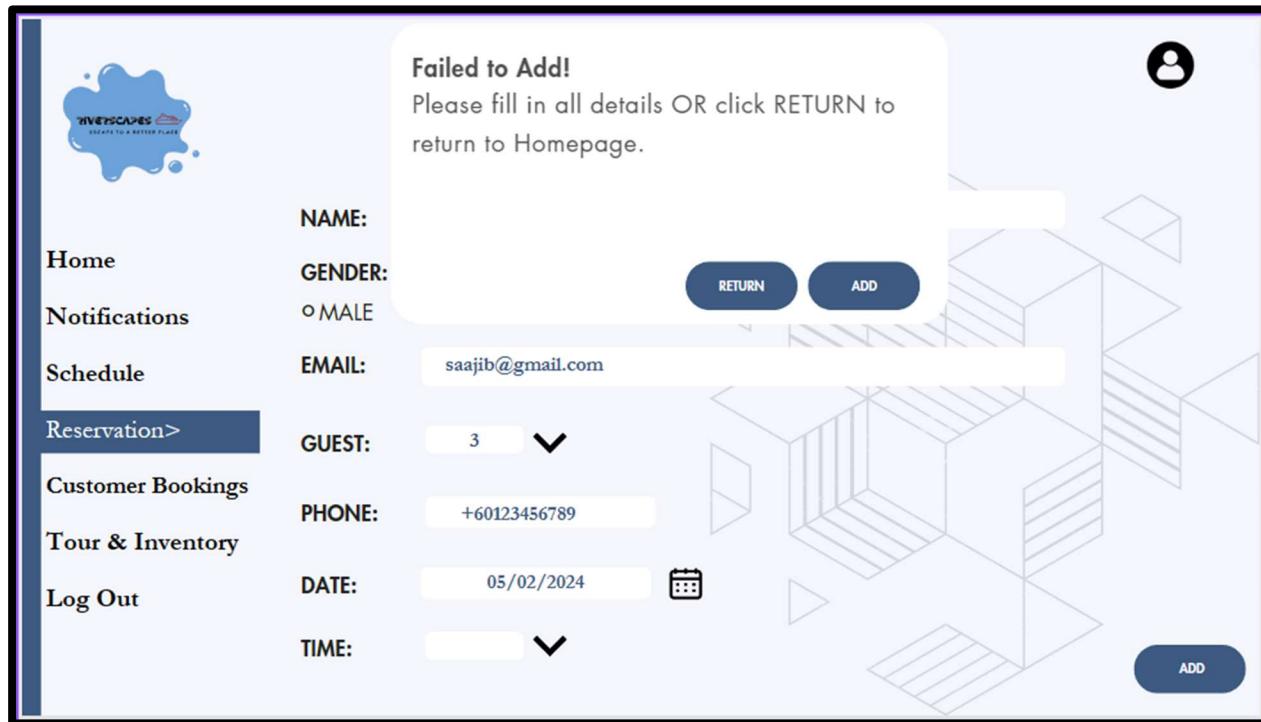
### 7.1.3.11 Add Reservation Confirmation Page

Successfully Added!  
Click ADD to continue adding reservation.  
Click RETURN to return to homepage.

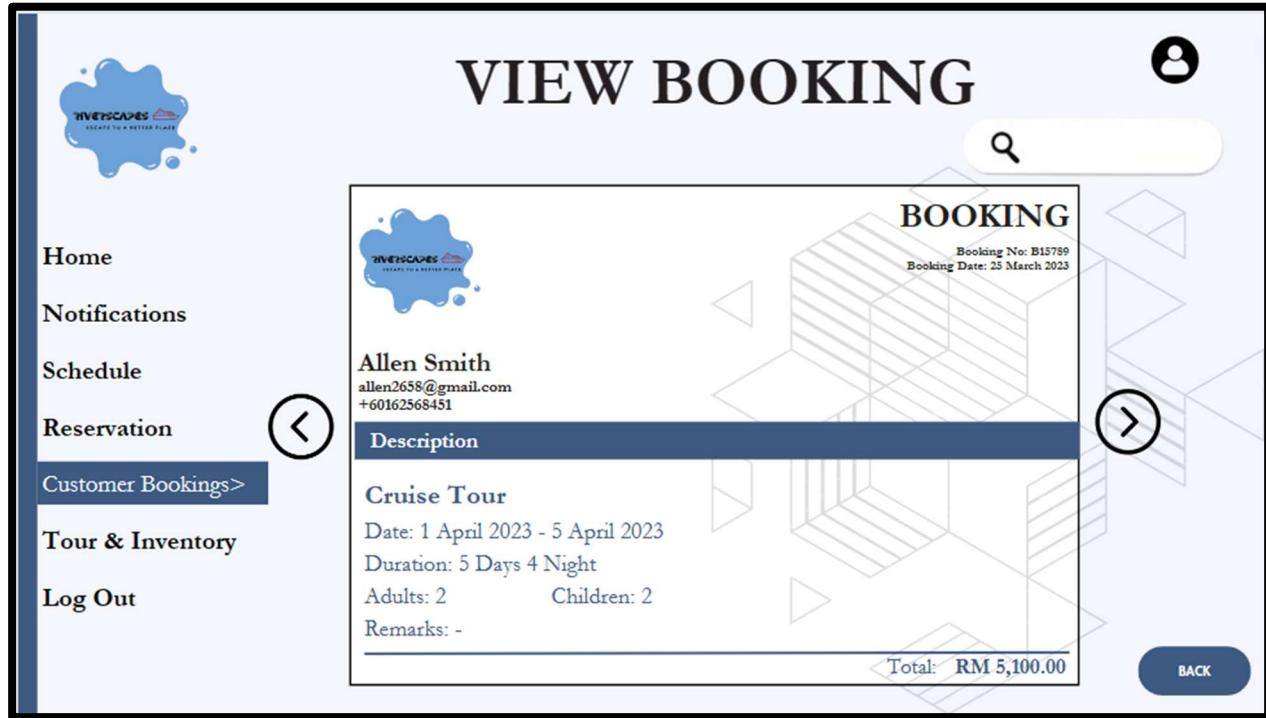
NAME:	
GENDER:	<input type="radio"/> MALE <input checked="" type="radio"/> FEMALE
EMAIL:	saajib@gmail.com
GUEST:	3
PHONE:	+60123456789
DATE:	05/02/2024
TIME:	11:30am

**RETURN**    **ADD**

<b>SCREEN NAME</b>	Add Reservation Confirmation Page
<b>INPUT</b>	Details of the customer, date, and time for reservation
<b>OUTPUT</b>	Reservation added success message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the “ADD” button to let the staff know that the reservation details have successfully been added in the system. If the staff wants to continue adding a reservation, the staff can click the “ADD” button in the pop-up message, if not they can click the “RETURN” button to return to the homepage.

7.1.3.12 Add Reservation Rejected Page

<b>SCREEN NAME</b>	Add Reservation Rejected Page
<b>INPUT</b>	Details of the sender, receiver, subject, and content of the email
<b>OUTPUT</b>	Reservation failed to add message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the “ADD” button to let the staff know that the reservation details have failed to be added in the system. This is due to some details being left empty. If the staff wants to continue adding a reservation, the staff can click the “ADD” button in the pop-up message, if not they can click the “RETURN” button to return to the homepage.

7.1.3.13 View Customer Booking Page

<b>SCREEN NAME</b>	View Customer Booking Page
<b>INPUT</b>	“Customer Bookings” at menu bar
<b>OUTPUT</b>	All bookings are made by customers and information such as customer name, email, phone number, booking description, and total amount to pay
<b>DESCRIPTION</b>	This page shows all the necessary information in a customer’s booking. Staff can click the arrow key to view more customer bookings or search by keyword in the search box. Staff can also choose to download the booking in pdf format or click “BACK” to return to previous page.

7.1.3.14 Add Tour & Inventory Page

**TOUR & INVENTORY** 8

**TOUR NAME:** MELAKA CRUISERS

**TOUR DESCRIPTION:** A river cruise is a voyage along inland waterways, often stopping at multiple ports along the way. Since cities and ...

**TOUR ROUTE:** ADD IMAGE

**PIC:** GWENDOLYN MCLENNAN

**ASST. PIC:** JEFFREY CHEAH

**TOUR PRICE:** RM 1235/person

**AVAILABLE DATES:** 03/01/24 - 19/02/24 CALENDAR

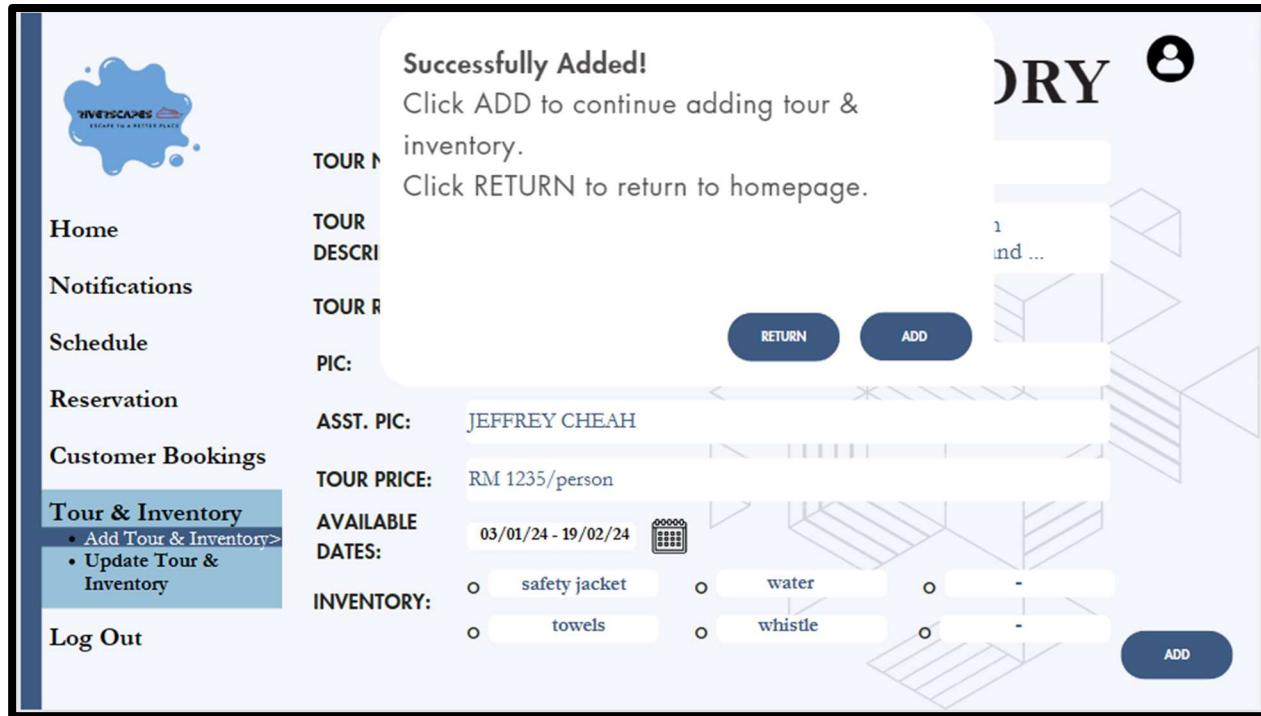
**INVENTORY:**

<input type="radio"/> safety jacket	<input type="radio"/> water	<input type="radio"/> -
<input type="radio"/> towels	<input type="radio"/> whistle	<input type="radio"/> -

ADD

**Home** **Notifications** **Schedule** **Reservation** **Customer Bookings** **Tour & Inventory** • Add Tour & Inventory  
• Update Tour & Inventory **Log Out**

<b>SCREEN NAME</b>	Add Tour & Inventory Page
<b>INPUT</b>	“Add tour & inventory” under “Tour & Inventory” at menu bar
<b>OUTPUT</b>	Input boxes to add in details to tour and inventory such as tour name, description and route, person in charge, assistant person in charge, tour price, available dates and list of inventories
<b>DESCRIPTION</b>	This page allows staff to add in the details to add into tour and inventory in the system. Staff are given an option to add an image to show the tour route. Once all details are entered, staff must click the “ADD” button to save.

7.1.3.15 Add Tour & Inventory Page (Addition Confirmation)

<b>SCREEN NAME</b>	Add Tour & Inventory Page (Addition Confirmation)
<b>INPUT</b>	Details of the tour & inventory
<b>OUTPUT</b>	Tour & inventory successfully added message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the "ADD" button to let the staff know that the details have successfully been added into the system. If the staff wants to continue adding tour & inventory, the staff can click the "ADD" button in the pop-up message, if not they can click the "RETURN" button to return to the homepage.

7.1.3.16 Add Tour & Inventory Page (Addition Reject Notice)

The screenshot shows a user interface for managing tours and inventory. On the left, there's a sidebar with links like Home, Notifications, Schedule, Reservation, Customer Bookings, and a prominent 'Tour & Inventory' section which is currently selected. This section contains two items: 'Add Tour & Inventory' and 'Update Tour & Inventory'. Below these are 'TOUR PRICE:', 'AVAILABLE DATES:', and 'INVENTORY:' fields. The 'INVENTORY:' field contains a grid of items: safety jacket, water, towels, and whistle, each with a radio button. A large pop-up message in the center says 'Failed to Add!' and instructs the user to fill in all details or click 'RETURN' to return to the homepage. There are 'RETURN' and 'ADD' buttons at the bottom of the pop-up.

<b>SCREEN NAME</b>	Add Tour & Inventory Page (Addition Reject Notice)
<b>INPUT</b>	Details of the tour & inventory
<b>OUTPUT</b>	Tour & inventory failed to be added message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the “ADD” button to let the staff know that the details has failed to be added into the system. This is due to some information not being added. If the staff wants to continue adding tour & inventory, the staff can click the “OK” button in the pop-up message, if not they can click the “RETURN” button to return to the homepage.

7.1.3.17 Update Tour & Inventory Page

**TOUR & INVENTORY**

**TOUR NAME:** MELAKA CRUISERS

**TOUR DESCRIPTION:** A river cruise is a voyage along inland waterways, often stopping at multiple ports along the way. Since cities and ...

**TOUR ROUTE:**

**PIC:** GWENDOLYN MCLENNAN

**ASST. PIC:** JEFFREY CHEAH

**TOUR PRICE:** RM 1235/person

**AVAILABLE DATES:** 03/01/24 - 19/02/24

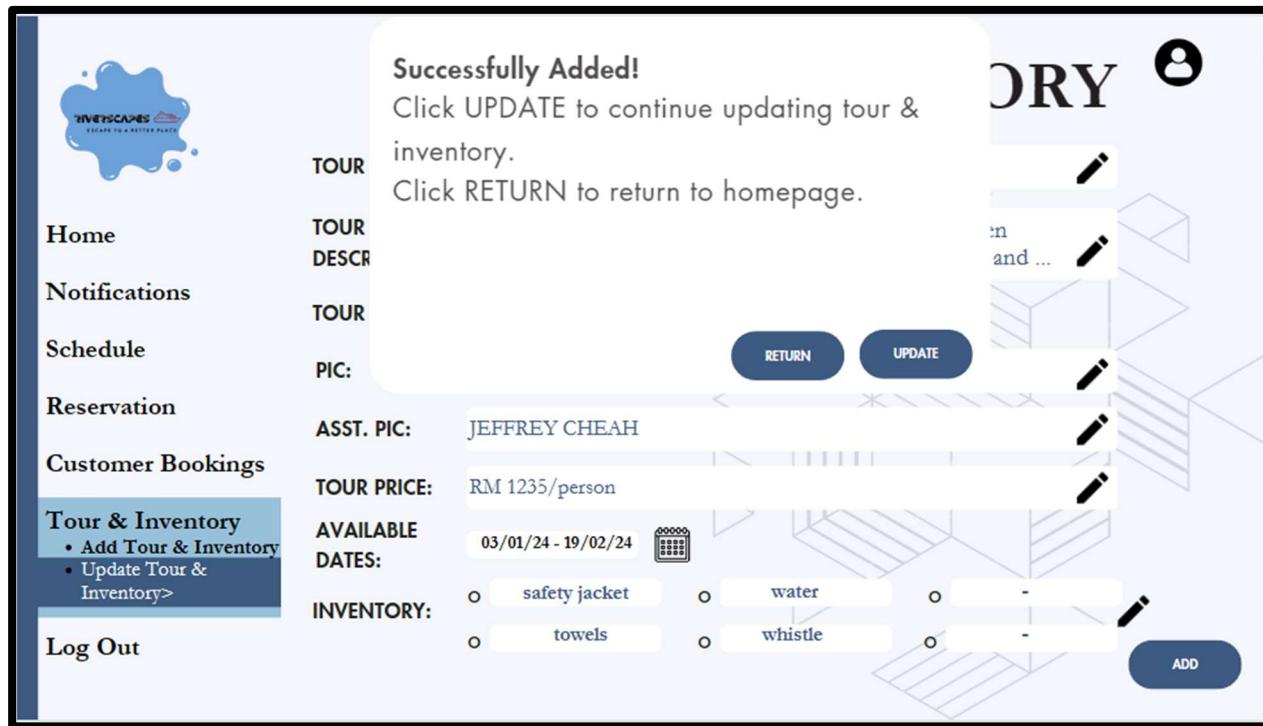
**INVENTORY:**

<input type="radio"/> safety jacket	<input type="radio"/> water	<input type="radio"/>
<input type="radio"/> towels	<input type="radio"/> whistle	<input type="radio"/>

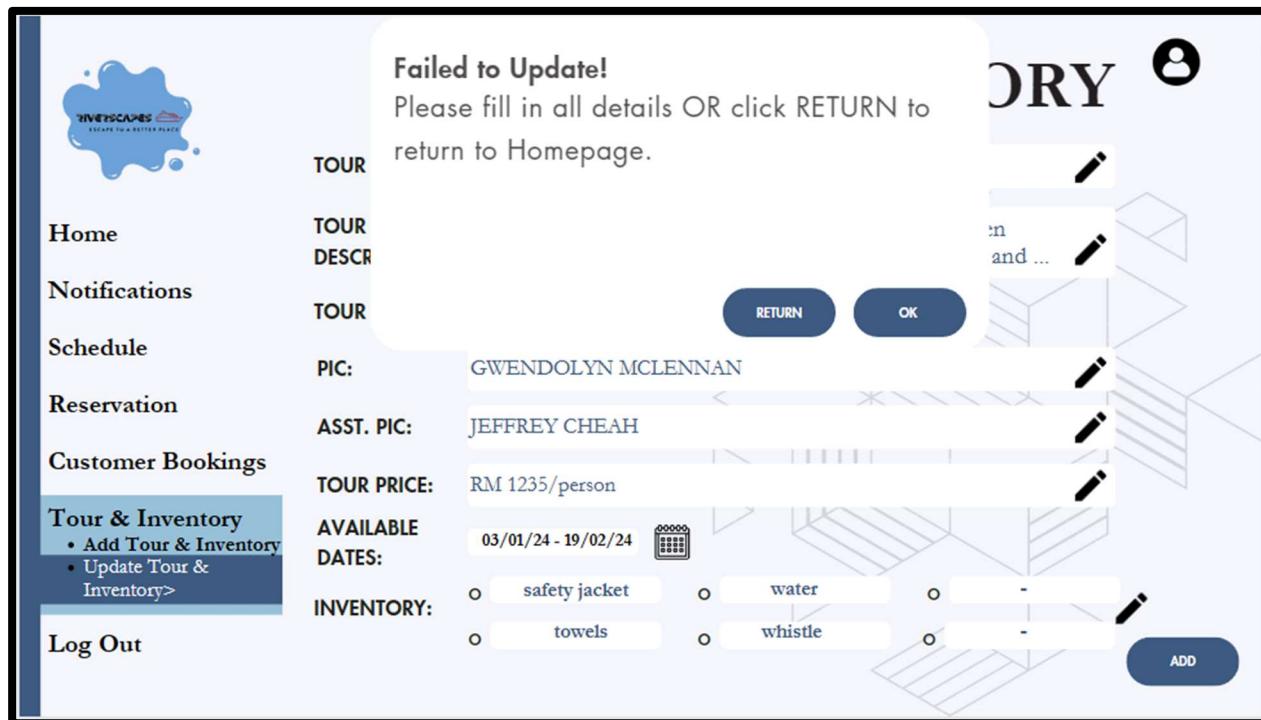
**Home** **Notifications** **Schedule** **Reservation** **Customer Bookings** **Tour & Inventory** • Add Tour & Inventory • Update Tour & Inventory> **Log Out**

<b>SCREEN NAME</b>	Update Tour & Inventory Page
<b>INPUT</b>	“Update tour & inventory” under “Tour & Inventory” at menu bar
<b>OUTPUT</b>	Input boxes to update details to tour and inventory such as tour name, description, route, person in charge, assistant person in charge, tour price, available dates, and list of inventories
<b>DESCRIPTION</b>	This page allows staff to update the details of the existing tour and inventory in the system. Staff are given an option to click the pencil icon to update a specific detail. Once all details are entered, staff has to click the “UPDATE” button to save.

### 7.1.3.18 Update Tour & Inventory Confirmation Page



<b>SCREEN NAME</b>	Update Tour & Inventory Confirmation Page
<b>INPUT</b>	New details of the tour & inventory
<b>OUTPUT</b>	Tour & inventory successfully updated message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the “UPDATE” button to let the staff know that the details has successfully been updated in the system. If the staff wants to continue updating tour & inventory, the staff can click the “UPDATE” button in the pop-up message, if not they can click the “RETURN” button to return to the homepage.

7.1.3.19 Update Tour & Inventory Reject Page

<b>SCREEN NAME</b>	Update Tour & Inventory Reject Page
<b>INPUT</b>	Details of the tour & inventory
<b>OUTPUT</b>	Tour & inventory failed to be updated message
<b>DESCRIPTION</b>	This page shows a pop-up message that appears after clicking the “ADD” button to let the staff know that the details has failed to be updated in the system. This is due to some information not being added. If the staff wants to continue updating tour & inventory, the staff can click the “OK” button in the pop-up message, if not they can click the “RETURN” button to return to the homepage.

7.1.3.20 Staff ID and Password Page

The screenshot shows a user profile page with the following details:

- NAME:** JEFFREY TOH
- GENDER:**
  - MALE
  - FEMALE
- EMAIL:** jeff0641@gmail.com
- PHONE:** +60123456543
- STAFF ID:** RC021
- PASSWORD:** qwert3456@#A
- DATE JOINED:** 03/06/2021

A "BACK" button is located at the bottom right of the page.

<b>SCREEN NAME</b>	Staff ID and Password Page
<b>INPUT</b>	Profile icon at the top right corner of the website
<b>OUTPUT</b>	Account details such as staff name, gender, email, phone number, staff id, password, and date joined
<b>DESCRIPTION</b>	This page displays personal information about the staff. Staff can also refer to their id and password in this page. A “BACK” button is there for staff to return to their previous page.

### 7.1.4 Accountant

#### 7.1.4.1 View Financial Data Page



<b>SCREEN NAME</b>	View Financial Data Page
<b>INPUT</b>	"Financial Data" at menu bar
<b>OUTPUT</b>	List of financial reports of specific times
<b>DESCRIPTION</b>	This page shows the financial data of a certain time. Accountant can click the year at the top of the page or search for a specific time to view the data. Accountant can click "BACK" to return to the previous page. By clicking on the data, the page will lead to the financial report.

7.1.4.2 Show Financial Report Page

**FINANCIAL REPORT**

	2017 \$	2016 \$
<b>INCOME</b>		
Subscriptions	899	1,105
Advertising	258	-
Donations	136	145
Entry fees from annual show	2,125	4,785
General fundraising	4,158	4,700
Interest	26	27
<b>Total Income</b>	<b>7,602</b>	<b>10,762</b>
<b>EXPENSES</b>		
Administration costs	204	204
Bank fees	45	45
Cost of annual show	1,000	1,500
Instructor fee	120	-
Insurance	90	90
Postage	10	10
Printing	10	10
Rates	10	10
<b>Total expenses</b>	<b>1,489</b>	<b>1,869</b>
<b>Net surplus/(loss)</b>	<b>6,113</b>	<b>(8,893)</b>

**Home**      **Financial Data**      **Log Out**

**DOWNLOAD PDF**      **BACK**

<b>SCREEN NAME</b>	Show Financial Report Page
<b>INPUT</b>	“Financial report” at menu bar
<b>OUTPUT</b>	Financial Report of the chosen time
<b>DESCRIPTION</b>	This page shows the financial report of a specific time chosen by the accountant. The accountant can choose to download the report by clicking “DOWNLOAD PDF” or return to the previous page by clicking “BACK”.

## 7.2 Concepts and Principles

### 7.2.1 Input Interface Design

#### 7.2.1.1 Login Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Login Page	Simplicity	There are not many components on the login page, therefore, the customers would not get distracted by other elements. The only functions available on this page are login, forget password and register account.
	Accuracy	The arrangement and the connection of the input and output is accurate which allows the users to log in to their account successfully. Besides, it also prevents errors and problems from happening.
	Easy to Use	The design of the login page is straightforward. Thus, the user doesn't have to spend time to find the input forms.

7.2.1.2 Reset Password Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Reset Password Page	Simplicity	The reset password page has a simple design that only consists of essential components such as email ID and OTP input forms as well as a "NEXT" button. This could reduce the visual fatigue of the user.
	Easy to Use	Instructions are stated clearly for the users. Therefore, this could guide the user to proceed to the process of resetting the password without any difficulties.
	Effectiveness	The correctness of the OTP will be determined and a pop-up message will also be displayed based on different results. These features could protect the user's privacy as they could prevent unknown users from logging into the account.

7.2.1.3 Registration Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Registration Page	Simplicity	The registration page has a simple design with clear labels and an intuitive layout. This enhanced the user experience by eliminating unnecessary complexity and ensuring easy and efficient data entry.
	Accuracy	Input validation ensures that data is entered accurately. Accurate information is critical for user accounts, as it minimizes errors and increases the overall reliability of the enrollment system.
	Consistency	Maintaining consistency in form elements, labels, and overall design promotes a consistent user experience and minimizes cognitive load. Additionally, consistent patterns throughout the registration page make the process more intuitive and efficient.

#### 7.2.1.4 Request Booking Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Request Booking Page	Easy to Use	The design of the request booking page is simple and user-friendly due to clear navigation and straightforward instructions. Thus, it has enhanced the user experience, making it accessible and hassle-free.
	Attractiveness	Attractive design attracts attention and keeps users engaged. For instance, the Request Booking page has visually appealing elements, colours, and well-organized content that encourages user interaction.
	Effectiveness	An effective booking page achieves its goal quickly. Processes should be streamlined to allow users to complete bookings efficiently. This promotes satisfaction and encourages repeat use.

7.2.1.5 Payment Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Payment Page	Accuracy	The payment page displays the correct amounts along with the necessary details to ensure precise financial transactions. In addition, accurate data prevents errors and promotes a secure payment process.
	Effectiveness	The payment process has been optimized for efficiency to enhance and improve overall effectiveness. This is achieved by streamlining the input fields, prioritizing the most important information, and guiding the user seamlessly through each step.
	Simplicity	The payment page has been designed in a simple and easy-to-use way by removing unnecessary complexity. Clear instructions are provided, and the information is presented concisely. This has created a straightforward and intuitive payment experience for users.

7.2.1.6 Staff Status Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Staff Status Page	Easy to Use	Easy navigation has been provided to users to prioritize user-friendly interactions. Other than that, clear layouts and buttons are also provided for the users to access and understand their status information without confusion.
	Simplicity	The staff status page has been designed in a simple and basic way to minimize complexity. In addition, the content has been stated clearly and concisely. Unnecessary elements have also been removed to improve overall usability and comprehension.
	Accuracy	The accuracy of the content has been maintained by implementing reliable data sources, validation mechanisms, and error-checking processes. Additionally, this promotes trust and reliability in the employee status page.

7.2.1.7 Notification Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Notification Page	Simplicity	The design of the notification page is clean and simple. The simplified information presentation creates an organized notification page that users can navigate effortlessly. In addition, the notification page uses buttons that are easy to understand.
	Attractiveness	The notification page utilized visually appealing design elements to capture the attention of its audience. For example, the use of various colors and typography in the component has made the page visually appealing, prompting users to engage with and respond to notifications.
	Accuracy	The notification ensured timely and accurate delivery of information. It prioritized delivering precise notifications to promote trust and confidence in the presented updates.

7.2.1.8 Update Schedule Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Update Schedule Page	Simplicity	The page displays input boxes immediately after clicking on the necessary button at the menu bar. Once all information is filled in, a button to request an update is available.
	Effectiveness	This page will inform the staff if the update request have been successfully sent. Besides that, the update will be done according to the staff ID, therefore there won't be any mix ups with other staff.
	Easy to Use	The update schedule page is very straight forward because it instantly displays the necessary details to request for an update. This will avoid any confusion therefore avoiding any mistakes in updating the schedule.

7.2.1.9 Add Reservation Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Add Reservation Page	Simplicity	The page has an organized layout and clear navigation. Staff can easily add in customers reservation faster because of consistency.
	Accuracy	Accuracy depends on its careful design, which makes accurate and exact data entry easier. This entails developing user-friendly forms with precise instructions, validation checks to avert mistakes, and enlightening feedback to ensure accurate submission.
	Easy to Use	Staff members may easily add customer reservations with little effort and a lower risk of error by streamlining forms and displays, offering straightforward navigation, and removing needless complexity.

7.2.1.10 Add Tour & Inventory Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Add Tour & Inventory Page	Accuracy	Staff are guided to appropriately submit information by the design's user-friendly forms with clear labels. Furthermore, validation checks ensure that the tour and inventory data entered into the system is accurate and precise by preventing errors.
	Consistency	When tour information and inventory details are arranged consistently, employees may easily navigate and comprehend pertinent areas of the website. This increases efficiency in managing tours and inventory within the system by encouraging a more intuitive user experience, and minimizing errors.
	Easy to Use	Staff members can manage the system more quickly and easily when it has an intuitive interface, which lowers the learning curve. This reduces the possibility of errors and speeds up the process of adding tour details and maintaining inventory, resulting in a more efficient workflow.

7.2.1.11 Update Tour & Inventory Page

PAGE NAME	INPUT DESIGN PRINCIPLE	EXPLANATION
Update Tour and Inventory Page	Accuracy	While dropdown menus, input validation, and clear, labelled fields can reduce errors, real-time feedback methods and confirmation prompts provide staff members confidence that their adjustments are correct. The webpage assists staff in preserving accurate tour and inventory information within the system by placing a high priority on correctness in design.
	Consistency	Updating the tour and inventory is important to maintain consistency. Any new item or tour should be immediately updated to avoid spreading misinformation to the customers.
	Easy to Use	Staff only have to click the pencil icon when they want to update certain details. This concept saves time and will not lead to duplicate information.

### 7.2.2 Output Interface Design

#### 7.2.2.1 Login Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Login Page	Designing output to serve a specific purpose	The specially designed login page helps facilitating secure user authentication. All the visual and interactive elements designed on the page are used to simplify and streamline the login process.
	Making output meaningful to the user	The development team prioritized clarity and user-friendly elements in the design of the login page. As a result, the login process is easily understandable for users due to the use of straightforward language, clear labels, and concise error messages.
	Providing appropriate output distribution	The login interface of Riverscapes has been optimized by the development team, allowing the login interface to meet the requirements and preferences across various platforms such as web-based login or mobile application.

### 7.2.2.2 Reset Password Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Reset Password Page	Designing output to serve a specific purpose	Reset password page clearly provides the necessary input fields for users to enter their information, guiding the users through the password recovery process.
	Making output meaningful to the user	The Reset Password page simplifies the process of resetting a password by guiding the user through the entire process with clear and simple instructions and error messages, as the user can easily understand each step.
	Delivering the appropriate quality of output	The Reset Password page maintains a trustworthy appearance throughout the process as it provides accurate and reliable information, including validation of user input and confirmation of the password reset.

### 7.2.2.3 Registration Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Registration Page	Designing output to serve a specific purpose	Facilitating and streamlining the user registration process are always the main requirements when developing the registration page. The Registration page clearly shows all the information required and necessary steps for registration.
	Making output meaningful to the user	Clear and simple languages, and relevant instructions are provided on the registration page, ensuring the user can understand the registration process easily.
	Delivering the appropriate quality of output	The registration page will provide users with accurate and reliable information and feedback. If the user input is invalid, the registration page will display an error message and prompt the user to re-enter.

#### 7.2.2.4 Request Booking Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Request Booking Page	Designing output to serve a specific purpose	The primary goal in designing the current request booking page is to streamline the booking process. The page offers a user-friendly interface, making it easy for users to submit booking requests.
	Making output meaningful to the user	Clear language and relevant information are provided on the request booking page, allowing the users to understand the details such as booking options easily.
	Delivering the appropriate quality of output	High quality output is provided in request booking page. Accurate and reliable information such as real-time feedback on the booking status, error messages and booking confirmation messages will be shown to facilitate the booking process.

7.2.2.5 Payment Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Payment Page	Designing output to serve a specific purpose	The development team aims to develop and create a payment page which will facilitate and streamline the payment transaction process. The payment page will only prompt the user to enter the information needed to complete the payment.
	Making output meaningful to the user	Clear language and relevant information such as total amount, payment method will be shown on the payment page, ensuring the users can understand the information and procedures easily.
	Delivering the appropriate quality of output	Accurate and reliable real-time feedback such as transaction status and payment confirmation messages will be shown on the payment page, aiming to increase the user experience during the payment transaction.

7.2.2.6 Staff Status Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Staff Status Page	Designing output to serve a specific purpose	The Staff Status page will display accurate and clear information about staff status. Relevant details will be displayed on the screen, making it easy for users to quickly understand the information they need.
	Making output meaningful to the user	The use of visual elements and clear language helps in conveying the status of staff to the user effectively.
	Delivering the appropriate quality of output	The system guarantees the quality of outputs by employing mechanisms that consistently update staff status data in real time, ensuring users have access to precise and trustworthy information.

7.2.2.7 Notification Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Notification Page	Designing output to serve a specific purpose	When designing the notification page, the developers have ensured that the users can easily understand the nature of the messages.
	Making output meaningful to the user	The notification page employs clear language and appealing visual elements, making it easy for users to understand how to read notifications effortlessly.
	Delivering the appropriate quality of output	The notification page will update the contents and notifications regularly, allowing the users to read the up-to-date notification.

7.2.2.8 Update Schedule Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Update Schedule Page	Designing output to serve a specific purpose	The page clearly shows the staff if the request has been accepted or rejected therefore staff are aware that their part has been complete.
	Making output meaningful to the user	The language used in the page shows appreciation to the user for requesting through the website.
	Delivering the appropriate quality of output	The page will constantly update the staff if the schedule has been successfully updated or it is still pending. It allows staff to refresh the page to make sure there is no glitch in the web.

7.2.2.9 Add Reservation Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Add Reservation Page	Designing output to serve a specific purpose	This page provides an intuitive user interface that leads staff through the reservation process with ease, guaranteeing a successful and seamless reservation.
	Making output meaningful to the user	This page shows relevant, and brief information. As a result, staff can finish their reservation and feel informed throughout the process. This guarantees that staff understand their progress, available options, and potential problems.
	Delivering the appropriate quality of output	Confirmations, and error messages that aid in troubleshooting, and prompt reservation status updates are all components of a high-quality output experience that staff can rely on.

7.2.2.10 Add Tour & Inventory / Update Tour & Inventory Page

PAGE NAME	OUTPUT DESIGN OBJECTIVE	EXPLANATION
Add / Update Tour & Inventory Page	Designing output to serve a specific purpose	This page outputs emphasize the tour's and inventory specifics, such as the person in charge, and the list of available inventory. This should encourage reservations while guaranteeing realistic expectations, ultimately resulting in positive travel experiences for customers.
	Making output meaningful to the user	This page is important as it shows necessary details about the tour to the customers.
	Delivering the appropriate quality of output	Confirmations, and error messages that aid in troubleshooting, are all components of a high-quality output experience that staff can rely on. This can avoid mistakes such as duplicate information or incomplete details.

## **8.0 Requirement Gathering**

### **8.1 Interview (JOSHUA EMMANUEL KC SATHASIVAM - TP070067)**

Interviews are a popular requirement gathering approach that involves direct engagement between the company and stakeholders like Tiffany and James and "Riverscapes" to gather information and requirements for the new information system. Interviews are often conducted to gain a more thorough understanding of the challenges encountered in the present system in order to design a more effective information system capable of resolving the existing issues. Interviews can be carried out either in person or online. For this project, an in-person interview with Tiffany and James will be conducted to facilitate the complete requirement gathering process for the new system.

#### **8.1.1 Benefits**

##### **1. Comprehensive understanding:**

Interviews allow for in-depth conversations, which provide a thorough insight of the business processes, difficulties, and expectations. Tiffany and James can describe their requirements, ideas, and worries in detail for Riverscapes (Brooke, 2020).

##### **2. Establishing Rapport:**

The interview method allows the project team and stakeholders to establish rapport. A good relationship encourages open communication, which aids in the clarification of any doubts or misconceptions that could emerge throughout the requirement gathering process. It enables for prompt feedback and further explanation of any uncertain areas, making it easier for Tiffany and James to voice their thoughts and issues to Riverscapes (Brooke, 2020).

**3. Real-Time Engagement:**

Interviews provide real-time engagement, allowing Riverscapes to explore further into certain areas of interest. Additional questions can be asked to establish a complete grasp of River Cruise (RC) business operations in order to create a more efficient and reliable system (Brooke, 2020).

**4. Identification of Stakeholder Expectations:**

Interviews aid in determining and recording stakeholder requirements and preferences, which is critical for a successful project. Understanding Tiffany, James, and other stakeholders' demands is vital for developing a system that satisfies their requirements (Brooke, 2020).

### 8.1.2 Setbacks

#### **1. Time-consuming:**

Interviews may be tedious, particularly when working with occupied stakeholders such as Tiffany and James. This could result in restricted time for accumulating requirements and most likely bottlenecks in the project time frame (Marshall, 2021).

#### **2. Biased Replies:**

Tiffany and James may deliver biased replies based on their individual opinions and insights. To establish a more accurate context, Riverscapes must evaluate information from interviews using additional requirement gathering methods (Marshall, 2021).

#### **3. Limited Opinions:**

Interviews reveal information mostly from the opinions of the interviewees. Other stakeholders, such as Devi, consumers, or staff, may offer vital insights that cannot be obtained through interviews alone (Marshall, 2021).

#### **4. Difficulties Recalling Information:**

Stakeholders might experience difficulties remembering certain information or may be sceptical of certain components of the business operations. This may result in missing or incorrect details being obtained throughout the interview (Marshall, 2021).

### 8.1.3 Conduct of Investigation Method

Interviews are potentially an important requirement gathering method for comprehending Tiffany and James' demands, requirements, and barriers. In this scenario, interviewing Tiffany and James, the business owners of River Cruise (RC), will give significant details regarding their present operations, issues, and proposed modifications for the Riverscapes system. The following are some steps to conducting an investigation using interviews:

#### **Step 1:**

##### **Determine The Main Stakeholders:**

Determine the significant stakeholders who will give beneficial insights regarding the requirements of the system. Tiffany, James, Devi, along with some frequent customers from River Cruise (RC) are possible stakeholders in this investigation for the upcoming Riverscapes system.

#### **Step 2:**

##### **Preparation for the Interview:**

Prepare a set of open-ended questions addressing various areas of River Cruise's processes, issues, and proposed modifications. These questions might cover issues such as present reservation processes, scheduling problems, consumer feedback, the efficacy of social media promotion, and segments for possible Riverscapes system enhancements.

#### **Step 3:**

##### **Arrange and Conduct Interview:**

Plan interview with important stakeholders such as Tiffany, James, and Devi. Start off the interview by discussing the goal and extent of the Riverscapes project. Ask open-ended questions and allow stakeholders to voice their opinions, problems, and suggestions for improvement.

**Step 4:****Document the Findings:**

During the interviews, take precise notes, including significant takeaways, problem areas, and recommendations. In addition, after conducting the interview, verify your findings by summarizing important findings and, if necessary, seeking clarification from Tiffany, James, and Devi. Furthermore, making sure that the specifications laid out are in line with the entire objectives of Riverscapes and the allocated funds.

**Step 5:****Post-Interview Evaluation:**

Determine the common themes, difficulties, or desired specifications mentioned by Tiffany, James, and Devi. Besides that, emphasize discovered challenges and enhancements according to their influence on regular operations and company objectives.

**Step 6:****Feedback Stage:**

Set up an additional meeting with Tiffany and James to further clarify the findings while outlining their suggested requirements for Riverscapes. On top of that, solicit their opinion and feedback on any areas that may require more clarification or modification to guarantee that the specifications sufficiently correspond to their requirements and desires for Riverscapes.

#### 8.1.4 Interview Questions

1. How do you foresee the system impacting the growth of River Cruise (RC)?
2. Are there any particular modifications or enhancements you'd want to see in the new system?
3. Would you be able to describe the current booking procedure for guided tours, kayak rentals, and instructing sessions?
4. Can you explain precisely how the inventory, which includes cruise ships, kayaks, and accessories, is now handled?
5. What difficulties do you encounter while organising the schedules, particularly when there are numerous bookings?
6. What obstacles or constraints have you experienced with the present system, regarding the area of operations and customer experience?
7. How do you assess the efficacy of your existing social media advertising initiatives?
8. What customer data do you currently gather, and how do you make use of it?
9. How do customers make bookings presently, and what is the average customer satisfaction rate?
10. Are there any particular customer demands or feedback that you believe should be taken into account while upgrading the system?
11. How do you deal with bookings made last minute and in-person customers?
12. Are there any examples of disputes between bookings and availability that led to challenges?
13. How can the system assist with planning of guided tours and instructing sessions?
14. How is the accounting software now utilised to handle River Cruise (RC's) financial matters?
15. Do you have any particular developments or possibilities for future growth in mind?

## **8.2 Document Review (GOH XIN TONG - TP069712)**

Document review, one of the ways to gather valuable information through existing documents and materials. The method of using documents as references could be very useful especially when looking for information background history. Besides, it could also be helpful in determining the reflection of program plan based on the program implementation and development of data collection tools for evaluation (Better Evaluation, 2018). Internal documentation and external documentation are the two types of documentation that need to be studied in document review. Internal documentation usually refers to documents that are used to support internal processes for the employees of the organization, conversely, external documentation refers to documents that provide guidelines or instructions to the customers or partners. Moreover, internal documentation would be more focused on processes, workflow and internal policies. Meanwhile, external documentation would be more on features, usage, and benefits<sup>1</sup> (Prabhakaran J., 2023).

Other than that, documentation review is also a necessary process that can be used for various scenarios, such as research and project management. Firstly, documentation review would be used in research as it could help provide a better understanding of the project and avoid work redundancy. Besides, it could be used to ensure that the research is conducted systematically. On the other hand, documentation review is important in project management because it can improve communication among team members. For instance, it allows everyone to know the project well. Other than that, it can also manage and track the project to ensure that it runs smoothly and aligns with its objectives (Briscoe, T et al., 2000).

### 8.2.1 Benefits

#### **1. Gather Historical Background:**

Document review involves the examination and analysis of various materials and facts. Additionally, it allows for the collection of historical background information, which is one of its advantages. Historical background would be important as it could help us to gain knowledge in terms of history, operation, as well as its philosophy. Besides, it also allows the user to have the better understanding about the evolution of the situation. For example, document review could help to keep track the development and the ongoing progress of a project as it would show relevant information that might not be seen in the current document.

#### **2. Provide Accuracy:**

Document review could also ensure the accuracy of the document until it meets the required accuracy standards. This is crucial when it comes to software development or other important projects, as the content should be free from errors so that it can be used for further processing. The information presented would also be user-friendly due to its easily understandable content. Besides, document review is essential for ensuring accuracy and consistency when coming to professional and business contexts. Not to mention, it also helps to enhance the relevance, connection, and understanding of the document.

**3. Provide Standardization:**

Other than accuracy, document review could also improve the standardization of the document. Document standardization involves reducing errors and maintaining the format as well as the procedure of the document from document its creation to storage. It would enhance overall efficiency and save time for the next process. Other than that, the document would be easy to organize and understand. Furthermore, it would allow for better document management, reducing confusion and ensuring the content is clear and organized (Nanganong P, n.d.).

**4. Enable for Analysis:**

Last but not least, document analysis is also one of the benefits of document review. It helps to organize the content and structure of the document, minimizing errors and ensuring it is error-free. Document analysis would require significantly less effort compared to observations or interviews. Besides, the analysis of data would not disrupt the sequence's operation, but it would enhance the operational framework in terms of continuity and efficiency. The analysis of data can be paused and resumed at any time. Moreover, falsification of documents would also not occur when it comes to document analysis (t2informatik, n.d.).

## 8.2.2 Setbacks

### **1. Incomplete:**

Material or documents such as business reports or regulatory documents are manually created by humans based on research or historical records. Therefore, situation such as incomplete content can occur. For example, if all the material comes from the same primary sources, the information we receive from secondary sources may be similar, as they may simply reiterate the same point and opinion.

Besides, the material might provide only less amount of useful information, so it would not be enough to get the information that we are looking for and needed for research purpose. Meanwhile, situation such as incomplete content might also happen in many materials and document, that all the facts and information are not clearly explained, and only brief description, evidence and facts are given.

### **2. Incorrect:**

One of the disadvantages of document review is the presence of incorrect content. When the purpose of the research is to generate profit, rather than primarily for the purpose of advancing knowledge, the researchers' priority may be to create an attractive story and attract more reader. Therefore, the content of the document or material might be compromised. Perhaps, the content would prioritize entertainment value over accuracy and correctness.

Nevertheless, the document may contain inaccurate or incorrect information in certain situations. When documents with invalid dates or outdated are used for research, the incorrect content can impact the accuracy and the correctness of the entire study. Additionally, the researchers may not prioritize the agenda when conducting the study, which can result in inaccuracies in the content. Thus, it would also increase the challenges when having research to identify the most relevant and suitable content.

**3. Time-Consuming:**

Documentation review is one of the most time-consuming methods for fact-finding, as the process is complicated, especially when dealing with a large volume of documents. Document review requires a significant amount of energy and focus in order to identify all errors. However, this can sometimes lead to errors being overlooked or result in an incomplete review of documents.

The overview document review starts with scanning the document, looking for typos and grammatical mistakes. Then, every single component in the document, including the headings and paragraphs, would also be observed to avoid poor readability, information gaps, and logical errors. Besides, the structure and formatting style of the document will be identified and emphasized.

### 8.2.3 Conduct of Investigation Method

As Tiffany and James are looking for a way to update their system, detailed information are required for the creation of the new system. Meanwhile, Riverscapes development team chose document review as the method to gather the information. Planning, preparation, review, quality control as well as validation and approval are the five steps that involved in document review.

#### **1. Planning:**

The process of document review starts with the Riverscapes development team, along with Tiffany and James to plan the objectives and purpose of the document review. The scope of the review will also be determined by identifying the types of documents that will be assessed. Different roles will be assigned to different members in the development team. Gathering documents would also be necessary to collect all the required information for future processing. Various methods are used by the development team to obtain the necessary documents, including the use of a Document Management System (DMS) and requesting hard copies from the author. Meanwhile, the Riverscapes development team had also created a timeline to identify the deadlines for each stage of the review process.

#### **2. Preparation:**

When it comes to the preparation stage, the Riverscapes development team needs to identify and review the documents that are needed to gather them all together. Then, the Riverscapes development team needs to create a document management system in order to track and organize the process. Other than that, the development team also would have discussion with Tiffany and James to identify the guidelines and standards.

**3. Review:**

In the review stage, the development team would begin the process of reviewing all the documentation by adhere to the guidelines and standards that were established in the previous stages. This process typically involves reading, analyzing, categorizing, coding, and finally tagging documents. Besides, the Riverscapes development team would also identify the completeness and accuracy of the documents.

**4. Quality Control:**

After analyzing and reviewing all the documentation, the development team will begin to assess the quality and accuracy of the review results. Quality control is essential for the development team as it helps to prevent errors and mistakes in documents after analyzing and reviewing a large amount of information. Besides, they would also verify that all the documents are following the guidelines and standards.

**5. Validation and Approval:**

Validation and approval would be the final phase for the development team. They would only need to prepare a report for Tiffany and James summarizing the results and findings of the review. Reports that would be prepared by the development team include the quality control report, validation report, compliance report, and the final document. Overall, the Riverscapes development team would also discuss their suggestions, recommendations, and improvements with Tiffany and James in order to provide them ideas to enhance their business (Cavintek, 2023).

#### 8.2.4 Document Review Questions

To better assist Tiffany and James, the development team would continue with the research of River Cruise with the method of document review. Various questions had been prepared by the development team to have a better research direction and various aspects to focus on.

1. What are the main problems and challenges that River Cruise faced in the past system, and they would like to solve?
2. How often will Tiffany record the details to the database, and is there any data that would be more focus for personalized service purposes?
3. How do RC run their inventory system, and what challenges do they face when keep tracking of equipment?
4. How could Tiffany collect the data to identify the preferences of the customer?
5. What is the method used by Tiffany and James to keep track of their business?
6. Did the employee of River Cruise face any difficulties when communicating with customers?
7. What of the method provided to the customer so that they could notify their reservations or other notification?
8. Is there any training provided for RC staff regarding the reservation and other operational tasks?
9. What is the method of RC to gather feedback from the customer in terms of tour experience?
10. Did RC received any feedback from the customer and employees regarding to the current system?

### 8.2.5 Findings

After the development team conducted research on the system using the document review method, they collected some problems and issues. The development team also devised solutions to the problems encountered by Tiffany and James.

1. The development team's initial issue is with Devi's handling of telephone inquiries and reservations. Sometimes, he struggles to manage the situation effectively when there is a high volume of incoming calls, when he is tired from his studies, or when he is not feeling well. This could lead to situations such as providing incorrect information to the customer. In terms of the problems that could be faced by Devi, the development team suggests that the new system should be an auto system that can collect the requests of the customer automatically. Therefore, Devi could handle the request when he is free and will not panic even when he is on leave.
  
2. As Tiffany is considering adding books and videos that are related to kayaking and ecotourism, the development team has found that it might not be a suitable way to do so. For example, books that contain too many pages that the customer might feel bored to read. Besides, young customers might not have the interest and patience to read. Other than that, the books chosen by Tiffany might not meet the requirements and interests of the customer. In the meantime, some customers might also lose their patience when the video is too long. When coming to foreign customers, may also could not understand the accent of the video. Thus, solutions were also given by the development team to solve this problem. Therefore, the development team suggested that the new system should allow Tiffany and James to collect the feedback of the customers to get to know their preferences and their opinions about the system.

3. The third problem that was discovered by the development team was when Tiffany would enter the details such as reservation date, customer details and kayak type into the database when time was enough. This would bring errors and problems when the data needed to be used but has not been added to the database. When Tiffany is adding the details in a rush situation, she might also enter the wrong information. Therefore, the solution given by the development team is the new system should be automated to handle all the data and information. Besides, it also could handle large amounts of data to increase the efficiency of the system and save manpower from doing the same thing twice.
  
4. The last problem that was discovered by the development team is there is conflict between James and Tiffany's reservations to their availability. The problem might occur as the same timing might be chosen by 2 groups of customers, or the reservation time had clashed with their timetable. Thus, the development team think that the new system should be a time tracking system for the schedule of Tiffany and James. Therefore, this could allow the customer to view and avoid choosing the same timing as other people. Besides, it also allows Devi to understand customers' inquiry purposes.

## **8.3 Observation (LIM WEI LUN - TP069058)**

Fact-finding techniques play a crucial role for system analysts when they are reading and collecting accurate and reliable data related to the system. As River Cruise's goal of developing more efficient systems for its business operations demonstrates its commitment to efficiency and optimization, thus the ability to extract and collect meaningful information becomes critical. Observation is one of the fact-finding techniques to study, understand and learn about the system by analyzing, reading and witnessing the activities, processes and behaviors within the system (The McGraw-Hill Companies, 2007). The main objective of carrying out observation fact-finding techniques is to capture real-time data. By observing the activities and processes of the system, the system analysts are able to collect first-hand and real time information about the information, minimizing the risk of relying on hearsay and acquiring inaccurate or misleading data.

### **8.3.1 Benefits**

#### **1. Simplest Method:**

Compared to other fact-finding techniques, observation is known as the most common and simplest method (Choudhurs, n.d.). This is because technical knowledge does not require much when observing the processes and behaviors of the system. Furthermore, compared to other techniques, the observation fact-finding technique's data collection process will be less complicated because it just requires direct observation and recording of the system's behaviors and activities, without other intermediaries like surveys and interviews.

**2. High Accuracy and Reliability:**

The data collected through observation will have a higher accuracy and reliability which helps data analysts and system analysts to make better informed decisions. Compared to other fact-finding techniques such as interviews and questionnaires, observation will give more accurate and real-time data since it involves directly witnessing and experiencing the system or process in action. By using observation fact-finding technique, the risk of respondents' interpretation and memory lapses can be avoided because observation does not rely on the information provided by the respondents.

**3. Helps in Identifying Discrepancies:**

The observation fact-finding technique helps system analysts to identify the discrepancies between the documentation and real actual system. In this situation, the development team of Riverscapes will be able to identify the disparities between the intended design and the actual system, and thus make improvements to the new system. The team needs to ensure that the actual proposed system needs to intend the goals, objectives and functions as expected. This is because discrepancies could result in problems such as low efficiency of the system, deviations from standards and failure to meet and satisfy the needs and expectations of end users of the system, Tiffany and James.

**4. Insight into Natural Settings:**

Through observations, the system analyst will be able to gain a holistic understanding of how the users communicate, interact and conduct activities using the system. It is very crucial to know how the end users naturally interact with the system without the influence of artificial settings. Having natural settings data will ensure that the data collected are applicable to real-world situations. The Riverscapes development team will be able to develop a new system that complies with employees' natural communication and interaction with it. Hence, the system's efficiency can be enhanced, while ensuring that the proposed system is user-friendly.

### 8.3.2 Setbacks

#### **1. Resource-intensive:**

Resource-intensive is the biggest setback of observation fact-finding techniques. Compared to other techniques, observation requires more time to collect and record data. Besides, the data analysts also should observe the target several times to ensure that the data collected is reliable. The report done by Sirris, Lindheim and Askeland in 2022 can prove that observation is a very time-consuming technique (Sirris et al., 2022). The observer might feel tired and stressed or distracted, since the observation process might take a long time and be boring. This might affect the efficiency of data analysts in collecting data.

#### **2. Limited to Observable Behavior:**

Observations are limited to observable behavior is one of the drawbacks of the observation fact-finding technique. This is because the system analysts would not be able to identify and observe the problems of the past and internal states, and this can lead to these issues not being taken and not being addressed and fixed in the new systems. For instance, since River Cruise is going to develop a new system, the development team needs to identify the problems in the existing system. However, the problem of conflict of information provided to Tiffany and James might not be observed by the development team, which might cause the proposed system to use the slow database. It will cause the efficiency of the new system affected.

**3. Subjectivity:**

Lastly, subjectivity is one of the disadvantages of observation fact finding technique. Since the data collected through observation is based on what data analysts observe and record, therefore, the data analysts might record the data with their own personal perspective and inherit bias. This bias might cause inconsistent judgement, as different data analysts will evaluate and judge the same process and behavior differently.

**4. Dependence on Observer's Skills:**

The accuracy of data collected through observation is highly depends on the skills of the observer. Skilled observers will pay close attention and notice important details based on their experience, but less experienced observers might miss these details, making the data less accurate. In addition, experienced observers are less likely to let their personal views influence the data, recording observations without incorporating their own beliefs or expectations.

### 8.3.3 Conduct of Investigation Method

Since River Cruise is going to develop a new system for their business operations, the system development team, Riverscapes conducts a series of fact-finding activities to gather and determine the requirements if relevant information about the existing system, and also the problems of the existing system. Besides, conducting fact-finding allows the Riverscapes development team identifies the potential risks and challenges before developing the system. For observation fact-finding techniques, there are 6 main steps throughout the whole process: Determine the Scope of Observation, Prepare the Observation, Conduct the Observation, Record the Observation. Analyse and Interpret Data and Document and Communicate the Observations (Nicholas, n.d.; The Functional BA, 2020).

#### **1. Determine the Scope of Observation:**

Determining the scope of observation is the first phase of the process. In this phase, Riverscapes development team needs to identify their scope of observation. This phase is very crucial for effective planning as identifying a wrong scope of observation will cause the Riverscapes development team wastes resources in observing least important parts. For instance, examining the way of reservations are being managed and recorded are one of the highlighted parts of observation. Besides, the development team should also observe the situation during specific times which will impact River Cruise operations, such as peak hours, school holidays and special events.

**2. Prepare the Observation:**

In this phase, the Riverscapes development team needs to identify the best method of observation. The choice of observation methods will significantly affect the accuracy and quality of data collected, as well as the efficiency of data collecting process. Besides that, the Riverscapes development team should also prepare the necessary tools and documentation for observation. In this situation, since the focus of River Cruise is on reservations, kayak rentals and customer interactions, therefore, the most important things need to be gathered is the access to reservation systems. This is very crucial as it will make the process of observation and data collection easier. Furthermore, notebooks are also one of the things need to be gathered to conduct observation as it is useful for recording the data observed.

**3. Conduct the Observation:**

The Riverscapes development team needs to pay attention when observing in this phase. This is due to the reason that this observation will provide valuable insights into the operational dynamics of River Cruise such as the strengths of River Cruise, and the problems in River Cruise. For instance, the development team needs to focus on how Tiffany and Hames communication with the system, and also the status and conditions of the system. Moreover, handling phone inquiries and reservations during peak hours should also be observed by the development team. This is because during peak hours, there will be a high volume of calls, which might cause Devi not to be able to handle all the phone calls well. Thus, the development team needs to focus on the strategies used by Devi to address this issue.

**4. Record the Observation:**

In this phase, the results gained from observations need to be recorded immediately by the Riverscapes development team. When recording the results, the development needs to ensure that the results recorded are impartial by avoiding adding personal perspectives, comments, and suggestions into it. There are some emphasis parts that need to be focused by the development team, such as the challenges faced by Tiffany and James in their business operations by using the current reservation system. Besides that, the development team should also focus on recording the way of Tiffany and Hames handle the display of availability of the kayak.

**5. Analyse and Interpret Data:**

Analysing and interpreting data will be conducted after recording the observation. The development team needs to analyse the data and find out the weaknesses and problems in existing systems. Thus, the improvements can be made in the proposed system to fix the problems. Since the reservations for guided tours or instruction sessions will conflict with the availability of Tiffany and James, therefore the development team needs to analyse the reason that cause it to happen.

**6. Document and Communicate the Observation:**

Document and communicate the observation is the last phase of observation. The development team needs to record all the data observed into a document and communicate with Tiffany and James about the solutions implemented in the proposed system in order to address the issues and problems identified in the existing system. For example, since the existing system will provide conflicts information, the development team should discuss and communicate with each other to address this issue. For instance, the proposed system can implement a new feature which will detect and solve the conflict between the schedule automatically. By addressing all the issues identified, the efficiency of the system as well as the customer satisfaction can be improved and enhanced.

### 8.3.4 Observation Questions

In order to identify how Tiffany and James communicate with systems and the problems in the existing system, a few questions were developed by the development team. These questions may help the development team to focus on what is important and not getting distracted by other things. Here are the questions developed:

1. What do the areas or sections of River Cruise need to be focusing on?
2. How do Tiffany and James handle the reservations during peak hours?
3. How do Tiffany and James overcome the conflicts of reservations during the tours and instruction sessions?
4. How often do Tiffany and James encounter scheduling conflicts?
5. How efficient is the process of overcoming the conflicts of reservations?
6. What are Tiffany and James' methods for managing inventory and availability for walk-in customers in real-time?
7. How does Devi manage telephone inquiries and reservations amid peak hours, considering the potential influx of numerous calls simultaneously?
8. What are the strategies used by Devi to handle high volume of calls?
9. What are the challenges faced by Tiffany and James by using the current system to manage reservation businesses?
10. Is the user interface for current system user friendly?
11. Will the more user-friendly interface of new system help in improving the efficiency of business operations?

### 8.3.5 Findings

After conducting observations, the Riverscapes development team has a deeper and more holistic understanding towards the situation and problems of existing systems. These findings uncover the important information and issues of the existing system, thus the Riverscapes development team will be able to focus on these areas when developing the new system. Here are the findings after conducting observations fact-finding techniques:

1. The existing system will provide conflict information about the schedule to James and Tiffany, and this issue happens more frequently during peak hours and special events. This means that the existing system are not able to handle large demands. Therefore, the Riverscapes development team should develop a new system which can handle large requests and ensure the correctness and accuracy of the information provided at the same time.
2. For existing systems, Tiffany needs to enter all the reservations into the database manually. This method has a lot of disadvantages, such as it is very time consuming, and Tiffany might enter the wrong information into the database. Besides that, the volume of tourists will increase greatly during special events, or holidays. There will also be a significant increase in bookings at that time, which may add to Tiffany's burden of manually entering all the information into the database. Therefore, the Riverscapes development team has to focus on this issue and overcome it in the proposed system by designing a system which will enter all the data of reservation automatically.

3. For telephone queries and reservations, Devi will help to handle it. However, Devi might not be able to handle all the telephone queries well during peak hours due to excessive number of telephone queries. It might lead to dissatisfaction of customers and lost interest in visiting River Cruise. Thus, developing a system which will help Devi in handling the telephone queries and reservations. By addressing it, the Riverscapes development team can implement a priority system for queries during peak hours to ensure that the urgent queries can be addressed in time. Furthermore, the development team can put in place automated response systems to handle repetitive queries, which will enable Devi to concentrate on more complicated problems.
4. Most of the processes in the existing system is manually, which means Tiffany and James has to conduct the process and manage business operations manually such as print reservation lists. However, during special events, holidays and peak hours, the volume of customers will increase. Tiffany and James might not have enough time in processing these business operations manually. Thus, developing an auto system will help in business operations a lot, and the efficiency of managing business operations will become better as well.
5. Tiffany and James aim to gather additional information about rental patterns, customer profiles, advertising efficacy, and future business opportunities in order to analyze them and improve their business. However, the existing system is lack of this feature. Thus, the development team should develop a new system which can collect and analyse the data collected and provide useful and real-time information to Tiffany and James. This will help them a lot in making better and informed decisions.

## **8.4 Sampling (AMIRHOSSEIN HAYATGHEIBI - TP069095)**

Sampling is one of the many fact-finding techniques and is specifically used for research and data collection. In theory, sampling uses a selected subset of a larger population, using this subset to gather more information and draw a more accurate conclusion about the entirety of the population without studying each person. It is generally more useful when used with large populations which are otherwise too costly to study. There are multiple methods of sampling, each with advantages and disadvantages of their own. **Random sampling** is when a representative sample is required as each member has an entirely equal and random chance of being chosen. **Stratified sampling** is when the subset of the population is further divided using specific characteristics (e.g. people that use private transport, people that use public transport) and are then randomly sampled. **Systematic sampling** is when every nth individual from a list is selected, which is less time-consuming than randomly sampling. After parts of the population are selected, methods such as interviews will be used to study the chosen subset.

### **8.4.1 Benefits**

#### **1. Cost effectiveness:**

Since sampling reduces the required resources for data collection and analysis, it allows a much more cost-effective method of gathering data from a large population than just studying the whole population.

#### **2. Time efficient:**

Having a smaller sample size than the entire population allows the researchers to have much quicker data collection as opposed to studying every individual, which makes it especially effective when regarding time constraints, which are often an issue in data collection.

**3. Conservation of resources:**

By using the sampling method, manpower can be used elsewhere other than simply using every available person to simply research a population. This not only allows people to work on other parts of the project, but it also saves massive amounts of time. It is also more viable as the business does not have to spend massive amounts of money on their research alone and thus is more capable of funding other parts of the project.

**4. Practicality:**

When it comes to populations which are impossible to collect and analyse data from, particularly logically impossible, sampling is a necessity. It is utterly impractical to study every customer of a company such as Amazon as there are way too many customers.

## 8.4.2 Setbacks

### **1. Errors:**

One of the biggest problems that sampling faces is potential errors due to the variability of samples. This can be lessened by using a large sample; however, it is impossible to completely remove this issue as people are always unique and each person can have their own opinion.

### **2. Inadequate sample size:**

Sometimes the sample size may be too small as there are differences in population. This makes research challenging as the statistical power is not enough to detect reliable changes.

### **3. Dynamic populace:**

Since people change, there is a chance that these changes may occur during the time period of the study. This means that if the research is done over a long period of time, the initial samples may become obsolete.

### **4. Resource constraints:**

Lastly, even though sampling allows much less resource usage, usually for large scale research projects, there may still be a lack of resources to do something as effectively as one may hope.

### 8.4.3 Conduct of Investigation Method

Since River Cruise system changes will require gathering of data, in this section we will be highlighting how the development team at Riverscapes used the sampling method to conduct fact-finding efficiently. This allows us to use less resources to be able to collect a valuable amount of data on both the current system and what changes we may need to make to better suit the business needs and the customer wants. The sampling steps are as follows: Identify the populace and determine sample frame, choose sampling method and sample size, apply the method, collect data and analyze and interpret results.

#### **1. Identify the populace and determine sample frame:**

The population regarded by the research group is chosen. This means that the overall group of people that we will be researching which goes anywhere from Tiffany and James, all the way down to some more active customers of River cruise. To find more active customers, we will be going through the current records of River Cruise.

#### **2. Choose sampling method and sample size:**

The sampling method is then chosen between random sampling, stratified sampling, and systematic sampling. In the case of River Cruise, the Riverscapes development team decided to use random sampling, and used the sample calculation formula  $n= p (100-p)z^2/E^2$  (Taherdoost, 2023).

**3. Apply the sampling method and collect data:**

The next step required the help of a randomization software to be able to choose the samples for the chosen sample size. After the sampling method is applied, we then used the other fact-finding techniques such as interviews and questionnaires to conduct the research and collect all relevant data.

**4. Analyse and interpret results:**

After data collection, the data is then analysed using statistical techniques using the relevant methods such as descriptive statistics. It is then interpreted using the context of the larger population to be able to get an accurate generalization.

#### 8.4.4 Sampling Questions

1. Can you describe the step-by-step process a customer follows to book a river cruise or kayak rental with RC?
2. How do you feel about the current methods of customer feedback?
3. What gaps do you see in the current system?
4. Which of these gaps do you think Riverscapes would be able to cover?
5. Do you think River cruise will gain more revenue through the new system?
6. Are you able to make last minute bookings and cancellations using the current system?
7. How comfortable are you when it comes to booking cruises through River Cruise's current system?
8. Have you ever had a problem with River Cruise which could have been solved by a more competent system?

## **8.5 Research (JENNA CAITLIN DASS - TP070346)**

When it comes to system development, selecting the right research methodology is essential to obtaining relevant and accurate data. As a means of gathering information, research includes a wide range of sources and techniques, each with unique advantages and possible drawbacks. Examining the advantages and difficulties of using research approaches in the context of developing systems requires consulting a wide range of sources, including publications, websites, conferences, and in-person observations.

### **8.5.1 Benefits**

#### **1. Objectivity and Credibility:**

Research helps to minimize bias and personal opinions, ensuring that the gathered information is objective and unbiased. This credibility is crucial for making informed decisions based on the data (Soken-Huberty, 2023). ‘Riverscapes’ will have a solid foundation to come up with new ideas by doing research. The best sources for this research would be observing users of similar systems to ensure credibility.

#### **2. Depth of Understanding:**

This approach provides a more broad and comprehensive point of view (Market Research, 2023). Understanding customer needs and preferences by focus groups, Riverscapes can gain insights into the needs, preferences, and expectations of their target audience. This information can be used to tailor their offerings, improve customer satisfaction, and attract new customers.

**3. Problem-Solving and Decision-Making:**

Research methods provide valuable insights and evidence for addressing problems and making informed decisions. The gathered information can guide policy formulation, program development, and resource allocation (Soken-Huberty, 2023). Riverscapes can identify new opportunities for growth, such as expanding their service offerings, targeting new customer segments, or entering new markets. This can help them stay ahead of the competition, maintain a sustainable business, and constantly find ways to improve the system by solving any existing issues.

**4. Positive Reputation and Customer's Trust:**

An accessible, clear, and dependable reservation system is an important component of a good reputation and satisfied customers. In the competitive travel market, building a positive customer perception and keeping up with research and implementations of system enhancements not only improves system functionality but also grows customer trust and loyalty. There are always opportunities to have meaningful interactions that capture the attention of people to the business, whether they are non-customers, or customers of the competitors. (Barrere, 2021).

### 8.5.2 Setbacks

#### **1. Bias and Perspective:**

Academic or journalistic writers of books and articles may be influenced by institutional groups, societal norms, or personal prejudices that affect their viewpoints. This may result in a presentation of findings and research methodology that lacks objectivity (Jansen, 2022). To gather unbiased information that is relevant, there must be a balanced understanding. This is only possible by speaking with a variety of sources.

#### **2. Accessibility Issues:**

Some excellent research can only be accessed through subscriptions or payments to private databases or academic periodicals. For researchers who do not have institutional ties or the necessary funds to obtain these materials, this could provide obstacles. Making research more accessible to a wider audience is the goal of open-access journals, and other alternative distribution channels. (Kaube, 2018).

**3. Outdated Information:**

The production timetable for traditional publications, like books and some articles, is usually longer, and there might be a big gap between the time the research is done, and the final result is released. This time lag might lead to information that is out-of-date or no longer representative of the status of the sector in quickly changing areas like travel (Kleinmann, 2023).

**4. Lack of Real-Time Data:**

Books and journals usually rely on data and analysis from the past. These sources might not adequately convey the dynamic and quickly evolving nature of the travel business, even though they can offer insightful information about long-term trends. Making timely and well-informed judgements in this field frequently depends on having access to real-time data, which includes the most recent information on consumer behaviour, market dynamics, and new trends. The shortcomings of traditional publications can be partially offset by making use of additional resources such as market studies, industry reports, and internet platforms (Atlan, 2023).

### 8.5.3 Conduct of Investigation Method

This investigation's main goal is to examine River Cruise's many components and grasp its present technological infrastructure, user interface, business procedures, and overall customer journey. By carrying out in-depth study, we hope to find areas for innovation and improvement that may be used to create Riverscapes, a productive and user-friendly reservation system. We seek to offer a customized solution that coincides with the goals of the travel agency and places them at the top of technological advancement in the competitive travel sector by evaluating the advantages, disadvantages, and possibilities present in the current operating framework.

#### **1. Understanding Business Processes:**

Developing a system for River Cruise involves thorough research to understand the company's needs, industry trends, and user expectations. Some ways to conduct research are to understand business processes by identifying areas where the system could improve efficiency, reduce costs, or enhance customer experience. Arranging professional meetings with the owners would give us insights into current workflows and areas where technology can improve the system. This could also help define the company's objectives and scope of the system in terms of features, functionality, and target audience (Prett, Roy, McLaughlin, 2023). To achieve this, a discussion with the owners of River Cruise is necessary as they can provide the information needed to improve the existing system.

#### **2. User Interface and Experience:**

To make the system user friendly, we need to research users' preferences in similar systems. This way, we can make the interaction as simple, intuitive, and aesthetically pleasing as possible. Some key aspects of user interface would be layout and navigation, consistency, and responsive design. User experience involves understanding the user's emotions, perceptions, and interactions at every touchpoint a similar system. Some key aspects would be ease of use, efficiency, personalization, and accessibility. A system that is not aesthetically pleasing and easy to use will not attract potential users and customers to return.

### **3. Technology Assessment:**

Besides that, it would be practical to conduct a technology assessment to evaluate existing technologies and platforms that could be used in the development of the system. It is crucial to ensure the systems have better communication with each other (Resultant, 2023). The first step to conducting a technology assessment is to understand the current technology eco-system and understand the problem in terms of the business and end-user experience. Next is to analyze the functionality and focus on the system requirements (Enginess, 2021). Technology assessment is also a proactive approach that will allow Riverscapes to recognize problems in earlier stages, come up with viable solutions, and then implement them as soon as possible. Without proper technology assessment, Riverscapes could be heading for trouble without even knowing it (Belle, 2019).

### **4. Conducting Site Visits:**

The research will be successful if site visits are made. While creating a system to grab consumers' attention, graphics are equally crucial. The development team can have a general understanding of how to construct the system to fit the theme by going on a tour with River Cruise along the Melaka River. Aside from that, site visits enable the confirmation of data gathered from many sources, including records, papers, and internet data. This procedure of verification strengthens the validity of conclusions and helps to assure data integrity (theintactone, 2023).

#### 8.5.4 Research Questions

**Booking Preferences:**

1. Do people prefer online bookings or walk-in bookings when it comes to ecotourism or travelling?
2. Which age group prefers online bookings or physical bookings?
3. What influences people's choice to make online bookings?

**Marketing:**

4. What marketing channels and strategies are most effective in promoting a service like River Cruise?

**Safety and Security:**

5. What safety and security measures are in place, and how do they impact customer satisfaction?

**Environmental Sustainability:**

6. What environmental practices are currently adopted by River Cruise, and how do they contribute to sustainability?
7. How do environmentally friendly initiatives impact customer perceptions and choices?

**Technology and Innovation:**

8. How are technological advancements influencing the ecotourism industry, from booking processes to onboard experiences?
9. What innovative features or services can be introduced to enhance the overall River Cruise experience?

**Customer Satisfaction and Feedback:**

10. What are the key factors contributing to customer satisfaction with River Cruise services?
11. How can customer feedback be collected and utilized to enhance the quality of river cruises?

### 8.5.5 Findings

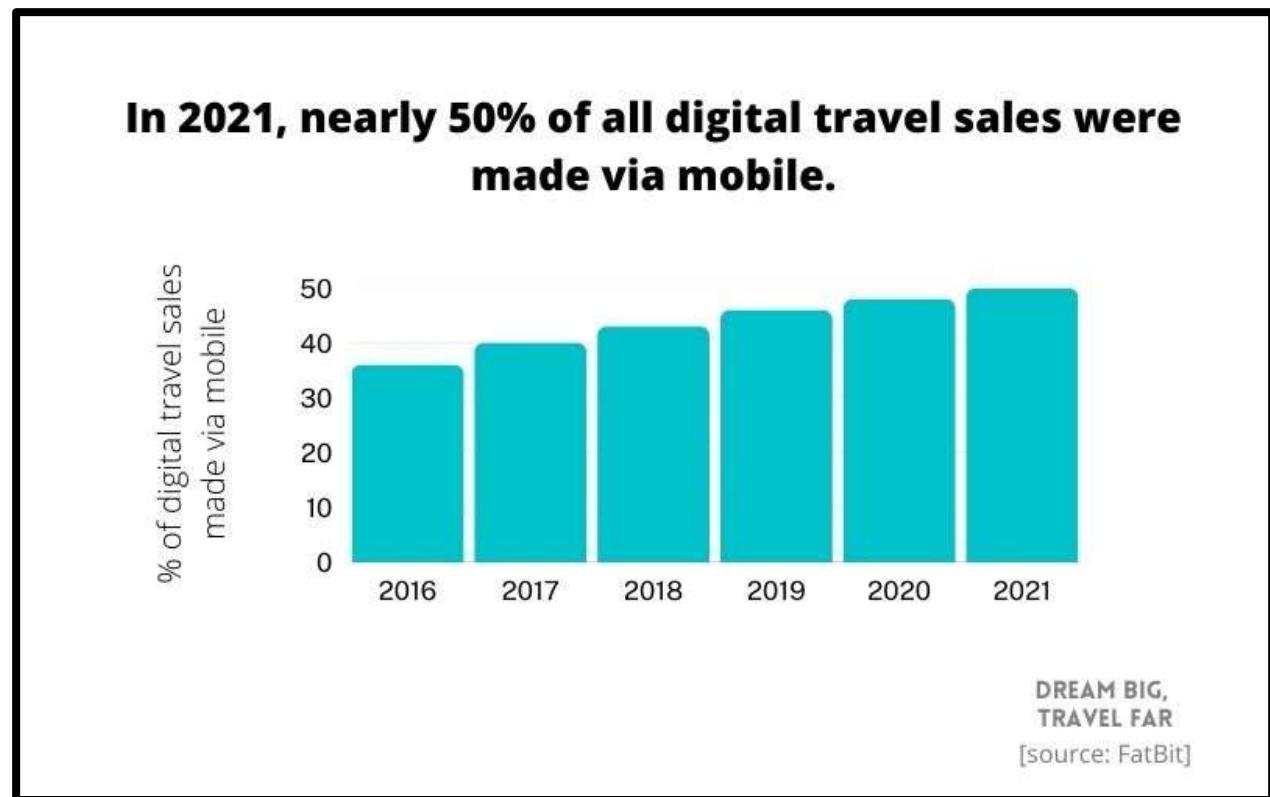


Figure 7: Online Travel Booking Statistics (Williams, 2023)

The graph shows that the percentage of digital travel sales made via mobile has been increasing steadily since 2016. In 2016, only about 20% of digital travel sales were made via mobile. However, by 2021, that number had nearly doubled to 50%.

This trend is likely due to the increasing popularity of smartphones and mobile apps. As more and more people use their smartphones to book travel, it is becoming increasingly important for travel companies to have a mobile-friendly website and app.

Variables	Gender					Educational level			
			Male	Female	Total	High School	Bachelor	Master or higher	Total
Importance of interface design	Yes	f	186	183	369	27	230	112	369
		%	94.42	96.3	95.35	75	97.87	96.55	95.35
	No	f	11	7	18	9	5	4	18
		%	5.58	3.7	4.65	25	2.1	3.4	4.7
	Total	f	197	190	387	36	235	116	387
	$\chi^2$		7.87			37.37			
Risk availability	P-Value		0.375			0.000*			
	Yes	f	167	176	343	27	209	107	343
		%	84.77	92.6	88.6	75	88.9	92.2	88.6
	No	f	30	14	44	9	28	9	46
		%	15.23	7.4	11.4	25	11.9	7.8	11.9
	Total	f	197	190	387	36	235	116	387
Satisfaction	$\chi^2$		5.93			8.16			
	P-Value		0.015*			0.017*			
	Yes	f	184	164	348	35	217	96	348
		%	93.4	86.32	89.92	97.22	92.34	82.76	89.92
	No	f	13	26	39	1	18	20	39
		%	6.6	13.68	10.08	2.78	7.66	17.24	10.08
	Total	f	197	190	387	36	235	116	387
	$\chi^2$		5.36			10.2			

Figure 8: Cross tabulation and Chi-square analysis on tested variables with respondents' demographic background (Kng & Chang, 2022)

According to a study by Kai-Li Kng and Shu-Chun Chang from the Graduate Institute of Bio-industry Management at National Chung Hsing University in Taiwan, the majority of respondents with a master's degree or higher valued the risks associated with online booking more than those with a lower educational level. In comparison to the younger respondents, the older respondents (ages 50–59) think that making reservations online carries greater risk. Additionally, there is a strong correlation between user satisfaction with online booking software and interface design. One interpretation is that customers will be more satisfied if the interface design is of good quality and simple to use. Interfaces include a variety of informational elements, including as text, images, symbols, charts, and videos, that are intended to provide users with sufficient information and entice them to use the service (Kng and Chang, 2022).



Figure 9: Travel Experiences: What Influences the Purchase Decision (Arival 2023 Experiences Traveler)

Arival's research indicates that an increasing number of travellers are anticipating the ability to make reservations online. All tour, activity, and attraction providers, regardless of size, ought to utilise an internet-based reservation platform. In addition to the fact that this is what travellers want, the correct technology should automate all of the mundane operations of the company, saving time and money while allowing the owners to concentrate on what makes their clients' experiences unique. Reviews, pictures and visuals, activity descriptions, and other details about the services have an impact as well (Visser, 2023).



Marketing channels and strategies for promoting a river cruise service can vary depending on the target audience, budget, and other factors. According to a study by Think with Google, early engagement with potential customers is vital. Search engines are the go-to channel when people begin to explore a cruise. Cruise brands, destinations, and ports are among the most popular types of searches conducted related to cruises. Investing in brand and category search terms gives cruise marketers an opportunity to capture interest in the early consideration stages and engage consumers further on their website or through a call center<sup>1</sup> (Wesley, 2017).

## **8.6 Surveys and Questionnaires (LAI ZHAO WEI - TP070225)**

For requirement gathering and fact-finding, surveys and questionnaires are the methods that have been selected to collect data from a group of respondents. This method commonly includes a set of questions, such as Multiple-Choice Questions, Likert Scales, Open-Ended Questions or Closed-Ended Questions. The primary reason for choosing the survey and questionnaire method for “Riverscapes” is to facilitate the data collection process, make it easier to perform analysis and interpret the responses. This requirement gathering method helps collect feedback from various stakeholders to identify their requirements and preferences regarding the services provided by “Riverscapes”.

### 8.6.1 Benefits

#### **1. Large-Scale Data Collection:**

Questionnaires provide an effective way for “Riverscapes” to collect information from a large number of individuals simultaneously (Lindemann, 2023). It enables the collection of data from a wide range of customers, such as travelers, adventure enthusiasts, families, and retirees coming from various age groups. By distributing the questionnaire form through an online platform, it provides convenience to customers from different locations to participate in the survey. This method allows the researchers to gather data from a wider group of people to enhance the applicability and external validity of the research outcomes (Lindemann, 2023). In addition, the substantial amount of data generated from the large-scale survey can provide a better understanding of diverse needs and expectations of a large customer base, which helps “Riverscapes” to customize their cruise offerings to the customers.

**2. Cost-Effective:**

Questionnaires are considered as a cost-effective method to gather data because it helps “Riverscapes” to reach a large number of participants at a low cost compared to other methods, such as interviews or focus groups (Cornell, 2023). Due to the budget constraints of “Riverscapes”, conducting surveys and questionnaires is a more cost-effective option for collecting customer feedback on a large scale. By using online questionnaires, “Riverscapes” can save costs related to printing as well as the necessity for manually entering data (Cornell, 2023). This data collection method not only helps “Riverscapes” to collect data efficiently but also reduces significant costs involved in the business.

**3. Standardized Responses:**

Standardization in questionnaires ensures that all the respondents are providing feedback on predefined options or scales. This consistency facilitates the analysis process and comparison of data. Questionnaires offer an organized framework for respondents to choose from standardized response options that help to reduce confusion, ensure consistency, and make it easier to analyze and compare the responses (Lindemann, 2023). Using standardized responses helps researchers in measuring and categorizing the data quantitatively by simplifying the patterns, current trends, and relationships among various factors (Lindemann, 2023). In a customer satisfaction survey focusing on the journey of a river cruise, the respondents might be requested to express their level of satisfaction ranging from 1 to 5, where 1 indicates “Very Dissatisfied”, and 5 represents “Very Satisfied”. These surveys help to collect consistency data, where statistical analysis can be performed to evaluate the overall satisfaction of “Riverscapes” customers.

**4. Time Efficiency:**

The advantage of using surveys and questionnaires as the data collection method ensures time efficiency for “Riverscapes” to gather lots of data that helps to analyze and interpret the result within a reasonable timeframe (Lindemann, 2023). For instance, “Riverscapes” can utilize social media platforms to distribute an online questionnaire, which can help to reach thousands of participants within a short span, contributing to a comprehensive data collection effort. Additionally, the predefined response options on questionnaires can save the time of respondents especially when they are answering multiple-choice questions which can be completed within a few minutes (Lindemann, 2023). Time efficiency in questionnaires enables researchers to facilitate the analysis process as well as to obtain the results in a short period of time.

**5. Flexibility:**

The flexibility of questionnaires allows the researchers to customize the design and content of the survey to collect specific information to ensure the relevance and accuracy of the data collected (DeFranzo & DeFranzo, 2023). The open-ended questions on questionnaires enable the respondents to provide detailed feedback, offering significant information to “Riverscapes”. For instance, the open-ended questions can focus on a specific area by asking the respondents to provide their feedback or suggestions, describing the issues they have encountered during the river cruise experience. This allows the respondents to express their own ideas, thoughts, or concerns related to the services offered by “Riverscapes”. By incorporating open-ended questions on the survey, it helps “Riverscapes” satisfy the requirements for research and collect more efficient and effective data used for analysis.

## 8.6.2 Setbacks

### **1. Limited Engagement:**

One of the setbacks of questionnaires is the potential for limited engagement from respondents. This happened when the respondents do not have interest or lack active involvement while completing the questionnaires (Lindemann, 2023). The respondents might provide inaccurate responses by rushing through the questions. For example, if the questionnaire contains lengthy or complex questions, the respondents may not invest their time to provide thoughtful and detailed answers, which can lead to unreliable results. To overcome the problem, researchers can create a user-friendly layout by providing clear instructions and manageable question length that can contribute to a positive user experience. This solution can reduce the burden of respondents and increase their interest in participating in the survey.

### **2. Low Response Rates:**

The drawback of low response rates for conducting questionnaires might impact on the outcomes of collected data. This can occur when the respondents refuse to participate in a questionnaire or choose not to complete the survey (Prasanna, 2023). In a customer satisfaction survey, the customers who had a bad experience are reluctant to get involved in the survey, which may overestimate the results from overall customer satisfaction levels. As a result, this will affect the validity of the conclusions obtained from the questionnaire data. To mitigate this issue, researchers can provide some incentives, such as the opportunity to win a prize draw that can increase their motivation to participate.

### **3. Misinterpretation of Questions:**

Another disadvantage of using questionnaires as the data collection method is the respondents might misunderstand or misinterpret the actual meaning of the questionnaire's item (Cornell, 2023). For instance, the question asks about preferred activities during the river cruise, some respondents might focus on adventurous activities, such as biking or hiking if the questionnaire does not provide a clear example of activities that can be organized by "Riverscapes". This can lead to inconsistent data among the respondents which reduces the validity and reliability of the results. To prevent misinterpretation of questions in questionnaires, the researchers should provide more concise questions, and consider using visual aids, including images or diagrams, to support the abstract concepts.

### **4. Limited Depth of Information:**

The shortcomings of conducting questionnaires which can limit the ability of respondents to provide in-depth responses. This limitation may restrict the richness of the information and result in a loss of important context (Lindemann, 2023). For instance, if the questionnaire only offers a Likert scale for rating satisfaction, it may not capture all the detailed reasons behind why the respondents give a particular rating. This limitation can make it harder to understand what type of factors are affecting how the customers feel when responding to the questions. To address this limitation, researchers enhance their understanding of the research topic by supplementing questionnaires with qualitative methods such as interviews or observations.

### 8.6.3 Conduct of Investigation Method

#### **1. Define Objectives and Scope:**

To conduct an effective data collection method, “Riverscapes” can utilize online questionnaires to gather valuable data to enhance the river cruise experience and better services given to the customers. The initial stage of designing the questionnaires should outline the objectives of the project and determine the key information required. The questions should focus on the customers’ preferences, desired amenities, preferred destinations, and other expectations relating to the services provided by “Riverscapes”.

#### **2. Design Questionnaire Structure:**

“Riverscapes” are encouraged to use online survey platforms, such as Google Forms to facilitate the process of data collection. To ensure high response rates from the participants, the questionnaire will be designed to be concise, and user-friendly. The questionnaire will include a combination of open-ended and close-ended questions to collect both quantitative and qualitative data from the customers. To ensure the systematic design of the questionnaire, the questions will be organized strategically, starting with inquiries about the customers’ demographic profiles and followed by questions related to their river cruise experience. The sequential order helps to establish a smooth flow, allowing respondents to answer the questions with ease as well as to gather useful information in an organized way.

#### **3. Survey Distribution and Data Collection:**

Once the questionnaire has been designed and thoroughly reviewed, “Riverscapes” can start distributing the questionnaire to the customers through various social media platforms, such as Facebook, Instagrams, Twitter in order to gather a large amount of valuable data in a short time. Alternatively, “Riverscapes” can also distribute the questionnaire’s link through the customer emails that registered on the system to ensure that it reaches the intended audience. This targeted approach aims to gather accurate and relevant data based on their own experiences.

**4. Data Analysis and Reporting:**

Upon receiving responses, the step taken for “Riverscapes” is to conduct data analysis by using Excel or Statistical Package for the Social Sciences (SPSS). This may include bar charts illustrating popular destinations, important amenities, and overall satisfaction ratings. Additionally, “Riverscapes” can analyze the information from the open-ended questions answered by the customers. The results can be compiled into a report, including visual aids, such as infographics and charts. The main purpose of this report is to highlight the findings based on the recommendations, identifying the areas for improvement or making potential enhancements to the river cruise experience. The feedback gathered through the questionnaire helps “Riverscapes” to make better decisions, offering customers better services that satisfy their requirements mentioned throughout the survey. By integrating these informed decisions into the development of “Riverscapes” system, it ensures the overall success and long-term sustainability of the project.

8.6.4 Survey Questionnaires

## RIVERSCAPES: "Enhancing Your River Cruise with Feedback and Suggestions"

- The objective is to help us improve your river cruise experience with "Riverscapes" by sharing your opinions in this survey.
- Please answer the following questions honestly.
- Please be ensured that all your responses will be kept confidential and used for research purposes only.

✉ Not shared Cloud

Next Clear form

**Section A: Demographic Profile**

This section is about personal details of participants.

**1. What is your gender? \***

- Male
- Female

**2. What is your age? \***

- 18 years old and below
- 19 - 22 years old
- 23 - 26 years old
- 27 - 30 years old
- 31 years old and above

3. What type of area do you live in? \*

- Urban
- Suburban
- Rural

4. How often do you go on vacations in a year? \*

- Seldom
- Sometimes
- Once a year
- 2 - 3 times a year
- More than 3 times a year

5. When you go on vacations, who do you usually travel with? \*

- Alone
- Spouse
- Family
- Friends
- Group Tours
- Other: \_\_\_\_\_

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[Clear form](#)

**Section B: River Cruise Service Experience**

This section focuses on the evaluating the quality and satisfaction level of services provided by "Riverscapes".

**1. What duration of river cruise do you prefer? (Select one) \***

- Short (3 - 5 days)
- Medium (6 - 10 days)
- Long (11 days or more)
- Other: \_\_\_\_\_

**2. Select the amenities that are important to you during a river cruise. (Select all that apply) \***

- Fitness Center
- Spa Facilities
- Educational Programs
- Onboard Entertainment
- Other: \_\_\_\_\_

**3. When selecting a river cruise destination, which factors are most important to \* you? (Select one or more options)**

- Scenery and Landscapes
- Cultural Experiences
- Historical Sites
- Adventurous Activities
- Wildlife and Nature
- Local Festivals and Events
- Other: \_\_\_\_\_

**4. What is your preferred method of communication for receiving information \* about upcoming cruises or promotions? (Select one)**

- Email
- Social Media
- Mobile Apps
- Phone Calls
- Other: \_\_\_\_\_

5. How would you rate the ease of booking process for your river cruise? \*

1      2      3      4      5

Very Difficult

Very Easy

6. Did you encounter any issues or problems during the river cruise? (If yes, please specify the issue) \*

Your answer

7. Do you consider the overall cost of your river cruise to be reasonable in relation to the services, amenities, and experiences provided? \*

- Yes, very reasonable
- Yes, somewhat reasonable
- Neutral
- No, somewhat unreasonable
- No, very unreasonable

8. How would you rate the overall quality of the service provided by "Riverscapes"? \*

1      2      3      4      5

Poor

Excellent

9. If you were to recommend the river cruise experience to a friend or family, what specific highlights or aspects would you emphasize? \*

Your answer

10. Please provide feedback or suggestions about your river cruise experience. \*

Your answer

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[Clear form](#)

"THANK YOU FOR FILLING UP OUR FORM. WE APPRECIATE YOUR RESPONSES."



Back

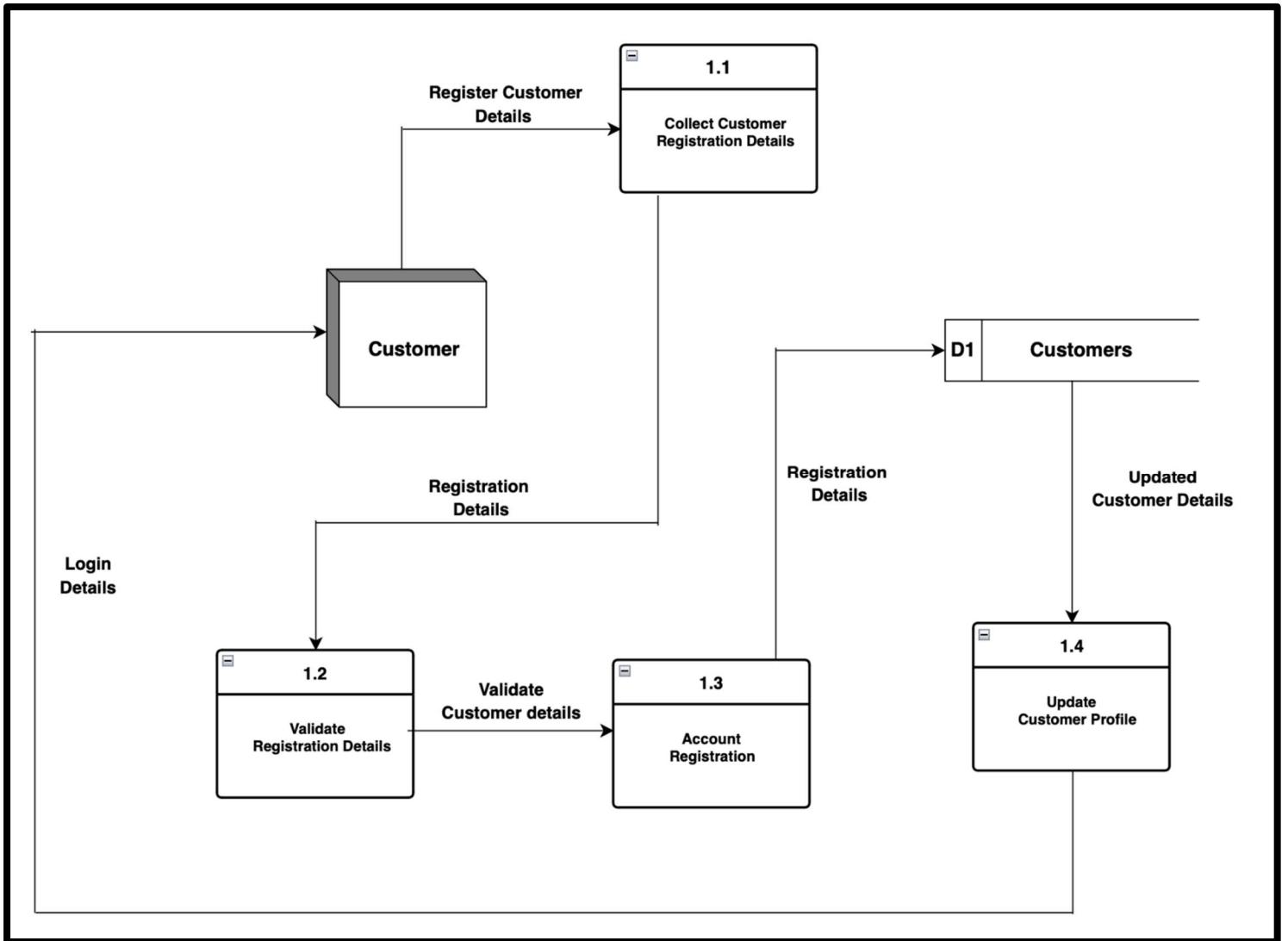
Submit

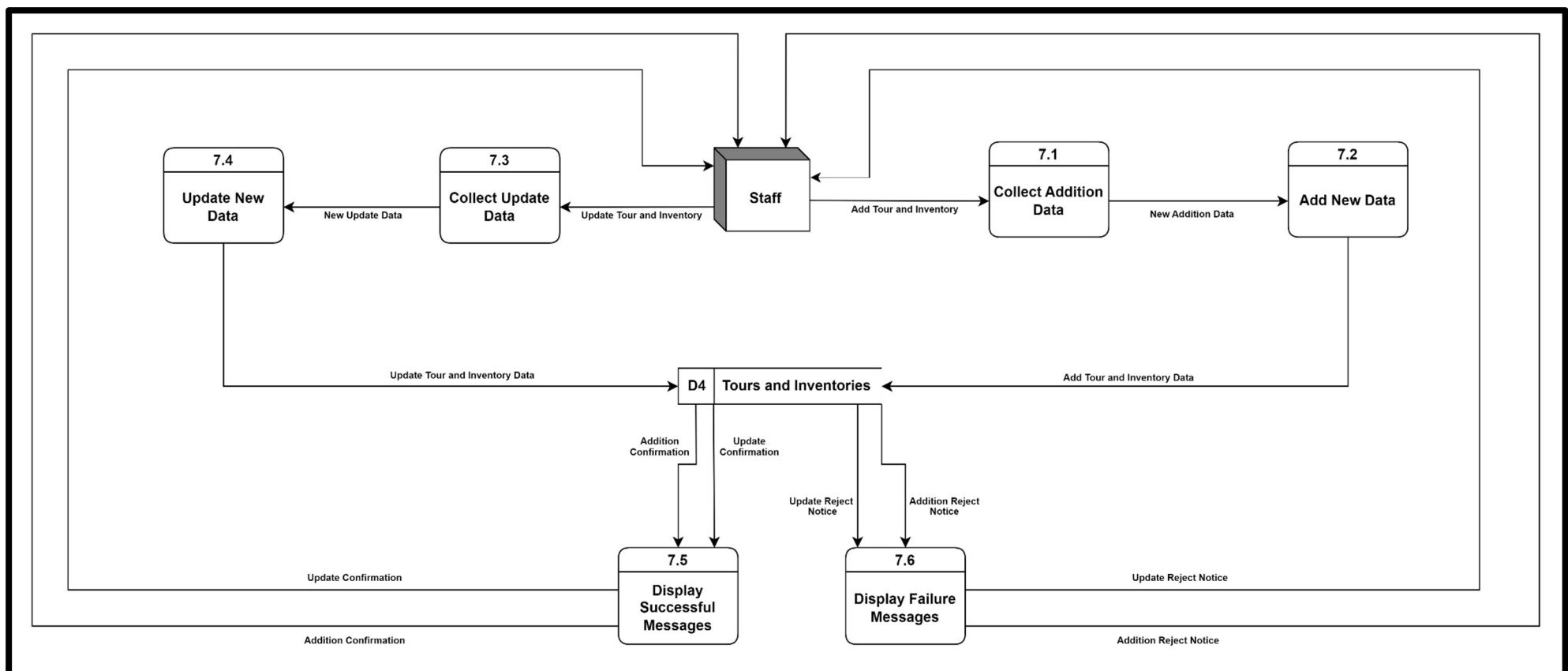
Clear form

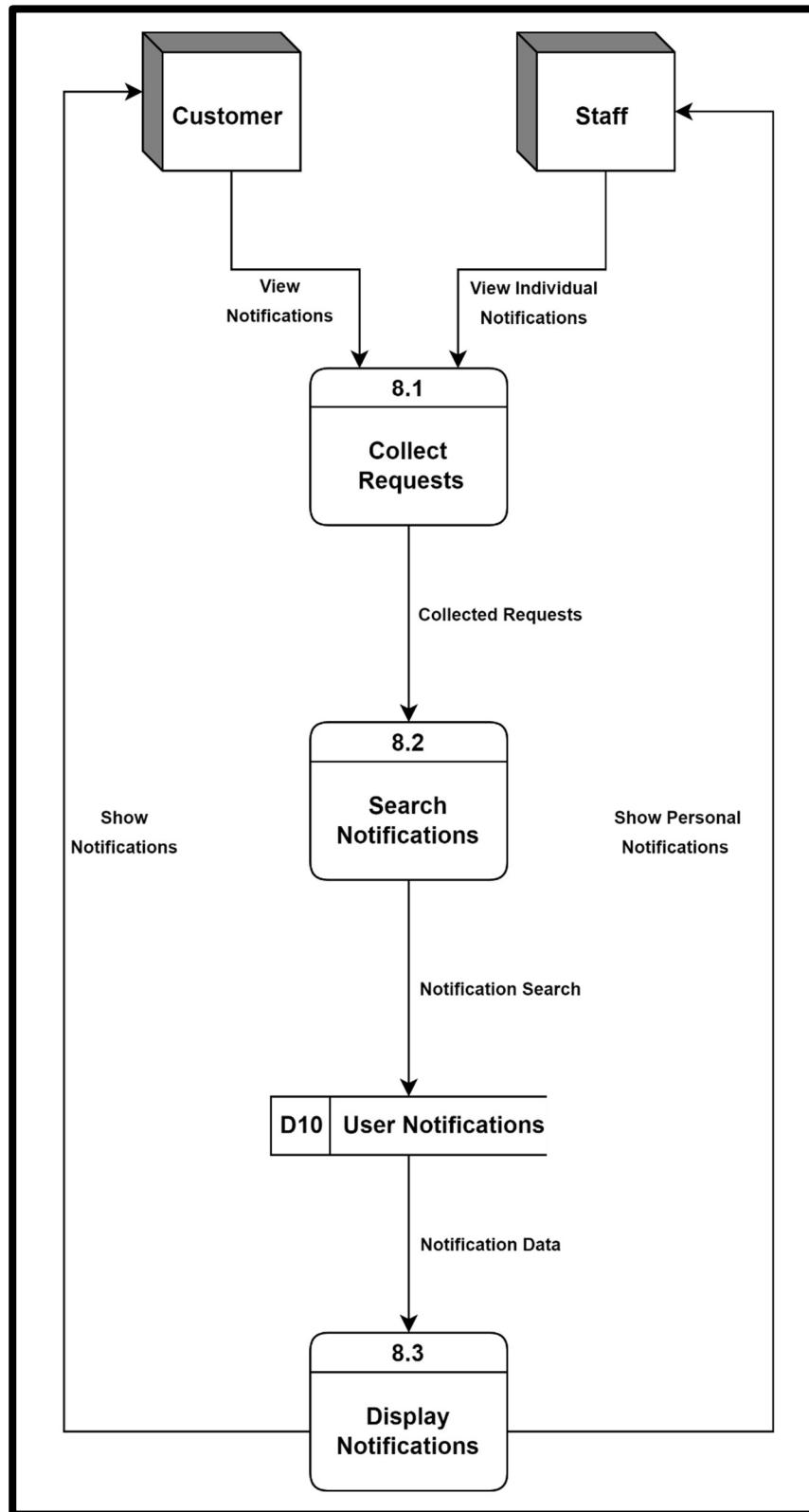
## **9.0 Design**

### **9.1 Data Flow Diagram (DFD) - Level 1**

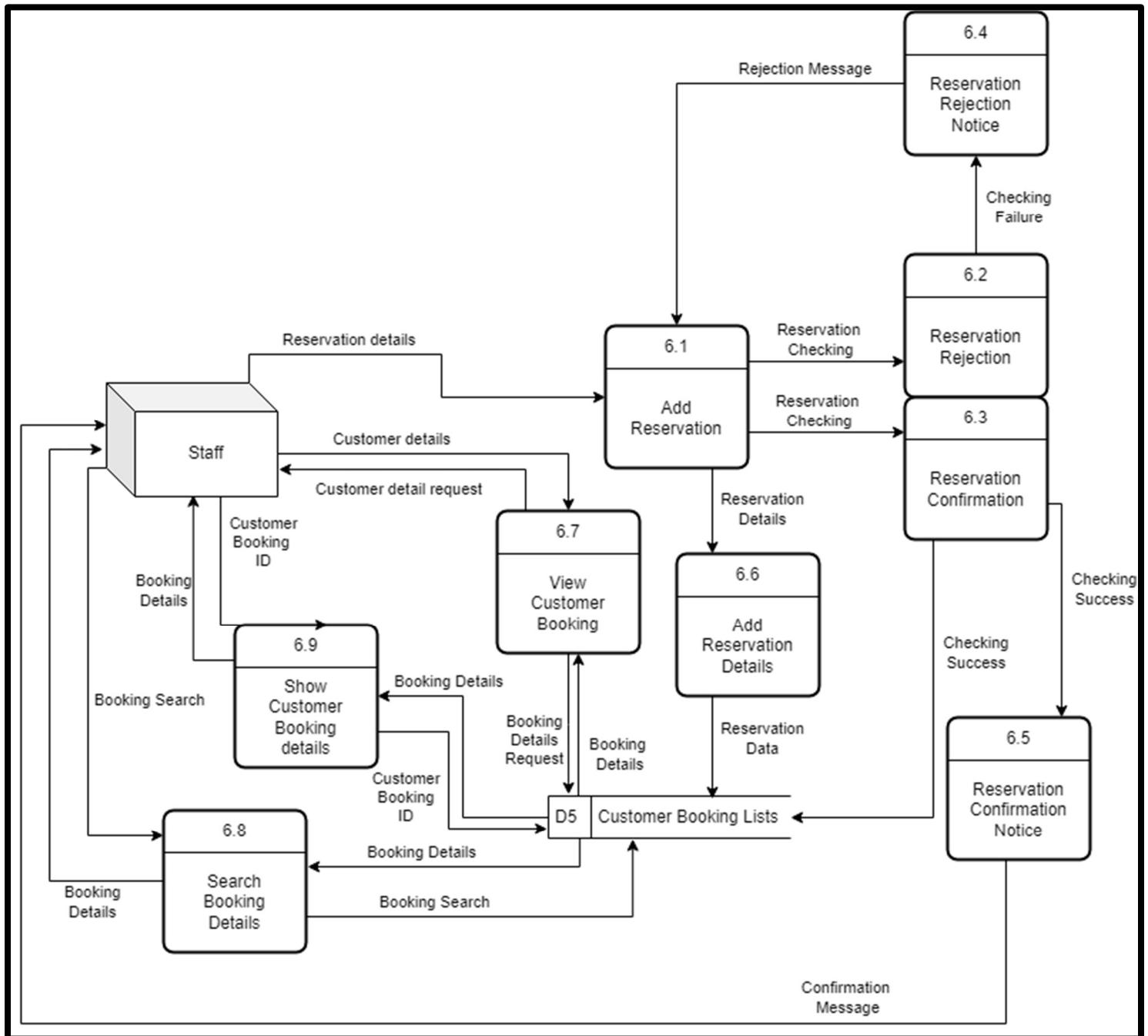
9.1.1 Register Customer Account (JOSHUA EMMANUEL KC SATHASIVAM - TP070067)



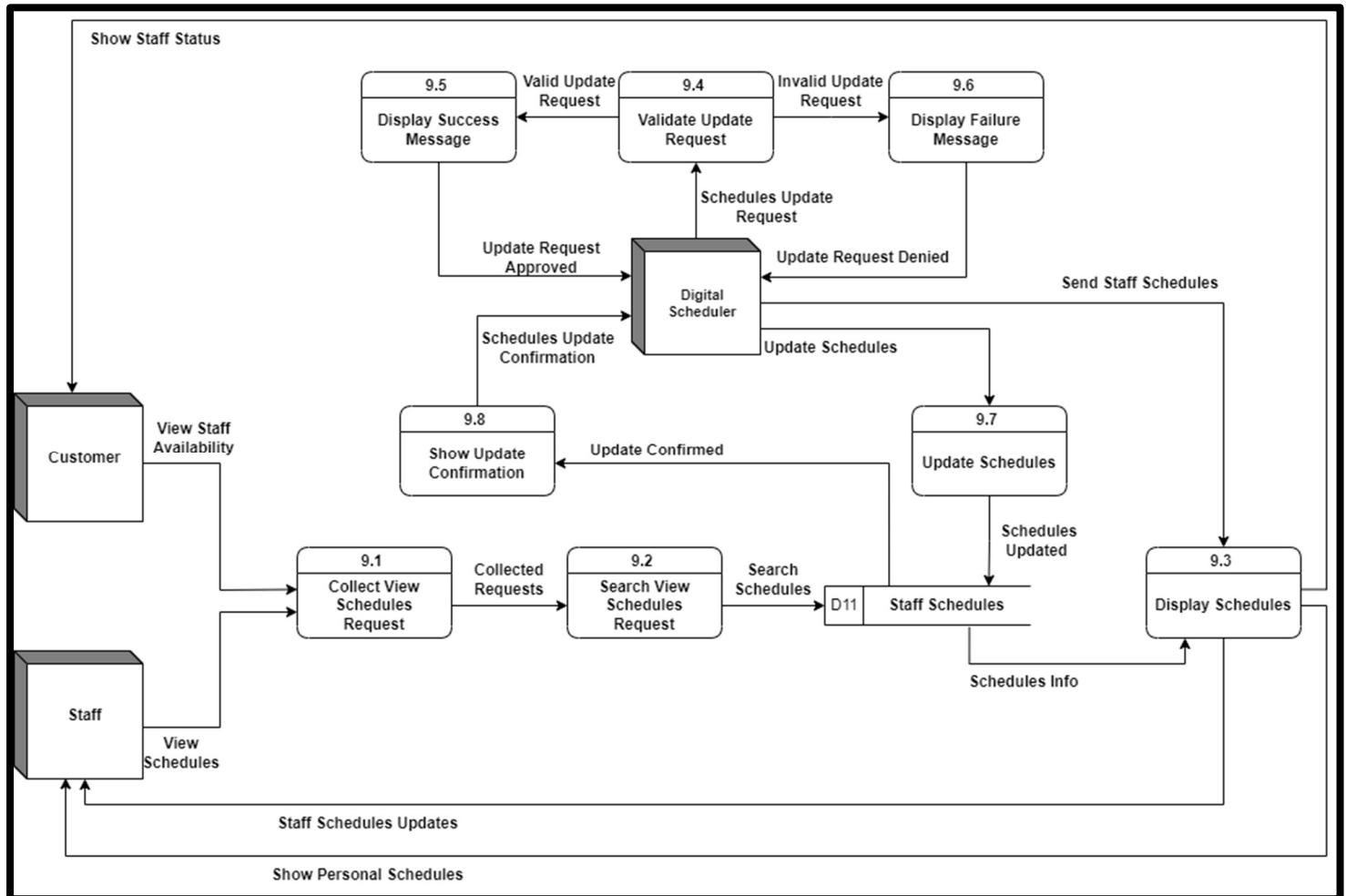
9.1.2 Manage Tour and Inventory (GOH XIN TONG - TP069712)

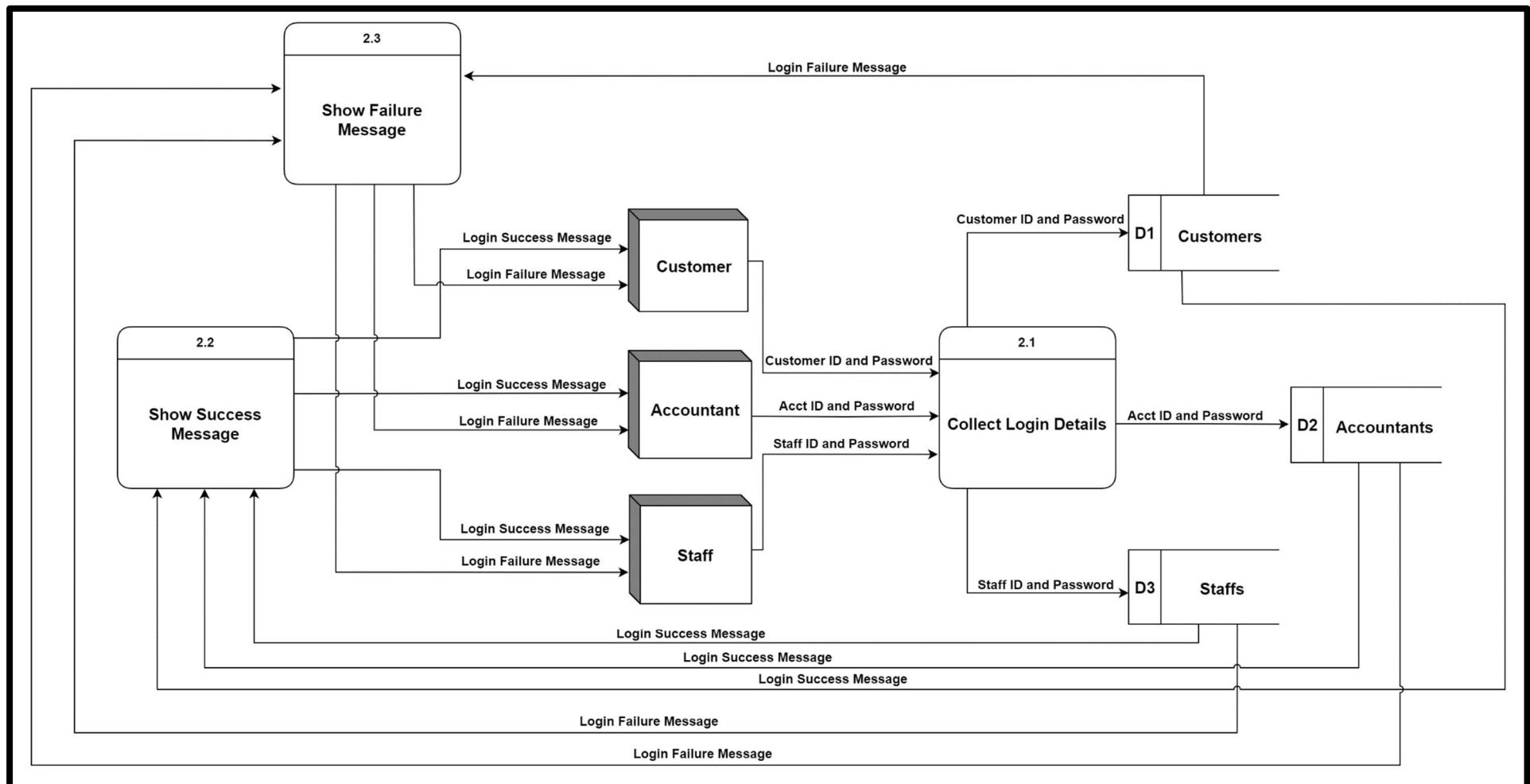
9.1.3 View Notification (LIM WEI LUN - TP069058)

### 9.1.4 Manage Reservation (Staff) (AMIRHOSSEIN HAYATGHEIBI - TP069095)



### 9.1.5 Manage Schedule (JENNA CAITLIN DASS - TP070346)



9.1.6 Authorize Login Details (LAI ZHAO WEI - TP070225)

## **9.2 Data Dictionary**

### **9.2.1 Register Customer Account (JOSHUA EMMANUEL KC SATHASIVAM - TP070067)**

#### **9.2.1.1 External Entity**

<b>NAME</b>	Customer
<b>DESCRIPTION</b>	Customers provide their registration details for customer registration.
<b>INPUT DATA FLOWS</b>	Login Details
<b>OUTPUT DATA FLOWS</b>	Register Customer Details

9.2.1.2 Process

<b>NAME</b>	1.1 Collect Customer Registration Details
<b>DESCRIPTION</b>	Customers provide their registration details for customer registration process.
<b>INPUT DATA FLOWS</b>	Register Customer Details
<b>OUTPUT DATA FLOWS</b>	Registration Details
<b>PROCESS DESCRIPTION</b>	<pre> START INPUT Registration Details IF Registration Details provided     PRINT "Validate Registration Details" ENDIF END </pre>

<b>NAME</b>	1.2 Validate Registration Details
<b>DESCRIPTION</b>	Customers registration details are validated before account is registered.
<b>INPUT DATA FLOWS</b>	Registration Details
<b>OUTPUT DATA FLOWS</b>	Validate Customer Details
<b>PROCESS DESCRIPTION</b>	<pre> START INPUT Registration Details IF Registration Details provided     PRINT "Validate Customer Details" ENDIF END </pre>

<b>NAME</b>	1.3 Account Registration
<b>DESCRIPTION</b>	Customers account is registered into the data store after customers registration details are validated.
<b>INPUT DATA FLOWS</b>	Validate Customer Details
<b>OUTPUT DATA FLOWS</b>	Registration Details
<b>PROCESS DESCRIPTION</b>	<pre> START INPUT Registration Details IF Customer Registration Details Validated     PRINT "Account Registered" ENDIF END </pre>

<b>NAME</b>	1.4 Update Customer Profile
<b>DESCRIPTION</b>	Customers profile is updated with the registered customer details.
<b>INPUT DATA FLOWS</b>	Updated Customer Details
<b>OUTPUT DATA FLOWS</b>	Login Details
<b>PROCESS DESCRIPTION</b>	<pre> START INPUT Registration Details IF Account Registered in Data Store     PRINT "Customer Details Updated in Customer Profile"     PRINT "Customers can Login using Login Details" ENDIF END </pre>

9.2.1.3 Data Flow

<b>NAME</b>	Register Customer Details
<b>DESCRIPTION</b>	For customers to register as new user in the system.
<b>ORIGIN</b>	Customer
<b>DESTINATION</b>	Process: 1.1 Collect Customer Registration Details
<b>DATA STRUCTURE</b>	Customer_ID, Name, Address, Phone_No., Email_Address, Password

<b>NAME</b>	Registration Details
<b>DESCRIPTION</b>	For system to validate customer registration details.
<b>ORIGIN</b>	Process: 1.1 Collect Customer Registration Details
<b>DESTINATION</b>	Process: 1.2: Validate Registration Details
<b>DATA STRUCTURE</b>	Customer_ID, Name, Address, Phone_No., Email_Address, Password

<b>NAME</b>	Validate Customer Details
<b>DESCRIPTION</b>	For system to validate customer registration details before account registration.
<b>ORIGIN</b>	Process: 1.2: Validate Registration Details
<b>DESTINATION</b>	Process: 1.3: Account Registration
<b>DATA STRUCTURE</b>	Validate Customer Details

<b>NAME</b>	Registration Details
<b>DESCRIPTION</b>	For customer registration details to be kept in data store after account registration.
<b>ORIGIN</b>	Process: 1.3: Account Registration
<b>DESTINATION</b>	Data Store: D1 Customers
<b>DATA STRUCTURE</b>	Customer_ID, Name, Address, Phone_No., Email_Address, Password

<b>NAME</b>	Updated Customer Details
<b>DESCRIPTION</b>	For customer registration details in data store to update customer profile.
<b>ORIGIN</b>	Data Store: D1 Customers
<b>DESTINATION</b>	Process: 1.4: Update Customer Profile
<b>DATA STRUCTURE</b>	Updated Customer Details

<b>NAME</b>	Login Details
<b>DESCRIPTION</b>	For customer to log into the system using registered customer details.
<b>ORIGIN</b>	Process: 1.4: Update Customer Profile
<b>DESTINATION</b>	Customer External Entity
<b>DATA STRUCTURE</b>	Customer_ID and Password

9.2.1.4 Data Store

<b>NAME</b>	D1 Customers
<b>DESCRIPTION</b>	To store customer details for both registration and login process.
<b>INPUT DATA FLOWS</b>	Registration Details
<b>OUTPUT DATA FLOWS</b>	Updated Customer Details
<b>DATA STRUCTURE</b>	Customer_ID, Name, Address, Phone_No., Email_Address, Password

9.2.2 Manage Tour and Inventory (GOH XIN TONG - TP069712)9.2.2.1 External Entity

<b>NAME</b>	Staff
<b>DESCRIPTION</b>	Staff input new tour and inventory data into the system.
<b>INPUT DATA FLOWS</b>	Update Confirmation, Addition Confirmation, Update Reject Notice, Addition Reject Notice
<b>OUTPUT DATA FLOWS</b>	Update Tour and Inventory, Add Tour and Inventory

9.2.2.2 Process

<b>NAME</b>	7.1 Collect Addition Data
<b>DESCRIPTION</b>	This process gathers all additional data input by the staffs.
<b>INPUT DATA FLOWS</b>	Add Tour and Inventory
<b>OUTPUT DATA FLOWS</b>	New Addition Data
<b>PROCESS DESCRIPTION</b>	<pre> START     SET New_data = empty list     INPUT addTourandInventory     IF addTourandInventory IS NOT NULL THEN         ADD addTourandInventory INTO New_data     ENDIF     RETURN New_data END </pre>

<b>NAME</b>	7.2 Add New Data
<b>DESCRIPTION</b>	This process adds the new data collected from the previous process into D4 Tours and Inventories Data Store.
<b>INPUT DATA FLOWS</b>	New Addition Data
<b>OUTPUT DATA FLOWS</b>	Add Tour and Inventory Data
<b>PROCESS DESCRIPTION</b>	<pre> START     INPUT New_data     IF (ADD New_data INTO D4 Tours and Inventory) IS TRUE THEN         RETURN Addition_Confirmation     ELSE         RETURN Addition_Reject_Note     ENDIF END </pre>

<b>NAME</b>	7.3 Collect Update Data
<b>DESCRIPTION</b>	This process gathers all updated data input by the staffs.
<b>INPUT DATA FLOWS</b>	Update Tour and Inventory
<b>OUTPUT DATA FLOWS</b>	New Update Data
<b>PROCESS DESCRIPTION</b>	<pre>START     SET Update_data = empty list     INPUT updateTourandInventory     IF updateTourandInventory IS NOT NULL THEN         ADD updateTourandInventory INTO         Update_data     ENDIF     RETURN Update_data END</pre>

<b>NAME</b>	7.4 Update New Data
<b>DESCRIPTION</b>	This process updates the new data collected from the previous process into D4 Tours and Inventories Data Store.
<b>INPUT DATA FLOWS</b>	New Update Data
<b>OUTPUT DATA FLOWS</b>	Update Tour and Inventory Data
<b>PROCESS DESCRIPTION</b>	<pre> START     INPUT Update_data     IF (UPDATE Update_data INTO D4 Tours and Inventory)         IS TRUE THEN             RETURN Update_Confirmation         ELSE             RETURN Update_Reject_Note         ENDIF     END   </pre>

<b>NAME</b>	7.5 Display Successful Messages
<b>DESCRIPTION</b>	This process will display the addition and update successful messages to the staffs.
<b>INPUT DATA FLOWS</b>	Addition Confirmation, Update Confirmation
<b>OUTPUT DATA FLOWS</b>	Addition Confirmation, Update Confirmation
<b>PROCESS DESCRIPTION</b>	<pre>START     INPUT Addition_Confirmation     INPUT Update_Confirmation     IF Addition_Confirmation IS NOT NULL THEN         DISPLAY Addition_Confirmation     ENDIF     IF Update_Confirmation IS NOT NULL THEN         DISPLAY Update_Confirmation     ENDIF END</pre>

<b>NAME</b>	7.6 Display Failure Messages
<b>DESCRIPTION</b>	This process will display the addition and update failure messages to the staff.
<b>INPUT DATA FLOWS</b>	Update Reject Notice, Addition Reject Notice
<b>OUTPUT DATA FLOWS</b>	Update Reject Notice, Addition Reject Notice
<b>PROCESS DESCRIPTION</b>	<pre> START     INPUT Update_Reject_Note     INPUT Addition_Reject_Note     IF Update_Reject_Note IS NOT NULL THEN         DISPLAY Update_Reject_Note     ENDIF     IF Addition_Reject_Note IS NOT NULL THEN         DISPLAY Addition_Reject_Note     ENDIF END </pre>

9.2.2.3 Data Flow

<b>NAME</b>	Add Tour and Inventory
<b>DESCRIPTION</b>	Send the new addition data prompted by the staff to 7.1 Collect Addition Data process.
<b>ORIGIN</b>	Staff
<b>DESTINATION</b>	7.1 Collect Addition Data
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	New Addition Data
<b>DESCRIPTION</b>	To send the collected addition data to the next process, proceed to 7.2 Add New Data.
<b>ORIGIN</b>	7.1 Collect Addition Data
<b>DESTINATION</b>	7.2 Add New Data
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	Add Tour and Inventory Data
<b>DESCRIPTION</b>	This data flow involves adding newly acquired tour and inventory data into the Tours and Inventories data store for accurate and up-to-date record-keeping.
<b>ORIGIN</b>	7.2 Add New Data
<b>DESTINATION</b>	D4 Tours and Inventories
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	Update Tour and Inventory
<b>DESCRIPTION</b>	Send the new update data prompted by the staff to 7.3 Collect Update Data process.
<b>ORIGIN</b>	Staff
<b>DESTINATION</b>	7.3 Collect Update Data
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	New Update Data
<b>DESCRIPTION</b>	To send the collected update data to the next process, proceed to 7.4 Update New Data.
<b>ORIGIN</b>	7.3 Collect Update Data
<b>DESTINATION</b>	7.4 Update New Data
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	Update Tour and Inventory Data
<b>DESCRIPTION</b>	This data flow involves updating newly acquired tour and inventory data into the Tours and Inventories data store for accurate and up-to-date record-keeping.
<b>ORIGIN</b>	7.4 Update New Data
<b>DESTINATION</b>	D4 Tours and Inventories
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

<b>NAME</b>	Update Confirmation
<b>DESCRIPTION</b>	This data flow will notify the system to display the update successful messages, showing that the data and inventories in the data store is updated successfully.
<b>ORIGIN</b>	D4 Tours and Inventories
<b>DESTINATION</b>	7.5 Display Successful Messages
<b>DATA STRUCTURE</b>	Confirmation_Message

<b>NAME</b>	Addition Confirmation
<b>DESCRIPTION</b>	This data flow will notify the system to display the addition successful messages, showing that the new data of tours and inventories is successfully added into the data store.
<b>ORIGIN</b>	D4 Tours and Inventories
<b>DESTINATION</b>	7.5 Display Successful Messages
<b>DATA STRUCTURE</b>	Confirmation_Message

<b>NAME</b>	Update Reject Notice
<b>DESCRIPTION</b>	This data flow will notify the system to display the update failure messages, showing that the data for tours and inventories in the data store have failed to update.
<b>ORIGIN</b>	D4 Tours and Inventories
<b>DESTINATION</b>	7.6 Display Failure Messages
<b>DATA STRUCTURE</b>	Reject_Message

<b>NAME</b>	Addition Reject Notice
<b>DESCRIPTION</b>	This data flow will notify the system to display the addition failure messages, showing that the new data for tours and inventories in the data store have failed to add.
<b>ORIGIN</b>	D4 Tours and Inventories
<b>DESTINATION</b>	7.6 Display Failure Messages
<b>DATA STRUCTURE</b>	Reject_Message

<b>NAME</b>	Update Confirmation
<b>DESCRIPTION</b>	This data flow will display update confirmation messages (indicating update success) to the staff, notifying them that the updated data has been recorded in the data store.
<b>ORIGIN</b>	7.5 Display Successful Messages
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Confirmation_Message

<b>NAME</b>	Addition Confirmation
<b>DESCRIPTION</b>	This data flow will display addition confirmation messages (indicating addition success) to the staff, notifying them that the new data has been recorded in the data store.
<b>ORIGIN</b>	7.5 Display Successful Messages
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Confirmation_Message

<b>NAME</b>	Update Reject Notice
<b>DESCRIPTION</b>	This data flow will display update reject messages (indicating update failed) to the staff, notifying them that the data is not updated in the data store.
<b>ORIGIN</b>	7.6 Display Failure Messages
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Reject_Message

<b>NAME</b>	Addition Reject Notice
<b>DESCRIPTION</b>	This data flow will display addition reject messages (indicating addition failed) to the staff, notifying them that the new data is not added in the data store.
<b>ORIGIN</b>	7.6 Display Failure Messages
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Reject_Message

9.2.2.4 Data Store

<b>NAME</b>	D4 Tours and Inventories
<b>DESCRIPTION</b>	D4 Tours and Inventories data store stores all the data and information about the tours and inventories
<b>INPUT DATA FLOWS</b>	Update Tour and Inventory Data, Add Tour and Inventory Data
<b>OUTPUT DATA FLOWS</b>	Addition Confirmation, Update Confirmation, Update Reject Notice, Addition Reject Notice
<b>DATA STRUCTURE</b>	Tour_ID, Inventory_ID, Tour_Name, Inventory_Name, Tour_Type

9.2.3 View Notification (LIM WEI LUN - TP069058)9.2.3.1 External Entity

<b>NAME</b>	Customer
<b>DESCRIPTION</b>	Customer submits requests to the system to access and review their own notifications.
<b>INPUT DATA FLOWS</b>	Show Notifications
<b>OUTPUT DATA FLOWS</b>	View Notifications

<b>NAME</b>	Staff
<b>DESCRIPTION</b>	Staff submits requests to the system to access and review their personal notifications.
<b>INPUT DATA FLOWS</b>	Show Personal Notifications
<b>OUTPUT DATA FLOWS</b>	View Individual Notifications

9.2.3.2 Process

<b>NAME</b>	8.1 Collect Requests
<b>DESCRIPTION</b>	This process receives and collects the view notifications request from customer and staff
<b>INPUT DATA FLOWS</b>	View Notifications, View Individual Notifications
<b>OUTPUT DATA FLOWS</b>	Collected Requests
<b>PROCESS DESCRIPTION</b>	<pre> START     SET Collected_Requests = empty list     INPUT ViewNotifications     INPUT ViewIndividualNotifications     IF ViewNotifications is not empty THEN         ADD ViewNotifications INTO             Collected_Requests     ENDIF     IF ViewIndividualNotifications is not empty THEN         ADD ViewIndividualNotifications INTO             Collected_Requests     ENDIF     RETURN Collected_Requests END </pre>

<b>NAME</b>	8.2 Search Notifications
<b>DESCRIPTION</b>	This process will search the collected requests in the data store.
<b>INPUT DATA FLOWS</b>	Collected Requests
<b>OUTPUT DATA FLOWS</b>	Notification Search
<b>PROCESS DESCRIPTION</b>	<pre>START     INPUT Collected_Requests     FOR EACH request IN Collected_Requests         SEARCH request IN D10 User Notifications         IF request IS FOUND THEN             RETURN request         ENDIF     ENDFOR END</pre>

<b>NAME</b>	8.3 Display Notifications
<b>DESCRIPTION</b>	This process will exhibit and present exclusively those notifications within the data store that pertain to the respective user.
<b>INPUT DATA FLOWS</b>	Notification Data
<b>OUTPUT DATA FLOWS</b>	Show Notifications, Show Personal Notifications
<b>PROCESS DESCRIPTION</b>	START INPUT Notification_Data DISPLAY Notification_Data END

9.2.3.3 Data Flow

<b>NAME</b>	View Notifications
<b>DESCRIPTION</b>	To allow customer to read the notifications by sending the requests to the Collect Requests process.
<b>ORIGIN</b>	Customer
<b>DESTINATION</b>	8.1 Collect Requests
<b>DATA STRUCTURE</b>	User_ID

<b>NAME</b>	View individual Notifications
<b>DESCRIPTION</b>	To allow staff to read the notifications by sending the requests to the Collect Requests process.
<b>ORIGIN</b>	Staff
<b>DESTINATION</b>	8.1 Collect Requests
<b>DATA STRUCTURE</b>	User_ID

<b>NAME</b>	Collected Requests
<b>DESCRIPTION</b>	To send the collected requests from customer and staff to the next process, Search Notifications process to search notification.
<b>ORIGIN</b>	8.1 Collect Requests
<b>DESTINATION</b>	8.2 Search Notifications
<b>DATA STRUCTURE</b>	User_ID

<b>NAME</b>	Notification Search
<b>DESCRIPTION</b>	Send the search notification request to the D10 User Notifications Data Store to search all the related notifications.
<b>ORIGIN</b>	8.2 Search Notifications
<b>DESTINATION</b>	D10 User Notifications
<b>DATA STRUCTURE</b>	User_ID

<b>NAME</b>	Notification Data
<b>DESCRIPTION</b>	To send the notifications from D10 User Notifications data store to Display Notifications process, thus allowing the customer and staff to read their notifications.
<b>ORIGIN</b>	D10 User Notifications
<b>DESTINATION</b>	8.3 Display Notifications
<b>DATA STRUCTURE</b>	Notification_Content, Timestamp, User_ID, Sender_ID

<b>NAME</b>	Show Notifications
<b>DESCRIPTION</b>	To display the notifications in text or visual form to allow the customer to read their own notifications.
<b>ORIGIN</b>	8.3 Display Notifications
<b>DESTINATION</b>	Customer
<b>DATA STRUCTURE</b>	Notification_Content, Timestamp, User_ID, Sender_ID

<b>NAME</b>	Show Personal Notifications
<b>DESCRIPTION</b>	To display the notifications in text or visual form to allow the staff to read their own notifications.
<b>ORIGIN</b>	8.3 Display Notifications
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Notification_Content, Timestamp, User_ID, Sender_ID

9.2.3.4 Data Store

<b>NAME</b>	D10 User Notifications
<b>DESCRIPTION</b>	Stores all the notification data.
<b>INPUT DATA FLOWS</b>	Notification Search
<b>OUTPUT DATA FLOWS</b>	Notification Data
<b>DATA STRUCTURE</b>	Notification_ID, User_ID, Sender_ID, Notification_Content, Timestamp

9.2.4 Manage Booking (Staff) (AMIRHOSSEIN HAYATGHEIBI - TP069095)9.2.4.1 External Entity

<b>NAME</b>	Staff
<b>DESCRIPTION</b>	Staff Sends requests to system to view and modify booking details
<b>INPUT DATA FLOWS</b>	Confirmation Message, Booking Details, Customer Details Request, Customer Booking Details
<b>OUTPUT DATA FLOWS</b>	Customer Booking ID, Customer Details, Booking Search, Reservation Details

9.2.4.2 Process

<b>NAME</b>	6.1 Add Reservation
<b>DESCRIPTION</b>	Staff adds details for a new reservation
<b>INPUT DATA FLOWS</b>	Reservation details, Rejection Message
<b>OUTPUT DATA FLOWS</b>	Reservation checking, Reservation details
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>    INPUT reservationdetails</p> <p>END</p>

<b>NAME</b>	6.2 Reservation Rejection
<b>DESCRIPTION</b>	Checking to see whether reservation data does not match the reservation criteria
<b>INPUT DATA FLOWS</b>	Reservation checking
<b>OUTPUT DATA FLOWS</b>	Checking failure
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>    IF reservationdetails == reservationcriteria</p> <p>        DISPLAY “Added successfully”</p> <p>    ELSE</p> <p>        DISPLAY “Reservation failed”</p> <p>END</p>

<b>NAME</b>	6.3 Reservation Confirmation
<b>DESCRIPTION</b>	Checking to see if reservation data successfully matches criteria
<b>INPUT DATA FLOWS</b>	Reservation Checking
<b>OUTPUT DATA FLOWS</b>	Checking Success
<b>PROCESS DESCRIPTION</b>	<pre> START     IF reservationdetails == reservationcriteria         DISPLAY "Added successfully"     ELSE         DISPLAY "Reservation failed" END </pre>

<b>NAME</b>	6.4 Reservation Rejection Notice
<b>DESCRIPTION</b>	An output process that allows the user to see that the reservation did not match criteria
<b>INPUT DATA FLOWS</b>	Checking Failure
<b>OUTPUT DATA FLOWS</b>	Rejection Message
<b>PROCESS DESCRIPTION</b>	<pre> START     IF reservationdetails != reservationcriteria         DISPLAY "Reservation failed" END </pre>

<b>NAME</b>	6.5 Reservation Confirmation Notice
<b>DESCRIPTION</b>	An output process that allows the user to see that the reservation matched criteria
<b>INPUT DATA FLOWS</b>	Checking success
<b>OUTPUT DATA FLOWS</b>	Confirmation Message
<b>PROCESS DESCRIPTION</b>	<pre> START     IF reservationdetails == reservationcriteria         DISPLAY "Added successfully" END </pre>

<b>NAME</b>	6.6 Add Reservation Details
<b>DESCRIPTION</b>	A process that adds the reservation details to the reservation data store
<b>INPUT DATA FLOWS</b>	Reservation Details
<b>OUTPUT DATA FLOWS</b>	Reservation Data
<b>PROCESS DESCRIPTION</b>	<pre> START     IF reservationdetails == reservationcriteria         INSERT reservationdetails INTO D5 END </pre>

<b>NAME</b>	6.7 View Customer Booking
<b>DESCRIPTION</b>	Allows the staff to view any of the customer bookings
<b>INPUT DATA FLOWS</b>	Customer details, Booking Details
<b>OUTPUT DATA FLOWS</b>	Booking Details Request, Customer Detail Request
<b>PROCESS DESCRIPTION</b>	<pre> START     INPUT customerbookingID     FOR EACH customerbookingID IN D5         IF customerbookingID == bookingID             RETURN bookingdetail         ELSE             RETURN "Not found"     END   </pre>

<b>NAME</b>	6.8 Search Booking Details
<b>DESCRIPTION</b>	Allows the staff to search for specific bookings using certain criteria
<b>INPUT DATA FLOWS</b>	Booking details, Booking search
<b>OUTPUT DATA FLOWS</b>	Booking Search, Booking Details
<b>PROCESS DESCRIPTION</b>	<pre> START     INPUT searchdetails     FOR EACH bookingdetails IN D5         IF searchdetails == bookingdetails             RETURN "Data found"             DISPLAY bookingid, bookingdetails     END   </pre>

<b>NAME</b>	6.9 Show Customer Booking Details
<b>DESCRIPTION</b>	Allows the staff to check which customer made which booking
<b>INPUT DATA FLOWS</b>	Booking Details, Customer Booking ID
<b>OUTPUT DATA FLOWS</b>	Booking Details, Customer Booking ID
<b>PROCESS DESCRIPTION</b>	<pre>START     INPUT id     IF id == customerID         DISPLAY customerID,customerdetails,bookingdetails     END</pre>

9.2.4.3 Data Flow

<b>NAME</b>	Reservation details
<b>DESCRIPTION</b>	Details of a reservation to be added
<b>ORIGIN</b>	Staff external entity
<b>DESTINATION</b>	6.1 Add reservation
<b>DATA STRUCTURE</b>	Reservation_details

<b>NAME</b>	Customer details
<b>DESCRIPTION</b>	Customer details being given to be viewed
<b>ORIGIN</b>	Staff external entity
<b>DESTINATION</b>	6.7 view customer booking
<b>DATA STRUCTURE</b>	Customer_id

<b>NAME</b>	Customer booking ID
<b>DESCRIPTION</b>	Booking ID of customer to search
<b>ORIGIN</b>	Staff external entity
<b>DESTINATION</b>	6.9 Show customer booking details
<b>DATA STRUCTURE</b>	Customer_booking_id

<b>NAME</b>	Booking search
<b>DESCRIPTION</b>	Searching for a specific booking
<b>ORIGIN</b>	Staff external entity
<b>DESTINATION</b>	6.8 Search booking details
<b>DATA STRUCTURE</b>	Booking_id

<b>NAME</b>	Customer detail request
<b>DESCRIPTION</b>	Request for the details of a specific customer
<b>ORIGIN</b>	6.7 View customer booking
<b>DESTINATION</b>	Staff external entity
<b>DATA STRUCTURE</b>	customer_details

<b>NAME</b>	Booking details
<b>DESCRIPTION</b>	The details that were requested using the customer booking ID
<b>ORIGIN</b>	6.9 show customer booking details
<b>DESTINATION</b>	Staff external entity
<b>DATA STRUCTURE</b>	Booking_id

<b>NAME</b>	Booking details
<b>DESCRIPTION</b>	The details requested using the booking search
<b>ORIGIN</b>	6.8 search booking details
<b>DESTINATION</b>	Staff external entity
<b>DATA STRUCTURE</b>	Booking_details

<b>NAME</b>	Confirmation Message
<b>DESCRIPTION</b>	Message received by staff to ensure that reservation was confirmed
<b>ORIGIN</b>	6.5 Reservation confirmation notice
<b>DESTINATION</b>	Staff external entity
<b>DATA STRUCTURE</b>	Conf_message

<b>NAME</b>	Rejection Message
<b>DESCRIPTION</b>	A message received when the reservation checking has failed
<b>ORIGIN</b>	6.4 Reservation rejection notice
<b>DESTINATION</b>	6.1 Add reservation
<b>DATA STRUCTURE</b>	Rej_message

<b>NAME</b>	Checking failure
<b>DESCRIPTION</b>	Checks to see if reservation was rejected
<b>ORIGIN</b>	6.2 Reservation rejection
<b>DESTINATION</b>	6.4 Reservation rejection notice
<b>DATA STRUCTURE</b>	Rej_id

<b>NAME</b>	Reservation Checking
<b>DESCRIPTION</b>	Checks to see if reservation meets criteria
<b>ORIGIN</b>	6.1 Add reservation
<b>DESTINATION</b>	6.2 Reservation rejection
<b>DATA STRUCTURE</b>	Res_id,res_details

<b>NAME</b>	Reservation Checking
<b>DESCRIPTION</b>	Checks to see if reservation meets criteria
<b>ORIGIN</b>	6.1 Add reservation
<b>DESTINATION</b>	6.3 Reservation confirmation
<b>DATA STRUCTURE</b>	Res_id,res_details

<b>NAME</b>	Checking Success
<b>DESCRIPTION</b>	Sends details of a confirmed reservation
<b>ORIGIN</b>	6.3 Reservation Confirmation
<b>DESTINATION</b>	6.5 reservation confirmation notice
<b>DATA STRUCTURE</b>	Conf_id

<b>NAME</b>	Checking Success
<b>DESCRIPTION</b>	Saves data of a confirmed reservation
<b>ORIGIN</b>	6.3 Reservation confirmation
<b>DESTINATION</b>	Datastore 5 Customer booking lists
<b>DATA STRUCTURE</b>	Res_details

<b>NAME</b>	Reservation Details
<b>DESCRIPTION</b>	Details of a successful reservation
<b>ORIGIN</b>	6.1 Add reservation
<b>DESTINATION</b>	6.6 add reservation details
<b>DATA STRUCTURE</b>	Res_id,res_details

<b>NAME</b>	Reservation data
<b>DESCRIPTION</b>	Saves reservation data
<b>ORIGIN</b>	6.6 Add reservation details
<b>DESTINATION</b>	Datastore 5 Customer booking lists
<b>DATA STRUCTURE</b>	Res_id,res_details

<b>NAME</b>	Booking search
<b>DESCRIPTION</b>	Sends the searched input for the booking
<b>ORIGIN</b>	6.8 Search booking details
<b>DESTINATION</b>	Datastore 5 customer booking lists
<b>DATA STRUCTURE</b>	Booking_details

<b>NAME</b>	Booking Details
<b>DESCRIPTION</b>	Returns booking details from the booking search
<b>ORIGIN</b>	Datastore 5 Customer booking lists
<b>DESTINATION</b>	6.8 Search booking details
<b>DATA STRUCTURE</b>	Booking_id, customer_id, booking_details

<b>NAME</b>	Customer booking ID
<b>DESCRIPTION</b>	Sends the searched data to the database
<b>ORIGIN</b>	6.9 Show customer booking details
<b>DESTINATION</b>	Datastore 5 customer booking lists
<b>DATA STRUCTURE</b>	Customer_booking_id

<b>NAME</b>	Booking details
<b>DESCRIPTION</b>	The booking details are returned from the searched IDs
<b>ORIGIN</b>	Datastore 5 customer booking lists
<b>DESTINATION</b>	6.9 Show customer booking details
<b>DATA STRUCTURE</b>	Customer_id, booking_details

<b>NAME</b>	Booking details request
<b>DESCRIPTION</b>	A request made for booking details
<b>ORIGIN</b>	6.7 View customer booking
<b>DESTINATION</b>	Datastore 5 customer booking lists
<b>DATA STRUCTURE</b>	Booking_id

<b>NAME</b>	Booking details
<b>DESCRIPTION</b>	The booking details that were requested earlier
<b>ORIGIN</b>	Datastore 5 customer booking lists
<b>DESTINATION</b>	6.7 View customer booking
<b>DATA STRUCTURE</b>	Booking_details

9.2.4.4 Data Store

<b>NAME</b>	Customer booking lists
<b>DESCRIPTION</b>	Stores all the data related to the customer bookings
<b>INPUT DATA FLOWS</b>	Booking search
<b>OUTPUT DATA FLOWS</b>	Booking data
<b>DATA STRUCTURE</b>	res_id, res_details, booking_id, booking_details, customer_id, customer_booking_id

9.2.5 Manage Schedule (JENNA CAITLIN DASS - TP070346)9.2.5.1 External Entity

<b>NAME</b>	Customer
<b>DESCRIPTION</b>	Customers' requests to view staff availability
<b>INPUT DATA FLOWS</b>	Show Staff Status
<b>OUTPUT DATA FLOWS</b>	View Staff Availability

<b>NAME</b>	Staff
<b>DESCRIPTION</b>	Staff requests to view schedule
<b>INPUT DATA FLOWS</b>	Staff Schedule Updates, Show Schedule
<b>OUTPUT DATA FLOWS</b>	View Schedule

<b>NAME</b>	Digital Scheduler
<b>DESCRIPTION</b>	Digital scheduler is in charge of creating and updating schedules
<b>INPUT DATA FLOWS</b>	Update Request Approved, Schedule Update Confirmation, Update Request Denied
<b>OUTPUT DATA FLOWS</b>	Update Schedule, Send Staff Schedule, Schedule Update Request

9.2.5.2 Process

<b>NAME</b>	9.1 Collect View Schedule Request
<b>DESCRIPTION</b>	This process receives and collects the view schedule request from customer and staff
<b>INPUT DATA FLOWS</b>	View Staff Availability, View Schedule
<b>OUTPUT DATA FLOWS</b>	Collected Requests
<b>PROCESS DESCRIPTION</b>	<pre> START     SET Collected_Requests = empty list     INPUT ViewSchedule     INPUT ViewStaffAvailability     IF ViewSchedule is not empty THEN         ADD ViewSchedule INTO             Collected_Requests     ENDIF     IF ViewStaffAvailability is not empty THEN         ADD ViewStaffAvailability INTO             Collected_Requests     ENDIF     RETURN Collected_Requests END </pre>

<b>NAME</b>	9.2 Search View Schedule Request
<b>DESCRIPTION</b>	This process will search the collected requests in the data store.
<b>INPUT DATA FLOWS</b>	Collected Requests
<b>OUTPUT DATA FLOWS</b>	Search Schedule
<b>PROCESS DESCRIPTION</b>	<pre>START     INPUT Collected_Requests     FOR EACH request IN Collected_Requests         SEARCH request IN D11 Staff Schedule         IF request IS FOUND THEN             RETURN requests         ENDIF     ENDFOR END</pre>

<b>NAME</b>	9.3 Display Schedule
<b>DESCRIPTION</b>	This process will exhibit and present exclusively those notifications within the data store that pertain to the respective user.
<b>INPUT DATA FLOWS</b>	Schedule Info, Send Staff Schedule
<b>OUTPUT DATA FLOWS</b>	Staff Schedule Updates, Show Schedule, Show Staff Status
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>    INPUT Schedule_Data</p> <p>    DISPLAY Schedule_Data</p> <p>END</p>

<b>NAME</b>	9.4 Validate Update Request
<b>DESCRIPTION</b>	This process will validate the update request sent by the digital scheduler to approve or deny.
<b>INPUT DATA FLOWS</b>	Schedule Update Request
<b>OUTPUT DATA FLOWS</b>	Valid Update Request, Invalid Update Request
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>    PRINT "Update Request Approved"</p> <p>    PRINT "Schedule updated successfully"</p> <p>END</p>

<b>NAME</b>	9.5 Display Success Message
<b>DESCRIPTION</b>	This process will show a success message to the user to show that the update request is valid and has been approved.
<b>INPUT DATA FLOWS</b>	Valid Update Request
<b>OUTPUT DATA FLOWS</b>	Update Request Approved
<b>PROCESS DESCRIPTION</b>	<pre> START  REQUEST = GetSchedUpdateReq() IF IsValidUpdateRequest(REQUEST) THEN     PRINT Success Message ELSE     PRINT Failure Message END IF  END </pre>

<b>NAME</b>	9.6 Display Failure Message
<b>DESCRIPTION</b>	This process will show a failure message to the user to show that the update request is invalid and has been denied.
<b>INPUT DATA FLOWS</b>	Invalid Update Request
<b>OUTPUT DATA FLOWS</b>	Update Request Denied
<b>PROCESS DESCRIPTION</b>	<pre> START  PRINT "Update Request Denied" PRINT GetValidationError()  END </pre>

<b>NAME</b>	9.7 Update Schedule
<b>DESCRIPTION</b>	This process updates the schedule as per the request by the digital scheduler and store the updated schedule in the data store.
<b>INPUT DATA FLOWS</b>	Update Schedule
<b>OUTPUT DATA FLOWS</b>	Schedule Updated
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>GET UpdateConfirmation</p> <p>FOR EACH Schedule IN</p> <p>IsValidUpdateRequest(REQUEST):</p> <p>    UPDATE Schedule</p> <p>    SEND UpdateSchedules to D11 Staff Schedule</p> <p>END</p>

<b>NAME</b>	9.8 Show Update Confirmation
<b>DESCRIPTION</b>	This process will confirm that the schedule has been updated and send the digital scheduler and confirmation notice.
<b>INPUT DATA FLOWS</b>	Update Confirmed
<b>OUTPUT DATA FLOWS</b>	Schedule Update Confirmation
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>PRINT "Update Confirmed"</p> <p>PRINT "Schedules have been updated."</p> <p>END</p>

9.2.5.3 Data Flow

<b>NAME</b>	View Staff Availability
<b>DESCRIPTION</b>	To allow customer to see staffs availability by sending the requests to the Collect View Notification Schedule process.
<b>ORIGIN</b>	Customer
<b>DESTINATION</b>	9.1 Collect View Schedule Request
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	View Schedule
<b>DESCRIPTION</b>	To allow staff to view their own schedule
<b>ORIGIN</b>	Staff
<b>DESTINATION</b>	9.1 Collect View Schedule Request
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	Show Staff Status
<b>DESCRIPTION</b>	To allow customers to view the staff availability status
<b>ORIGIN</b>	9.3 Display Schedule
<b>DESTINATION</b>	Customer
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	Staff Schedule Updates
<b>DESCRIPTION</b>	To allow staff to view their own updated schedule
<b>ORIGIN</b>	9.3 Display Schedule
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info

<b>NAME</b>	Show Schedule
<b>DESCRIPTION</b>	To show staff their own schedule as requested
<b>ORIGIN</b>	9.3 Display Schedule
<b>DESTINATION</b>	Staff
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info

<b>NAME</b>	Collected requests
<b>DESCRIPTION</b>	To collect requests made by staff and customer to view schedule and staff availability
<b>ORIGIN</b>	9.1 Collect View Schedule Request
<b>DESTINATION</b>	9.2 Search View Schedule Request
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	Search Schedule
<b>DESCRIPTION</b>	To search the staff schedule in the data store
<b>ORIGIN</b>	Search View Schedule Request
<b>DESTINATION</b>	D11 Staff Schedule
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	Schedule Info
<b>DESCRIPTION</b>	To display the staff schedule to the staff and customers
<b>ORIGIN</b>	D11 Staff Schedule
<b>DESTINATION</b>	9.3 Display Schedule
<b>DATA STRUCTURE</b>	Staff_ID

<b>NAME</b>	Send Staff Schedule
<b>DESCRIPTION</b>	Send staff schedule to display with schedule info
<b>ORIGIN</b>	Digital Scheduler
<b>DESTINATION</b>	9.3 Display Schedule
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info

<b>NAME</b>	Schedule Update Request
<b>DESCRIPTION</b>	To send request to update schedule
<b>ORIGIN</b>	Digital Scheduler
<b>DESTINATION</b>	9.4 Validate Update Request
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info, Update_Request

<b>NAME</b>	Valid Update Request
<b>DESCRIPTION</b>	Request to update schedule is valid
<b>ORIGIN</b>	9.4 Validate Update Request
<b>DESTINATION</b>	9.5 Display Success Message
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info, Update_Request

<b>NAME</b>	Invalid Update Request
<b>DESCRIPTION</b>	Request to update schedule is invalid
<b>ORIGIN</b>	9.4 Validate Update Request
<b>DESTINATION</b>	9.6 Display Failure Message
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info, Update_Request

<b>NAME</b>	Update Request Approved
<b>DESCRIPTION</b>	Request to update schedule is approved and schedule will be updated
<b>ORIGIN</b>	9.5 Display Success Message
<b>DESTINATION</b>	Digital Scheduler
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info, Update_Request_Valid

<b>NAME</b>	Update Request Denied
<b>DESCRIPTION</b>	Request to update schedule is denied and schedule will not be updated
<b>ORIGIN</b>	9.6 Display Failure Message
<b>DESTINATION</b>	Digital Scheduler
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info, Update_Request_Invalid

<b>NAME</b>	Update Schedule
<b>DESCRIPTION</b>	Schedule is sent to be updated after update request is approved
<b>ORIGIN</b>	Digital Scheduler
<b>DESTINATION</b>	9.7 Update Schedule
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info

<b>NAME</b>	Schedule Updated
<b>DESCRIPTION</b>	Schedule is successfully updated and stored in the data store
<b>ORIGIN</b>	9.7 Update Schedule
<b>DESTINATION</b>	D11 Staff Schedule
<b>DATA STRUCTURE</b>	Staff_ID, Updated_Schedule_Info

<b>NAME</b>	Update Confirmed
<b>DESCRIPTION</b>	Update of schedule has been confirmed and will be sent to show a confirmation
<b>ORIGIN</b>	D11 Staff Schedule
<b>DESTINATION</b>	9.8 Show Update Confirmation
<b>DATA STRUCTURE</b>	Updated_Schedule_Info

<b>NAME</b>	Schedule Update Confirmation
<b>DESCRIPTION</b>	Schedule that has been updated is confirmed and digital scheduler will be aware of the confirmation.
<b>ORIGIN</b>	9.8 Show Update Confirmation
<b>DESTINATION</b>	Digital Scheduler
<b>DATA STRUCTURE</b>	Staff_ID, Updated_Schedule_Info

9.2.5.4 Data Store

<b>NAME</b>	D11 Staff Schedule
<b>DESCRIPTION</b>	Stores all the staff's schedule information
<b>INPUT DATA FLOWS</b>	Search Schedules, schedules updated
<b>OUTPUT DATA FLOWS</b>	Schedules info, Update confirmed
<b>DATA STRUCTURE</b>	Staff_ID, Schedule_Info

9.2.6 Authorize Login Details (LAI ZHAO WEI - TP070225)9.2.6.1 External Entity

<b>NAME</b>	Customer
<b>DESCRIPTION</b>	Customers provide their Customer ID and Password for system login, receiving a login status message indicating success or failure
<b>INPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>OUTPUT DATA FLOWS</b>	Customer ID and Password

<b>NAME</b>	Accountant
<b>DESCRIPTION</b>	Accountants provide their Acct ID and Password for system login, receiving a login status message indicating success or failure
<b>INPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>OUTPUT DATA FLOWS</b>	Acct ID and Password

<b>NAME</b>	Staff
<b>DESCRIPTION</b>	Staffs provide their Staff ID and Password for system login, receiving a login status message indicating success or failure
<b>INPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>OUTPUT DATA FLOWS</b>	Staff ID and Password

9.2.6.2 Process

<b>NAME</b>	2.1 Collect Login Details
<b>DESCRIPTION</b>	It collects the User ID and Password from the users to verify whether they match with stored credentials in the data store
<b>INPUT DATA FLOWS</b>	<ul style="list-style-type: none"> <li>• Customer ID and Password</li> <li>• Acct ID and Password</li> <li>• Staff ID and Password</li> </ul>
<b>OUTPUT DATA FLOWS</b>	<ul style="list-style-type: none"> <li>• Customer ID and Password</li> <li>• Acct ID and Password</li> <li>• Staff ID and Password</li> </ul>
<b>PROCESS DESCRIPTION</b>	<pre> START COLLECT User ID COLLECT Password IF (User ID and Password match with Customer Credentials in Data Store)     PRINT "Login Success" ELSE IF (User ID and Password match with Accountant Credentials in Data Store)     PRINT "Login Success" ELSE IF (User ID and Password match with Staff Credentials in Data Store)     PRINT "Login Success" ELSE     PRINT "Login Failure" ENDIF END </pre>

<b>NAME</b>	2.2 Show Success Message
<b>DESCRIPTION</b>	It involves in displaying login success message to the users if the entered User ID and Password match with the stored credentials in the data store
<b>INPUT DATA FLOWS</b>	Login Success Message
<b>OUTPUT DATA FLOWS</b>	Login Success Message
<b>PROCESS DESCRIPTION</b>	<pre> START COLLECT User ID COLLECT Password IF (User ID and Password match with Customer Credentials in Data Store) OR (User ID and Password match with Accountant Credentials in Data Store) OR (User ID and Password match with Staff Credentials in Data Store)     PRINT "Login Success" ENDIF END </pre>

<b>NAME</b>	2.3 Show Failure Message
<b>DESCRIPTION</b>	It involves in displaying login failure message to the users if the entered User ID and Password do not match with the stored credentials in the data store
<b>INPUT DATA FLOWS</b>	Login Failure Message
<b>OUTPUT DATA FLOWS</b>	Login Failure Message
<b>PROCESS DESCRIPTION</b>	<p>START</p> <p>COLLECT User ID</p> <p>COLLECT Password</p> <p>IF (User ID and Password do not match with Customer Credentials in Data Store)</p> <p>OR (User ID and Password do not match with Accountant Credentials in Data Store) OR (User ID and Password do not match with Staff Credentials in Data Store)</p> <p>PRINT “Login Failure”</p> <p>ENDIF</p> <p>END</p>

9.2.6.3 Data Flow

<b>NAME</b>	Customer ID and Password
<b>DESCRIPTION</b>	To allow customers to log into the system
<b>ORIGIN</b>	Customer External Entity
<b>DESTINATION</b>	Process 2.1 Collect Login Details
<b>DATA STRUCTURE</b>	Customer_ID, Password

<b>NAME</b>	Acct ID and Password
<b>DESCRIPTION</b>	To allow accountants to log into the system
<b>ORIGIN</b>	Accountant External Entity
<b>DESTINATION</b>	Process 2.1 Collect Login Details
<b>DATA STRUCTURE</b>	Acct_ID, Password

<b>NAME</b>	Staff ID and Password
<b>DESCRIPTION</b>	To allow staffs to log into the system
<b>ORIGIN</b>	Staff External Entity
<b>DESTINATION</b>	Process 2.1 Collect Login Details
<b>DATA STRUCTURE</b>	Staff_ID, Password

<b>NAME</b>	Customer ID and Password
<b>DESCRIPTION</b>	To allow customers to log into the system after verifying their Customer ID and Password
<b>ORIGIN</b>	Process 2.1 Collect Login Details
<b>DESTINATION</b>	Data Store D1 Customers
<b>DATA STRUCTURE</b>	Customer_ID, Password

<b>NAME</b>	Acct ID and Password
<b>DESCRIPTION</b>	To allow accountants to log into the system after verifying their Acct ID and Password
<b>ORIGIN</b>	Process 2.1 Collect Login Details
<b>DESTINATION</b>	Data Store D2 Accountants
<b>DATA STRUCTURE</b>	Acct_ID, Password

<b>NAME</b>	Staff ID and Password
<b>DESCRIPTION</b>	To allow staffs to log into the system after verifying their Staff ID and Password
<b>ORIGIN</b>	Process 2.1 Collect Login Details
<b>DESTINATION</b>	Data Store D3 Staffs
<b>DATA STRUCTURE</b>	Staff_ID, Password

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To indicate that the login attempt from customers was successful
<b>ORIGIN</b>	Data Store D1 Customers
<b>DESTINATION</b>	Process 2.2 Show Success Message
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To indicate that the login attempt from accountants was successful
<b>ORIGIN</b>	Data Store D2 Accountants
<b>DESTINATION</b>	Process 2.2 Show Success Message
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To indicate that the login attempt from staffs was successful
<b>ORIGIN</b>	Data Store D3 Staffs
<b>DESTINATION</b>	Process 2.2 Show Success Message
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To indicate that the login attempt from customers was unsuccessful
<b>ORIGIN</b>	Data Store D1 Customers
<b>DESTINATION</b>	Process 2.3 Show Failure Message
<b>DATA STRUCTURE</b>	Login_Failure_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To indicate that the login attempt from accountants was unsuccessful
<b>ORIGIN</b>	Data Store D2 Accountants
<b>DESTINATION</b>	Process 2.3 Show Failure Message
<b>DATA STRUCTURE</b>	Login_Failure_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To indicate that the login attempt from staffs was unsuccessful
<b>ORIGIN</b>	Data Store D3 Staffs
<b>DESTINATION</b>	Process 2.3 Show Failure Message
<b>DATA STRUCTURE</b>	Login_Failure_Message

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To notify the customers if they successfully log into the system
<b>ORIGIN</b>	Process 2.2 Show Success Message
<b>DESTINATION</b>	Customer External Entity
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To notify the accountants if they successfully log into the system
<b>ORIGIN</b>	Process 2.2 Show Success Message
<b>DESTINATION</b>	Accountant External Entity
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Success Message
<b>DESCRIPTION</b>	To notify the staffs if they successfully log into the system
<b>ORIGIN</b>	Process 2.2 Show Success Message
<b>DESTINATION</b>	Staff External Entity
<b>DATA STRUCTURE</b>	Login_Success_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To notify the customers if they failed to log into the system
<b>ORIGIN</b>	Process 2.3 Show Failure Message
<b>DESTINATION</b>	Customer External Entity
<b>DATA STRUCTURE</b>	Login_Failure_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To notify the accountants if they failed to log into the system
<b>ORIGIN</b>	Process 2.3 Show Failure Message
<b>DESTINATION</b>	Accountant External Entity
<b>DATA STRUCTURE</b>	Login_Failure_Message

<b>NAME</b>	Login Failure Message
<b>DESCRIPTION</b>	To notify the staffs if they failed to log into the system
<b>ORIGIN</b>	Process 2.3 Show Failure Message
<b>DESTINATION</b>	Staff External Entity
<b>DATA STRUCTURE</b>	Login_Failure_Message

9.2.6.4 Data Store

<b>NAME</b>	D1 Customers
<b>DESCRIPTION</b>	To store customer details from registration process, and the details can be used for login process
<b>INPUT DATA FLOWS</b>	Customer ID and Password
<b>OUTPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>DATA STRUCTURE</b>	Customer_ID, Name, Address, Phone_No., Email_Address, Password

<b>NAME</b>	D2 Accountants
<b>DESCRIPTION</b>	To store accountant details that can be used for login process
<b>INPUT DATA FLOWS</b>	Acct ID and Password
<b>OUTPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>DATA STRUCTURE</b>	Acct_ID, Name, Address, Phone_No., Email_Address, Position, Password

<b>NAME</b>	D3 Staffs
<b>DESCRIPTION</b>	To store staff details that can be used for login process
<b>INPUT DATA FLOWS</b>	Staff ID and Password
<b>OUTPUT DATA FLOWS</b>	Login Success Message, Login Failure Message
<b>DATA STRUCTURE</b>	Staff_ID, Name, Address, Phone_No., Email_Address, Department, Password

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