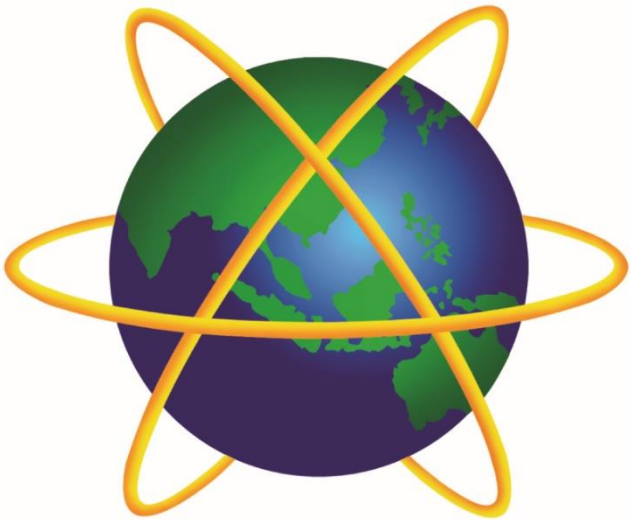

Module Code	**:**	CT026-3-1-SAAD – Systems Analysis and Design
Intake Code	**:**	APD1F2309IT
Lecturer Name	**:**	DR. JUSTIN GILBERT A/L ALEXIUS SILVESTER
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Tutorial No.	**:**	T-23
Group No.	**:**	Group 22
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1.0 Introduction

Figure 1.1 TSI LOGO

Travel Safe International (TSI) is an airline company that's located in Kuala Lumpur, Malaysia. It's a global distribution system market with a full-service flight ticketing brand almost across the world. While attending to customers' needs and efficiency are verticals, the airline also takes care of a wider variety of passengers, bridging gaps across four classes (economy, economy premium, business, and first-class) that are considered different meal preferences. The safety and comfort of the passengers are also addressed with their devotion to onboard specialized service. With this agenda-setting, TSI plans to move into more advanced development by spawning a fully functional prototype that will be capable of many things including flight reservations, cancellations, rescheduling, and producing insightful company reports, in the setting of 60,000 budget and 4 months as time frame, the main goals of TSI are to improve their services that make the travel process easy and smooth for its customers, on the other hand, the project is going to be focused on

the optimization of the working producers and processing to maximize the internal productivity and profit.

1.1 Vision

We proposed to disrupt the current travel industry by offering a reliable and user-friendly global booking system for flights with the option to customize journeys to reflect the passengers regarding the location on the globe and to provide them with the service of the highest quality both regarding convenience and reliability.

1.2 Mission

At TSI, our purpose is to surpass customer experience by combining emerging technology with industry experience, in turn, making sure that our solutions for flight scheduling, canceling, and changing are modern. We provide a safe, calm environment, and pleasant experience where you get what you deserve as a stakeholder. By implementing a stakeholder-oriented and ongoing improvement philosophy, we aim to stimulate customer experience and create lasting bonds with our customers and partners.

1.3 Motto

"Your Journey, Our Priority: Seamless, Safe, and Unforgettable."

1.4 Operational Process Overview

The Proposed system for Travel Safe International (TSI) is a system that includes a full suite of models for easy booking, rescheduling and cancellations, and company reporting. An easy-to-use dashboard interface designed for both staff and customers is the first feature of the system, which also includes a user authentication module to provide secure access. Customers can look up flights, enter traveler information, and choose extras like meal plans and special help using the flight booking module. Using multiple criteria, a fee calculation engine precisely calculates the overall fare. Whereas a booking confirmation module gives users access to comprehensive reservation details, integrated payment channels guarantee safe transactions. Furthermore, modules about special services reporting & analytics, cancellation & rescheduling management, and reporting equip staff and users with the resources they need for effective operation.

1. *Login/Sign-up*: To enable users to access the system, Travel Safe International (TSI) offers a secure login/sign-up interface. To make use of TSI's services, users whether employees or clients can register or log in with their login credentials (Thunkable, 2019).

2. *Dashboard*: Users are taken to their dashboards after successfully logging in. This dashboard acts as a primary hub from which users may access all TSI features and, facilitate easy task navigation and effective booking management.

3. *Flight search*: TSI site users look for flights according to certain parameters, such as the number of passengers, the chosen class (First, Business, Premium Economy, or Economy), the destination, and the travel dates. This feature ensures that users can easily find flights that match their travel needs (Thunkable, 2019).

4. *Flight option:* The user uses the search engine of the platform to look for flights by Entering destinations, travel dates, and air class preferences. Once the traveler has chosen an appropriate trip, he/she proceeds with the booking process by selecting the type of travel (one-way, round-trip, or multi-city), and the passenger's details, including the age category, for accurate fare calculation. Users then can choose a meal they would like to get and need special services like childcare or wheelchair assistance if they do. Fare is calculated,

depending on parameters such as passenger age, type of booking, and additional services, being paid with secured methods for a successful transaction. After confirming the booking, the customer receives a comprehensive description of the booking process, including the cancellation or rescheduling options within a specific period before the intended flight date. During this procedure, the software of TSI allows the users to make a smooth booking process which makes it easier to choose a flight and book it (Thunkable, 2019).

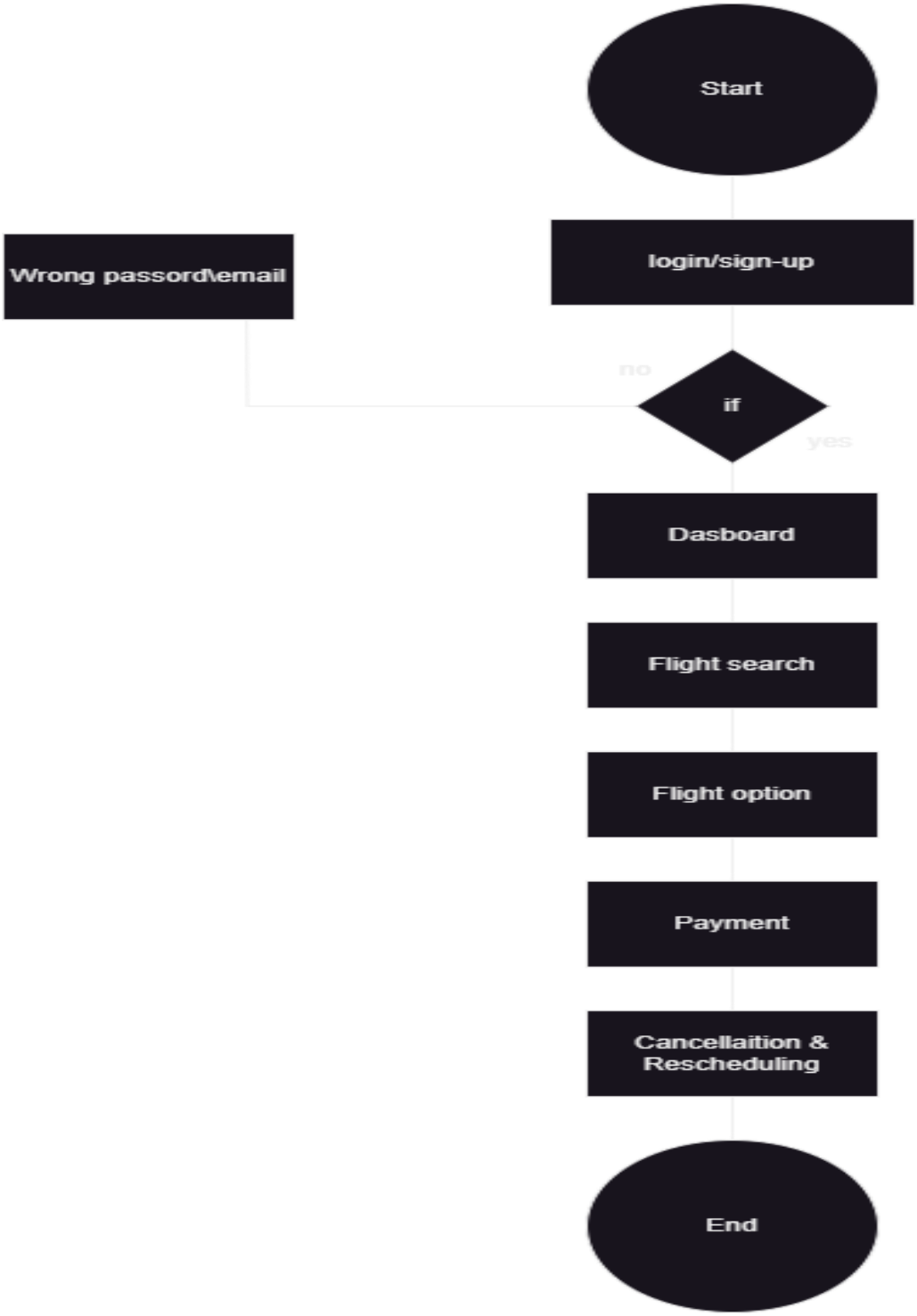
5. *Fare cancellation:* The TSI system calculates the fare for each booking based on various types, including passenger age, booking type, selected sets/services, and any applicable discounts or promotions, this ensures transparency and accuracy in pricing for users.

6. *Payment:* Users proceed with payment, where they can choose from different payment methods and complete the payment securely, also they can save the payment method for future booking.

7. *Confirmation:* Once the booking is confirmed, users receive a confirmation email or ticket with the details of their flight reservation.

8. *Cancellation & Rescheduling:* Users can cancel or reschedule their flights; it must be applicable with the charge and conditions. Changes may be made within a certain timeline before the scheduled flight.

A simple Diagram for these processes:



2.0 Problems Identification and Proposed Solutions

2.1 Potential problems with the system

1. Complexity of Fare Calculation: The system needs to calculate fares based on various factors such as passenger age, travel class, and whether they are accompanied by an infant. This complexity could easily lead to errors in fare calculation, causing confusion and dissatisfaction among passengers.

2. Unaccompanied Minor Service Management: Managing the service for unaccompanied minors is challenging. It involves ensuring these minors are safely boarded onto the aircraft and that the correct fees are assessed. Any mistakes in this process could lead to safety concerns and customer dissatisfaction.

3. Payment Options Problem: Offering multiple payment options is crucial to accommodate everyone and ensure a smooth experience. If the system doesn't support a wide range of payment methods, it might inconvenience passengers and deter them from using the flight services.

4. Login Issues: Potential customers might face difficulties if they do not have pre-existing accounts or if there are problems with logging in. Providing a simple and efficient sign-up process is essential to prevent the loss of potential customers.

2.2 Proposed Solutions

1. Automated Fare Calculation: Develop algorithms to automate fare calculation based on passenger details. This would reduce errors and ensure consistency in fare calculation, making the process more reliable and efficient.

2. Automated Unaccompanied Minor Service: Implement a system to manage the unaccompanied minor service, including boarding notifications and fee assessment. This would streamline the process, making it more efficient and reducing the likelihood of errors.

3. Multiple Payment Options: Offer a variety of payment options such as MasterCard, Visa, Apple Pay, and others. This ensures that passengers can choose the payment method they are most comfortable with, improving their overall experience.

4. Dedicated Sign-Up Page: Provide a comprehensive sign-up page to help new users create accounts easily. This would accommodate potential customers who do not have pre-existing accounts, preventing the loss of potential business.

2.3 Aim & Objectives

Aim: The primary aim of TSI's project is to enhance the efficiency, reliability, and user experience of the airline's booking and payment system, ensuring seamless fare calculation, effective management of special services, and providing a wide range of payment options for customers.

Objectives:

Automate Fare Calculation:

- Develop and implement advanced algorithms for accurate and automated fare calculation based on passenger age, travel class, and other factors.

- Minimise errors and discrepancies in fare calculations to improve customer satisfaction and trust.

Improve Unaccompanied Minor Service Management:

- Create an efficient system for managing the unaccompanied minor service, including automated boarding notifications and accurate fee assessment.

- Ensure the safety and well-being of unaccompanied minors through good service management.

Enhance Payment Options:

- Integrate various payment methods, including major credit cards (MasterCard, Visa), digital wallets (Apple Pay), and other popular payment solutions.

- Facilitate a smooth and convenient payment process, accommodating the preferences of passengers.

Simplify Account Registration:

- Design a user-friendly and comprehensive sign-up page to assist new users in creating accounts easily and efficiently.

- Address potential login issues and streamline the registration process to prevent the loss of potential customers.

3.0 Project Planning

3.1 System development life cycle (SDLC)

The Project Planning phase involving the (SDLC) framework has several key activities and processes that are to be done. First is the beginning phase where the project's Adequacy is evaluated and objectives are devised while planning is done as well. After that, the subsystem by conducting requirements gathering is explained by the collection of TSI needs and system functionalities. After putting together the requirements, the analysis phase takes place in the flow of which the requirements are analyzed and specified into TSI system specifications. Then design phase follows through the building of TSI system architecture, interfaces, and data structures Implementation follows design in this process, and the (system) coding and testing (of) the whole system is completed in this phase. Lastly, during the deployment phase, the TSI system is made available to users, with maintenance and support tiering following up to guarantee that the product runs smoothly and the operations are perfected (Oatley, 2013).

3.2 Gant Chart

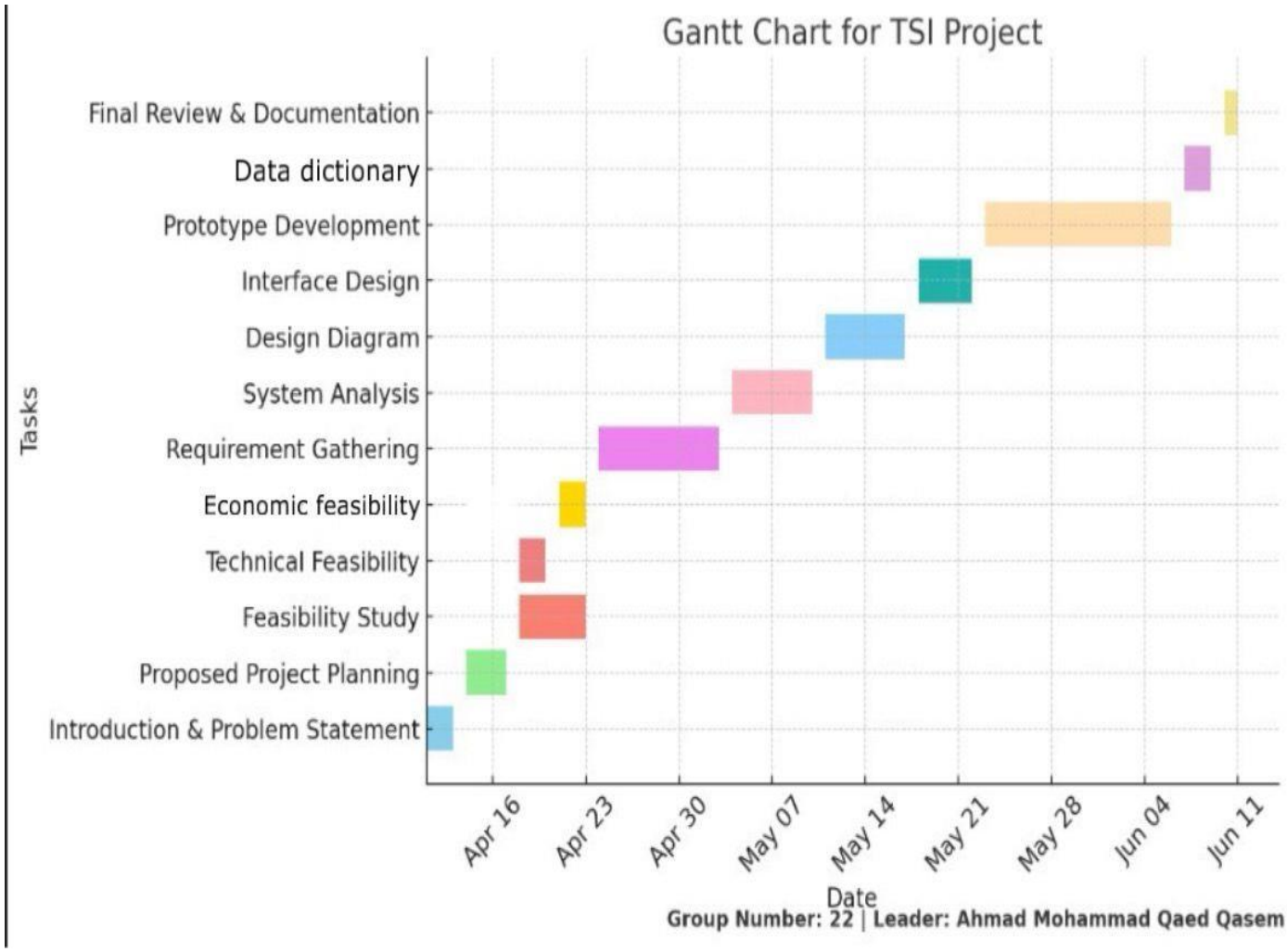


Figure 3.2.1 Gant chart

3.3 workload Matrix

ASIA PACIFIC UNIVERSITY OF TECHNOLOGY AND INNOVATON

CT026-3-1-SAAD

Student Coursework Workload Matrix - Grades and Feedback Attachment

INTAKE: APD1F2309IT	STUDENT NAME	Ahmed Mohammed Qaid Qasem (Leader)	Abrar Dawawala	Aliyan Rashid	Essa Wani	Aaron Justin Joseph
System Name: TSI airlines	TP NO.	TP077086	TP074840	TP077603	TP077603	TP077609

A. Group Component

CLO	ASSIGNMENT COMPONENT	ALLOCATED MARKS	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	TOTAL %
1	Introduction	5	100.00	0.00	0.00	0.00	0.00	100
2	Problems and Proposed Solutions	5	0.00	100.00	0.00	0.00	0.00	100
3	Project Planning	5	50.00	0.00	0.00	50.00	0.00	100
4	Feasibility Study	10	100.00	0.00	0.00	0.00	0.00	100
5	System Analysis	10	50.00	25.00	25.00	0.00	0.00	100
6	Design Diagram (Context Diagram, DFD 0, ERD)	20	0.00	0.00	65.00	10.00	25.00	100
7	Interface Design	10	20.00	80.00	0.00	0.00	0.00	100
	Total Marks and Contribution	65	38%	24%	24%	7%	7%	

Signature					

print until this point only

4.0 Feasibility Study

A feasibility study for TSI Airlines aims to examine the economic, operational, technological, schedule, and setback aspects. Determining whether TSI can complete the project is the primary goal (Sharma, 2022). A feasibility study could reveal creative ideas that completely alter the project's scope. Making these choices beforehand is preferable to starting a project and discovering it won't work. A feasibility study usually benefits a project since it gives you and other interested parties a comprehensive understanding of the proposal (Editor, 2023).

4.1 Technical Feasibility

The purpose of Technical feasibility is whether the company system, business, or system can be successfully implemented with the nowadays technologies and resources. It entails appraising aspects like the availability of required technology, expertise, infrastructure, and resources as well as factors that may cause technical issues, possible risks, and bottlenecks that may arise while the implementation process is ongoing. More generally, technical feasibility decides if the proposed solution is realizable from a technological point of view considering factors like compliance, reliability, scalability, and suitability to the applicable industry standards and regulations (Editor, 2023).

4.1.1 Is the proposed technology or solution practical?

Yes, the technology or solution that has been suggested for our company is workable. To make sure the selected technology fits our working needs and objectives, we have carried out thorough research and analysis.

4.1.2 Do we currently possess the necessary technology?

Yes, we have our newest technology available, and we know how to apply it effectively to develop our company system. For example, we have hardware such as modern aircraft with advanced systems, including GPS navigation, weather radar, and automated flight control systems.

4.1.3 Do we possess the necessary technical expertise, and is the schedule reasonable?

Yes, our airline company has advanced skills in creating the airways system. Also, we have two application programmers with extensive experience in aviation software development our schedule is reasonable, allowing ample time for thorough testing and implementation of the required technology for our Airline company.

4.1.4 If the technology is not available, can it be acquired?

Yes, we can certainly purchase the technology if the application can be purchased from reputable vendors. To ensure compatibility and dependability for our airline company operation, the necessary programmers can be bought from respectable suppliers that help in aviation software solutions.

4.1.5 Does technical feasibility evaluation entail examining the extent to which the suggested solutions flow with existing technology infrastructure?

Yes, a technical feasibility test implies analyzing if project solutions fit in the existing technical competencies and infrastructures of the organization.

4.2 Economical Feasibility

The Economic feasibility of our proposed system should expect to generate signification benefits that outweigh the estimated costs of implementation and operation. Our company's innovative products and cost-effective operations have allowed it to maintain a competitive edge in the market, making it economically viable and attractive for investors and customers alike (Sharma, 2022).

4.2.1 is the budget enough for our system?

Yes, the budget is enough and we can manage it through the system

4.2.2 Is the anticipated value of the benefits greater than projected costs of development?

Yes, we expected that our company would have more value in benefits outweigh the projected costs of the development.

4.2.3 Does the organization have adequate cash flow to fund the project during the development period?

Yes, our organization has sufficient cash to fund the project during the development period. Our strong financial position and well-planned budgetary distributions guarantee that the resources required to support the project's execution are available.

4.2.4 Will the use of the proposed system lead to more efficient flight reservations, cancellations, and rescheduling processes?

Yes, our system will make the flight reservations process a more precise, error-free, and quick one, and as a result, the overall efficiency will increase.

4.2.5 is the system able to generate a more effective decision-making process in comprehensive sales reports on sale trends, profit margins, and customer likes?

Yes, this system will integrate reporting features to provide a full picture of the various aspects of the business, thereby allowing management to make well-convinced decisions, execute the right strategy, and identify those areas of the business that need further improvement to result in increased earnings.

4.3 Schedule Feasibility

A timeline requirement for the prototype creation of various passenger operations of TSI, which include flight reservations, cancellations, rescheduling, as well as company reporting, within four months, depends on elaborate planning, effective allocation of resources, and well-thought-out development processes. The project will be phased gathering requirements, analysis, design, development, testing, and deployment are some of the phases. Every phase needs to be handled with due care and attention so that all stages of the project are realized within the planned timeframe. We will divide our task for this timeframe so that we can complete it before the deadline (Stanley, 2023).

4.3.1 Is it possible to accomplish the task during May and there is enough time to finish the need determination phase by the end of the month?

Yes, we can accomplish the completion of the requirement-gathering phase in a month if all the group is in the process and communication is as clear as a bell.

4.3.2 Can we face the problem and prototyping the passenger operations system design that is due in two weeks if we consider the current requirement-gathering phase?

Yes, ‘within two weeks’, the system can be designed entirely, if the requirements are precise and there is a good team that only deals with the designed parts.

4.3.3 Will it be feasible to make a cross version of this one in 6 weeks, taking into account the complexity level of the task?

Yes, the possibility of developing flight booking prototypes within the said six weeks, if the developers are skilled and technical issues encountered along the processes of development, are minimal.

4.3.4 Is there a mechanism to ensure expert testing of the prototype for passenger operation not later than two weeks after the development?

Yes, the scenarios are well outlined, and the testing team has access to the required resources within two weeks which is enough to test all system components.

4.3.5 should we perform human operations or not during such a short time remaining, which is two weeks in the last four months?

Yes, if I can get the testing issues resolved and if we devise and execute a detailed plan, then we can deploy the prototype within the two final weeks.

4.4 Operational Feasibility

Operational feasibility refers to the degree to which management, staff, customers, suppliers, and other participants are willing and able to use and support a proposed system. It speaks about how long it takes to use a newly suggested system to address a problem. The operational feasibility for TSI Airlines is the functionality of the airline operations after a project, such as the launching of a new route or upgrading the proposed system has been implemented into the operational context of the airline. The evaluation taps into this by analyzing different inputs, including the availability of aircraft, crew, and infrastructure, and then by considering the potential impact on everyday operations, such as scheduling, maintenance, and customer service. It will also consider the conformity of the proposed elements with regulatory requirements and industry norms (Simplilearn, 2012).

4.5 Pieces Framework

We used the PIECES framework for operational feasibility to thoroughly examine the current issues and specifications of Travel Safe International (TSI) we were able to determine the key features that our proposed system must have and identify particular areas where TSI's present solution has weaknesses by segmenting the operational aspects into Performance, Information, Control, Economy, Efficiency, and Services (Simplilearn, 2012). We were able to closely match our solution to TSI demands and challenges because of this systematic technique, which guarantees that our suggested system will both successfully solve their pain spots and satisfy their operational and functional requirements.

Performance: The complexity of the carriage constituency comes from the need to consider fare calculation factors at the same time including the age of passengers, booking type, and selected services together with any reduction that applies. This complexity can cause problems with service performance too. For instance, at times of high demand, we may have a great influx of booking requests that need to be made at the same time, which could in turn cause a latency issue. To solve this problem, the system must be made up of efficient algorithms and provide powerful computational resources to enable high-speed processing of the work volume. Furthermore, incorporating real-time monitoring and performance optimization techniques would enable the system to be up and running in different conditions. Coming to the point of demand for enough function of companionless minors' system of services, the implementation of every service organization, the implementation of every service organization is at the very center of its meaning and mission. Because that is the purpose of the organization, the safety and well-being of unaccompanied minors must be ensured. The system needs to have the operational affordance of providing reliable evidence of groups, guardians, and young people connectionless where the system also will indicate exactly when a minor is being supervised, the platform must consist of real-time tracking and monitoring capabilities (Nnene et al., 2023).

4.6.1 Is the new system going to be more efficient and high output?

Yes, the new system will be more efficient and high-output. By incorporating efficient algorithms, powerful computational resources, and real-time monitoring capabilities, it will streamline processes, improve performance, and enhance the overall operational efficiency of TSI Airlines.

Information: The open and precise execution of cancellation and ticket change policies make clearer what these are about and why customers must follow them, preventing any kind of unwanted misunderstandings and disputes. The system shall include extensive and reliable information about the criteria, fees, and time limits of cancelations and alterations which will provide users equal chances to make an appropriate choice. Not only must the system be able to produce reports of high quality and on time, but reports that comply both internally and with external authorities are also the subject matter. Hence, this constitutes a generalized financial performance statement for in-house viewing, a functional performance report for monitoring the activity, and a regulatory statement for the sake of compliance. Moreover, the CRM system should also be able to create ad hoc reports to cater to needs and thus, stakeholders' demand will be fulfilled when the demand rises.

4.6.2 Does the current mode provide end users and managers with timely, pertinent, accurate, and usefully formatted information?

Yes, the current mode provides end users and managers with timely, pertinent, accurate, and usefully formatted information.

Economy: The reasonableness of the system relies on either implicate or explicit identification of the fare calculation management, cancellation, ticket changes, etc. For this objective, the system must be built to save computational resources and time by at least, while still ensuring a high degree of accuracy and transparency. In this case, the process may include the optimization of the algorithms, data caching for frequently accessed shared memory, and parallel processing to spread the workload as multiple processes work in parallel. Hence, the system must possess the automation of processors needed to handle the ticketing changes and cancellations, in turn ensuring that the administrative costs are reduced. Through efficient operations for payment tariff calculation and ticket management, the system becomes capable of reducing operation expenses (OPEX) and improving the system's economy.

4.6.3 Could there be a reduction in costs and/or an increase in benefits?

Yes, our company can save operating costs and increase total benefits through better efficiency and use of resources by improving fare calculation management, ticketing modifications, and cancellations.

Control: When a company adopts cancellation and ticket change policies, controls become an essential element for the process to be done correctly and the regulations to be followed. This helps to prevent people from abusing the system. The implementation of the right measures in that way helps in keeping the revenue that leaks up under control and maintaining the efficiency of the operation of the business. Resolution to the issue should be imposed through reporting process control keeping in mind the data integrity, confidentiality, as well compliance with regulatory standards. Inadequate performance of control measures will erode not only the accuracy but also the authenticity of computing reports which may, in turn, risk poor decisions and lack of compliance with regulatory provisions.

4.6.4 Does current mode of operation offer effective controls to protect against fraud?

Yes, the current system of operation provides strong safeguards against fraud. To stop unwanted access to private information and services, the organization has put strong authentication processes, tracking systems, and access limits in position.

Efficiency: The fare calculations and ticket management should be made efficient enough to create easy-to-use and customer-friendly experiences that are desired to give satisfaction level to riders. To achieve it, therefore, the process should be engineered such that the number of actions of the user should be reduced while at the same time, the traveler must be allowed to personalize the entire travel process. This would be performed by simplifying the interface, pre-filling the forms with essential data, and giving the customers clear-cut plans step by step. Along with that, the system should be equipped with automated mechanisms to deal with ticket sales and ticket changes. To a large extent, these mechanisms will relieve the employees of additional work. Given the efficiency, the system can accelerate the level of user satisfaction and, therefore, the possibility of recurring visits to this system is increased.

4.6.5 In the ticket pricing and handling process, how essential is the operating efficiency in the application of either processes or mechanisms that are automated?

Yes, ticket management and fare calculation optimization case the ideal user experiences, and enhanced passenger happiness, and hence the probability of returning rises.

Service: The presence of unaccompanied minors service is an integral part of the system, a subsystem in particular, which has the ability to provide specialized assistance in the securing of minors who are traveling alone. The system should supply a card that will allow adults or other responsible persons to book a child without parents or another legal guardian; passports, consent of legal owner, and contact information must be provided alongside. In addition to that, the system should apply a bed of tools to watch and track unaccompanied minors during their journey, as updates are reported in real-time to parents and team members. The efficiency and reliability of an unaccompanied minor service are primary factors by which the safety of minors during their travel is easily brought confidence among customers and therefore taken care of.

4.6.6 Is it flexible and expandable?

Yes, the operational feasibility evaluation considers the flexibility and expandability of our system, ensuring it can adapt to changes and future growth in TSI airline operations.

4.7 Cost-benefit analysis table

Cost-benefit Analysis						
Costs in RM	**Month**					**Total costs**
	0	**1**	**2**	**3**	**4**	
Development costs	16,200					16,200
Operation costs		3,000	4,000	5,500	6,400	18,900
Advertisements		3000	4500	2000	4000	13,500
Other supplies		1,400	1,000	2,000	1,000	5,400
Total Costs	16,200	7,400	9,500	9,500	11,400	54,000
cash reserve	6000					

Benefits in RM	**Month**					Total benefits
	0	**1**	**2**	**3**	**4**	
selling the brands of the company		5,000	6,000	7,000	8,000	26,000
selling frequent-flier miles		2,000	2000	4000	4000	12,000
Parking		2,000	3,000	4,000	4,000	13,000
The benefits for tickets		7,000	8,000	10,000	14,000	39,000
Total benefits		14,000	19,000	27,000	30,000	90,000
Benefits ratio		1.89	2	2.84	2.63	1.67

5.0 Requirement Gathering (Individual)

5.1 Document Review (Ahmed Mohammed Qaid (Leader) – TP077086)

The document review is one of the methods of requirement gathering that is a critical step that focuses on systematically analyzing different sorts of documents related to the project such as business documents, user manuals, technical specifications, and any existing software or system documentation. This comprehensive assessment provides information about hidden rules, dependencies identification, and operating environment features. Through this investigation of the documents, the analysis may clarify ambiguity, test the validity of assumptions, and verify that the collected requirements precisely reflect the needs and expectations of stakeholders. Also, the process of document review is a tool for the identification of inconsistencies or conflicts between different sources of information, thus enabling the team to discover and resolve such issues at the requirement elicitation stage early in the process, as a result of this, minimize potential risks associated stage early in the process, and as a result of this, minimize potential risks associated with misunderstanding or misinterpretation of requirements (Brandenburg, 2022).

5.1.1 Document Review Benefits

1. **Clarity and Understanding:** it allows to creation of a general look, which contains the project grounding (context), objective, and constraints. It will allow our team to better grasp the TSI project's nature specification (Mishra, 2018).

2. **Identification of Gaps and Redundancies:** The scrutinizing of existing indices makes the analysis identify the possible gaps or the repetitions therapy making all the required sections simple and the unrequired ones to be removed (Mishra, 2018).

3. **Validation of Assumptions:** The documentary review helps in that case with overseeing the assumptions made by the aforementioned stakeholders, confirming that the requirements are based on true facts and coincide with the real demands of the project (Mishra, 2018).

5.1.2 Setbacks

The Document review setbacks like:

1. **Limited Scope:**

   Knowledge that is based only on existing documents, may lead to limitations in the scope of comprehension, as documents at times can lack complete insight into the project and may not be very detailed in specific parts (MathieuM, 2019).

2. **Outdated Information:**

   The documents may lose their currency due to which they may not be updated frequently leading to wrong information or inconsistencies in the requirements document. The possibility of making misinformation decisions and ineffective solutions can occur because decision-making is based on old information (MathieuM, 2019).

3. **Incomplete or Inconsistent Documentation:**

   Papers will often be either inaccurate or missing important details of information, therefore the right specifications won't be satisfied. On the other hand, this can impede the development process and it often leads to repetition of the tasks (MathieuM, 2019).

5.1.3 The Conduct of Investigation

- Identify Relevant Documents: Get project charters, business plans, technical specifications, current system documentation, and other sources of information for the process.

- Organize Documents: The main file storage will be a shared drive which can be accessed easily, or it could be a document management system if desired.

- Review Documents Contents: Apply text analysis software or even some text editors in a very structured way to review document content (admin, 2020).

- Analyze Document Structure: Take a look at document structure, such as the apparition of sections and headings, to figure out its logical sequence.

- Identify Key Requirements: Spotlight in the beginning the major milestones, parameters, goals, and requirements of the stakeholders.

- Cross-Reference Information: The intervention of information technology tools can be used to eliminate the inaccuracies that exist due to inconsistencies across the documents (admin, 2020).

5.1.4 Question Asked In Document Review

- What do the mission statements and visions of this system cycle and business plans say?
- Do you know of any specific technical specifications or requirements that were addressed in the TSI system details?
- Although some system documents are in place, do they cater to future system functionalities or needs?
- Are there conflicting views or differences in what the document shows regarding the referenced source?
- What is the main objective and timeline of the milestones, as well as the deliverables the system is expecting?
- What connection is there between these mentioned goals and the vision, as well as the mission, of the TSI system?

5.2 Surveys and Questionnaires. Aliyan Rashid (TP077204) & Abrar Dawawala (TP074840):

5.2.1 Surveys and Questionnaires Introduction:

At TSI Airlines, we're dedicated to giving our clients an outstanding travel experience that both meets and surpasses their expectations. We are confident that getting honest input from our travelers will help us do this. For this reason, a crucial element of our consumer engagement approach is the use of surveys and questionnaires.

An organised and effective approach to obtaining in-depth knowledge about our passengers' experiences, preferences, and expectations is through surveys and questionnaires. We can pinpoint potential for improvement and identify areas where we excel by asking our clients to share their thoughts on many elements of our services, such as our unique unaccompanied minor services, a variety of payment methods, in-flight amenities, and overall travel experience.

With the help of this direct feedback, we are able to continuously improve our services to meet the demands of our customers and offer the greatest possible degree of comfort, convenience, and satisfaction. Your input is very important to us at TSI Airlines as we work to provide a seamless and personalised travel experience. You have a direct impact on how TSI Airlines develops in the future and ensures that every trip is better than the last by answering our surveys.

5.2.2 Surveys and Questionnaires Benefits:

- **Measuring customer satisfaction:**

  Airlines can use surveys to determine how satisfied customers are with a range of aspects of their travel experience, including as the ease of booking, in-flight services, comfort of their seat, and overall satisfaction. Airlines can use this input to determine their areas of strength and areas for improvement.

- **Understanding Passenger Preferences:**

  Airlines can better understand the interests and preferences of their passengers by using surveys. Airlines may better fulfill the expectations of their passengers by customizing their services by questioning about services, preferred seats, lunch selections, and other service offers.

- **Conserves time and resources:**

  surveys and questionnaires are less expensive than other data collection techniques because they don't require costly equipment. (Kanika, 2023)

5.2.3 Surveys and Questionnaires Setbacks:

- Poor Reaction Times:

  Low response rates might result from participation being discouraged by lengthy or unclear questions, as well as requests for private or sensitive information.

- Absence of social interaction:

  When there is no in-person connection, the survey itself must communicate clearly, including information about the surveyor's identity and objectives.

- Privacy Concerns:

  When taking part in surveys, passengers may be concerned about the security and privacy

of their personal information, especially if they are requested to submit sensitive information or feedback. (Lindemann, 2023)

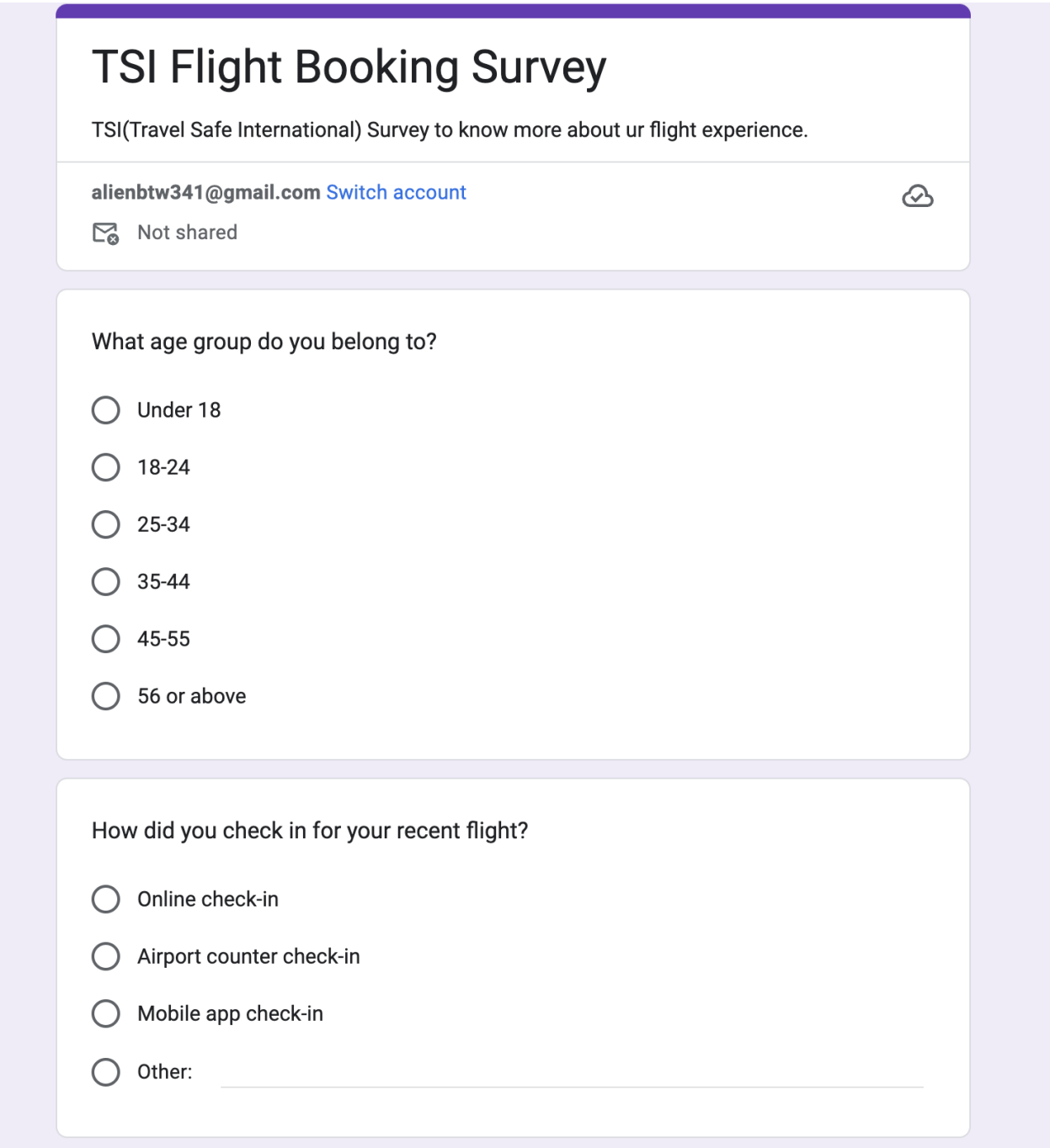
5.2.4 Surveys and Questionnaires Conclusion:

- A customized survey pertaining to TSI's flight booking system will concentrate on collecting feedback to improve the system and tackle frequent problems experienced by travelers throughout the booking process.

- Targeting travelers who use the system to book flights, the poll will be sent by email to all TSI users. Although TSI's main office being in Malaysia, the survey will not be regionally restricted because users come from a variety of nations.

- Inquiries will concentrate on identifying system issues and requesting suggestions for new features that will benefit users, in line with TSI's dedication to customer satisfaction.

5.2.5 TSI Booking Survey



TSI Flight Booking Survey

TSI(Travel Safe International) Survey to know more about ur flight experience.

alienbtw341@gmail.com Switch account

Not shared

What age group do you belong to?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-55
- 56 or above

How did you check in for your recent flight?

- Online check-in
- Airport counter check-in
- Mobile app check-in
- Other:

Was your flight on time according to the scheduled departure and arrival times?

- ◯ Yes, it departed and arrived on time
- ◯ Yes, it departed on time but arrived late
- ◯ No, it departed late but arrived on time
- ◯ No, it departed and arrived late
- ◯ Other: _____

How satisfied were you with the handling of your baggage?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neutral
- ◯ Dissatisfied
- ◯ Very Dissatisfied

Which entertainment options did you utilize during your flight?

- ☐ Seatback TV
- ☐ In-flight Wi-Fi for personal devices
- ☐ In-flight magazine
- ☐ None
- ☐ Other: _____

How would you rate the friendliness and helpfulness of the cabin crew?

- ○ Excellent
- ○ Good
- ○ Fair
- ○ Poor
- ○ Other: _____

How likely are you to choose [TSI] for your next flight?

- ○ Extremely Likely
- ○ Very Likely
- ○ Likely
- ○ Not very Likely
- ○ Not at all likely

What features would you like to see in the future

Your answer

Submit Clear form

5.3 Interview (Essa Wani & Aaron Justin)

Interview: Experts depend heavily on interviews as a source of data. Analysts must be good at this. Interviews are most effective when they are simple and allow for on-the-spot discussion and a deeper understanding of the subjects. They are flexible in recording the interviewee's statements and record personal thoughts and experiences in alongside facts. When people are in a comfortable environment, they open up and give more accurate information. Body language is one example of informal interaction that can provide important context. Despite these drawbacks, interviews are an essential part of the information-gathering process since they provide wealthy. detailed information.

5.3.1 Interview benefits

Improved Customer Experience Simple Booking:

- Makes the entire process of selecting flights, seats, and meals quick and simple.
- Specific Requests: effectively handles special needs services, such as daycare and wheelchairs.
- Flexible Options: Provides a variety of travel options, including multiple seating classes and one-way, round-trip, and multi-city flights.

Automation for Smoother Operations:

- By automating the booking system, errors are reduced and less manual labor is required.
- Accurate Pricing: Determines the right fare on its own, taking into account trip information and age.

Reports That Are Beneficial Sales Data:

- Provides you with an in-depth understanding of your company by generating data on ticket sales and profits on a weekly and monthly basis.

- Customer Trends: Looks at trends in bookings to help focus marketing efforts and enhance services.

5.3.2 conduct of investigation

1. Preparation Phase:

Define Objectives: The following objectives will summarize the purpose of the investigation regarding the aspects involving flight reservations, cancellations, rescheduling services, and reporting: These sources embodied local expertise, which provided better insights into the user requirements, system capabilities, and limitations of operation.

Identify Stakeholders: It is also necessary to identify who the participants are, where participants will include the TSI management, the IT personnel, sales personnel, customer care attendants and maybe the excessively patronizing customers too. Make sure that you involve participants from different functional areas so as to apply the Balanced Scorecard from a range of perspectives.

Choose Investigation Methods: Organise at least three techniques that may include Interviews, Questionnaires, Document review, observation and workshop for gathering ample information. How each one of these methods can be employed in conjunction with the others so as to give a detailed description of the requirements.

2. Execution Phase

Conduct Interviews:

Preparation: List down the questions for every stakeholder group that would be specific to each cluster. It recommended conducting the interviews during convenient times depending on the stakeholders and planning for a quiet and comfortable environment for face-to-face interviews or having a dependable platform for remote interviews.

During the Interview: In this project, I intend to provide the reader with a general overview of myself and the project in question before going into the main discussion. Introduce yourself and explain the information's goals of the interview then, state that everything shared will be kept discreet. Establish a first impression with the interviewee to put them at ease before the actual interview begins. Use questions that require elaboration to get details from respondents and use specific questions to elicit explanation to provide tone and color. Ensure that you record the interview or take notes of the conversation for future reference as you will be surprised with what you will come up with at analysis stage from your notes.

5.3.3 Interview Setbacks

Time-Consuming:

- Scheduling Interviews: Scheduling of interviews with suitable dates Visits with key players is often inconducive due to their tight schedule. The best approach, however, as mentioned before, is trying to align the schedules in order to be certain that everyone involved will be available.

- Conducting and Transcribing: Holding each interview, especially in-depth ones, can be time-consuming. There is always a danger of spending too much time in the interview since conducting each interview can be time-consuming, particularly if the interviews are in-depth. Hence, the resource-intensive process of transcribing the interviews in order to make

a correct analysis of the data is also a drawback. This process can prove to be time-consuming and in a way reach great proportions for a large number of stakeholders.

Potential Bias:

- Interviewer Bias: Bias inserted by the interviewer involves aspects such as the beliefs, attitudes and decisions of the interviewer that influence the kind of questions asked and the interpretation of answers. This is because such bias may be able compromise the neutrality of the collected data.
- Response Bias: Respondents fall short of providing the answers they believe the interviewer expects from them than what they desire or believe. This response bias may result in improper and insufficient requirements information to be gathered.

- Leading Questions: It is notable that how questions are formulated may help to lead the spectrum of stakeholders somewhere. For instance, leading questions may hint at a certain response to the interviewee, thereby limiting the kind of information that one obtains.

5.4.4 Interview Questions

- How often do you book flights using the TSI website?

- How would you rank TSI's customer service in terms of helpfulness and responsiveness?

- What about the TSI website appealed to you the most?

- What aspect of the TSI website didn't you find appealing?

- What about the TSI website appealed to you the most?

- How easy and transparent was it to purchase tickets for the various passenger age groups (youngster, adult, senior, infant, etc.)?

6.0 System Analysis

The TSI Flight Booking System aims to streamline the flight booking process, improve customer satisfaction, and ensure efficient operations. The following requirements were gathered using methods such as document review, survey questionnaires, and interviews.

6.1 Function Requirements

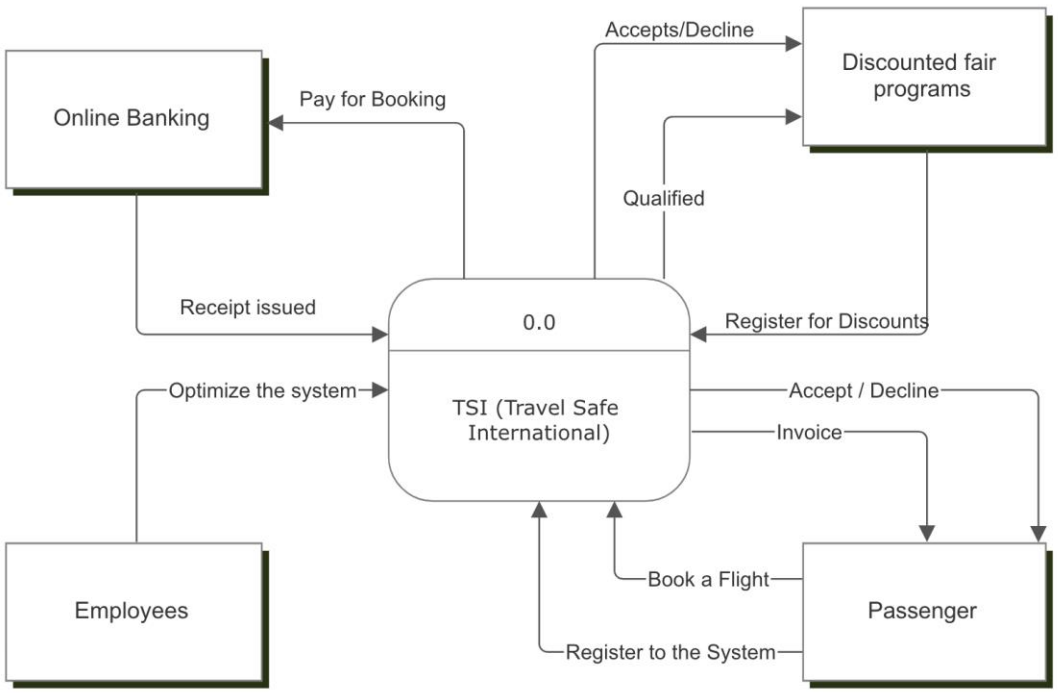
- The system should allow customers to create their accounts.
- The system should allow customers to search for flights based on destination.
- The system should display available flights with detailed information such as price.
- The system should allow customers to select seats during the booking process.
- The system should support credit card payments.
- The system should send a confirmation email to customers upon successful booking.

6.2 Non-Funcional Requirements

- The system should handle up to 10,000 simultaneous users without performance degradation.
- The system should have an average response time for search queries of under 2 seconds.
- The system should encrypt all personal information.
- The system should have an intuitive user interface.
- The system should have an uptime of 99.9%.
- The system should be scalable to accommodate future growth in the user base.

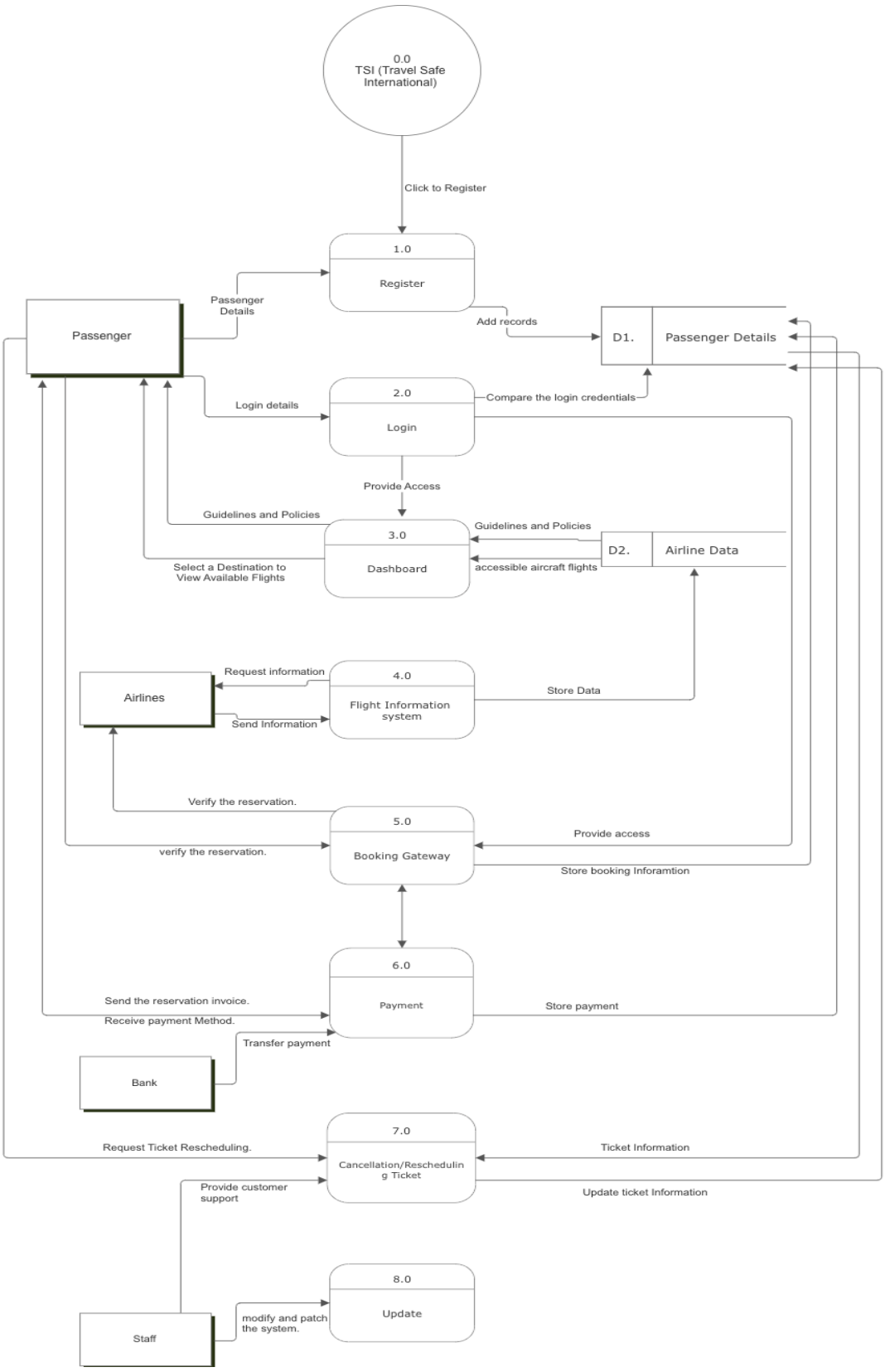
7.0 Design Diagram

7.1 System Context Diagram

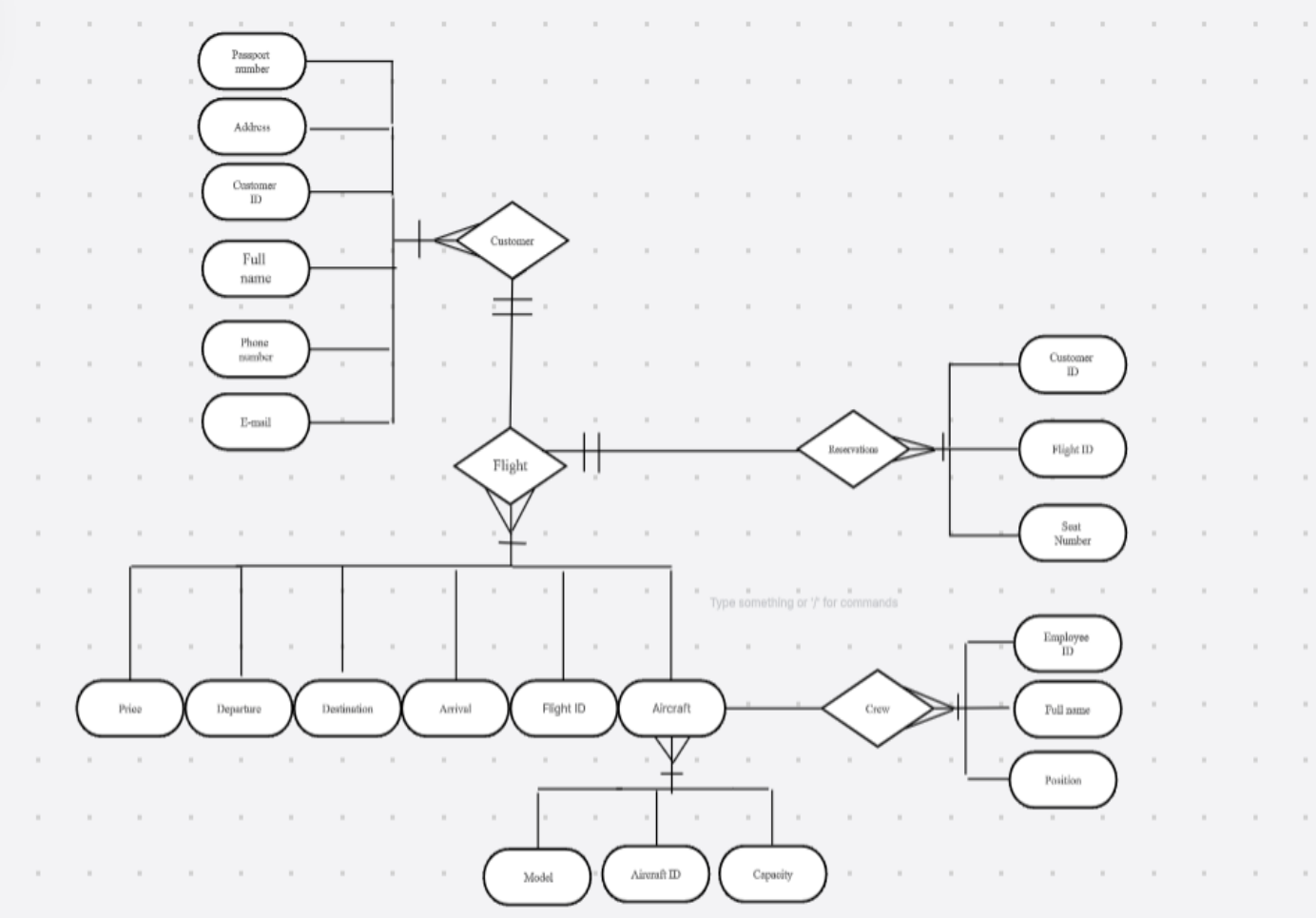


In summary, this is a context diagram that depicts the gist of Travel Safe International's (TSI) booking and discount management system for travelers. It models the external entities, such as online banking, employees, passengers, and discounted fare programs for communicating with the TSI system, and the core data flows among them, such as payment for booking, registering, booking flights, requesting for discounts, and invoice generating.

7.2 LEVEL 0 Diagram

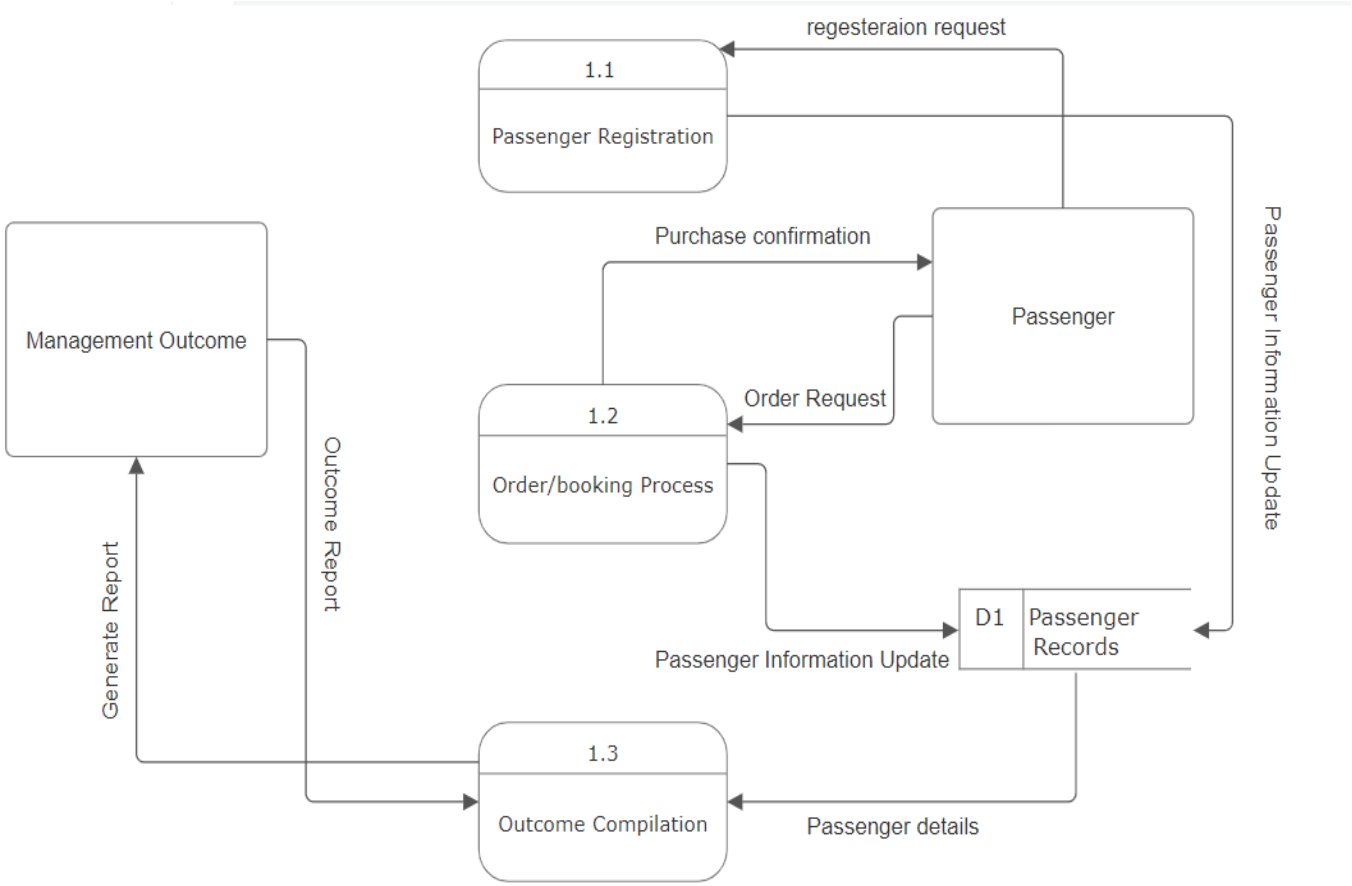


7.3 The ERD Diagram



8.0 Design (Individual)

8.1 Data flow Diagram Level 1 (Register) – (Ahmed Mohammed Qaid TP077086)



8.1.1 Data dictionary

Entity:

Name	Passenger
Description	process passenger transactions and manage their journey details.
Input data flow	Purchase confirmation
Output data flow	Registration Request, Order Request

Process:

Name	Passenger Regester
Description	Register a Passenger
Input data flows	Regestration request
Output data flow	Passenger information Update

Process description	Start
	PassengerID = GenerateUniqueID()
	If Validate(RegistrationRequest) Then
	RegistrationStatus = True
	system
	StorePassengerInfo(PassengerID, RegistrationRequest)
	Else
	RegistrationStatus = False

	output
	PassengerInformationUpdate = {
	PassengerID: PassengerID,
	RegistrationStatus: RegistrationStatus
	}
	Return PassengerInformationUpdate
	End

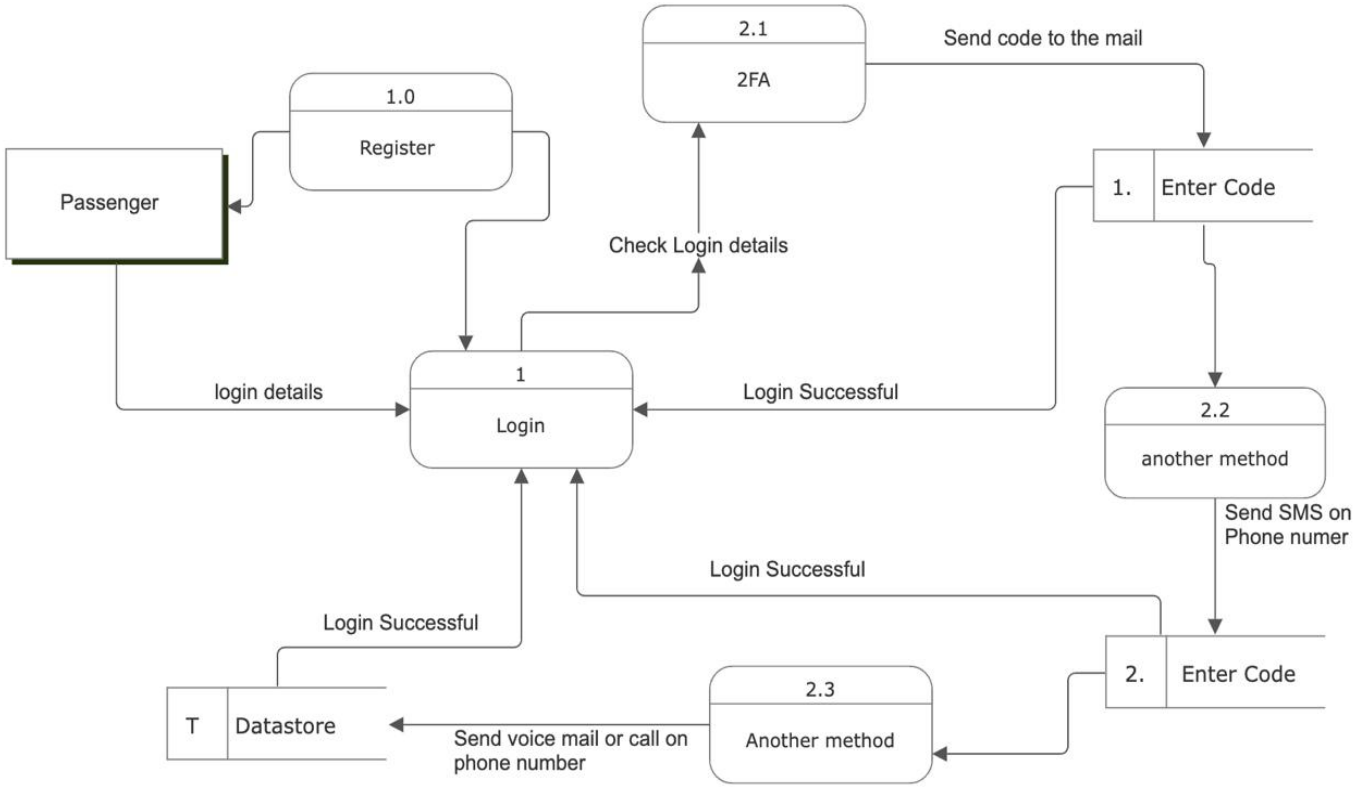
Data Flow:

Name	Order Request
description	Request to initiate a booking process.
Origin/source	Passenger
destination	Order/Booking Process
Data structure	(Passenger ID) + (Travel Detatils) + (Payment Information)

Data Store:

Name	Passenger Records
Description	data store contains records of passengers who have registered and booked tickets.
Input data flows	Passenger Information Update
Output data flows	Passenger details
Data structure	(BookingID) + (PassengerID) + (BookingDate) + (TotalCost)

8.2 Data Flow Diagram Level 1(Login)- Aliyan Rashid (TP077204):



8.2.1 Data Dictionary:

Entity:

Name	Login
Description	credentials that are used to confirm a user's identity
Input data flow	The Email of the user and its Password
Output data flow	Permits the user to purchase an airline ticket by logging into his account.

Process:

Name	2FA (2 Factor authentication).
Description	Strengthening the authentication process by increasing the risk of unauthorized users' account access.
Input data flows	The passenger/user is suppose to receive the code and than enter it.
Output data flow	The passenger/User will be able access the account.

If; the first method of 2FA doesn't work

Else-if ; try another method (if doesn't work).

Else; try another method again

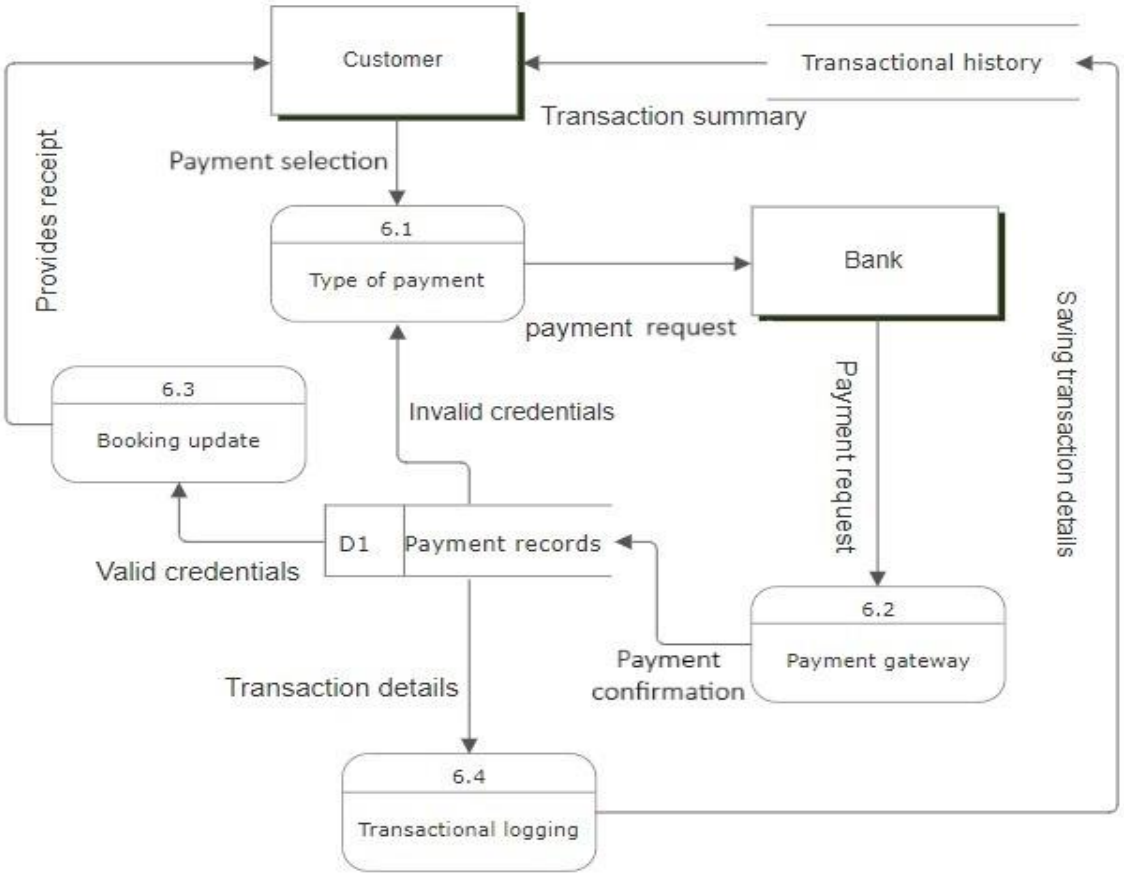
Data Store:

Data Store	Description	Attributes
Data Store(T)	Stores registration and login information	Passenger Details, Login Attempts, 2FA Details

Data Flows:

Data Flow	Description	Source	Destionation
Login Details	Credentials used by passenger to log in	Passenger	Login Process
Login Successful	Confirmation of successful login	Login Process	Passenger, Datastore, 2FA
Send Code to Mail	Sends verification code to passenger's email	2FA Process	Passenger
Send SMS in Phone Number	Sends verification code via SMS to phone number	2FA Process (via 2.2)	Passenger
Send voice mail or call on phone number	Sends verification code via voice mail/call	2FA Process (via 2.3)	Passenger
Entered code	Verification code entered by passenger	Passenger	Login Process (via Enter Code Processes 1 & 2)
Check Login details	Verifies login details for authentication	Login Process	2FA process.

8.3 Data Flow Diagram Level 1 (Payment) – Abrar Dawawala (TP074840)



8.3.1 Data Dictionary

Entity:

Name	Customer
Description	Individual or entity making a transaction
Input data flow	Transaction summary, Provides receipt
Output data flow	Payment selection

Process:

Name	Type of payment
Description	Process where the customer selects the type of payment
Input data flow	Payment selection
Output data flow	Payment request

Process description	START
	PROCESS Type_of_Payment
	INPUT payment_selection FROM Customer
	IF payment_selection is valid
	GENERATE payment_request
	OUTPUT payment_request
	ELSE
	DISPLAY error message
	PROMPT Customer to select payment type again
	END IF

	END

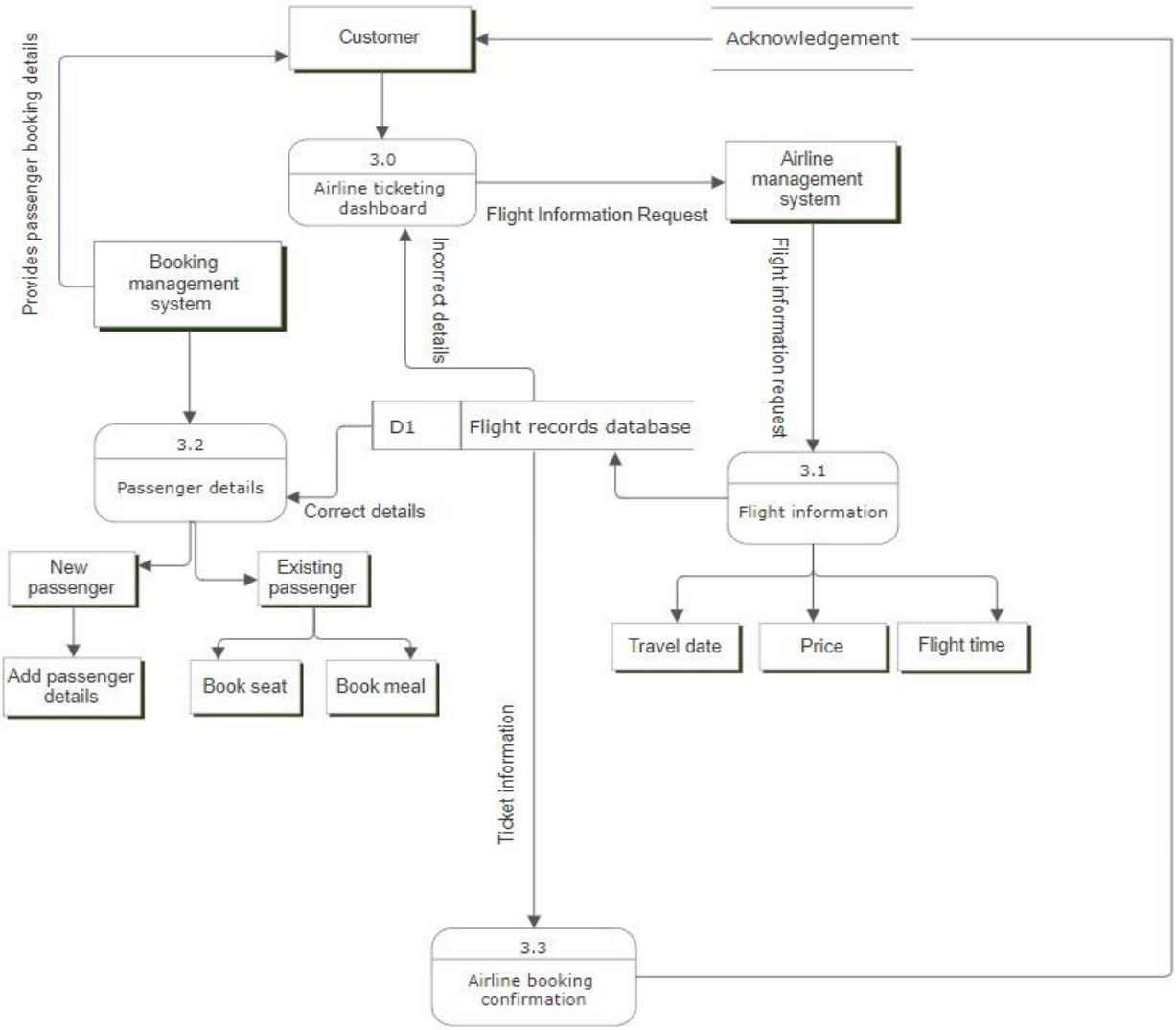
Data store:

Name	Payment Records
Description	Stores all payment records of transactions
Input data flow	Payment confirmation
Output data flow	Transaction details, Valid credentials, Invalid credentials
Data structure	(PaymentID)+ (CustomerID) + (PaymentDate) +(PaymentAmount) + (PaymentMethod) + (TransactionID)

Data flow:

Name	Payment verification
Description	Verification of the payment credentials
Origin/Source	Type of Payment
Destination	Bank
Data structure	(VerificationID) + (PaymentID) + (CustomerID) + (PaymentMethod) + (Amount) + (VerificationStatus)

8.4 Data Flow Diagram Level 1 (Dashboard) – Essa Wani (TP077603)



8.4.1 Data Dictionary

Entity:

Name	Customer
Description	Individual or entity booking an airline ticket
Input data flow	Flight information request, Provides travel date, price and flight time
Output data flow	Booking confirmation, Acknowledgement

Process:

Name	Airline ticketing dashboard
Description	Process where the customer selects the flight
Input data flow	Flight information request
Output data flow	Flight information

Process description	START
	PROCESS Flight_information
	INPUT flight_information_request FROM Customer
	IF flight_information is valid
	GENERATE passenger_details
	OUTPUT passenger_details
	ELSE
	DISPLAY error message
	PROMPT Customer to enter flight information again
	END IF
	END

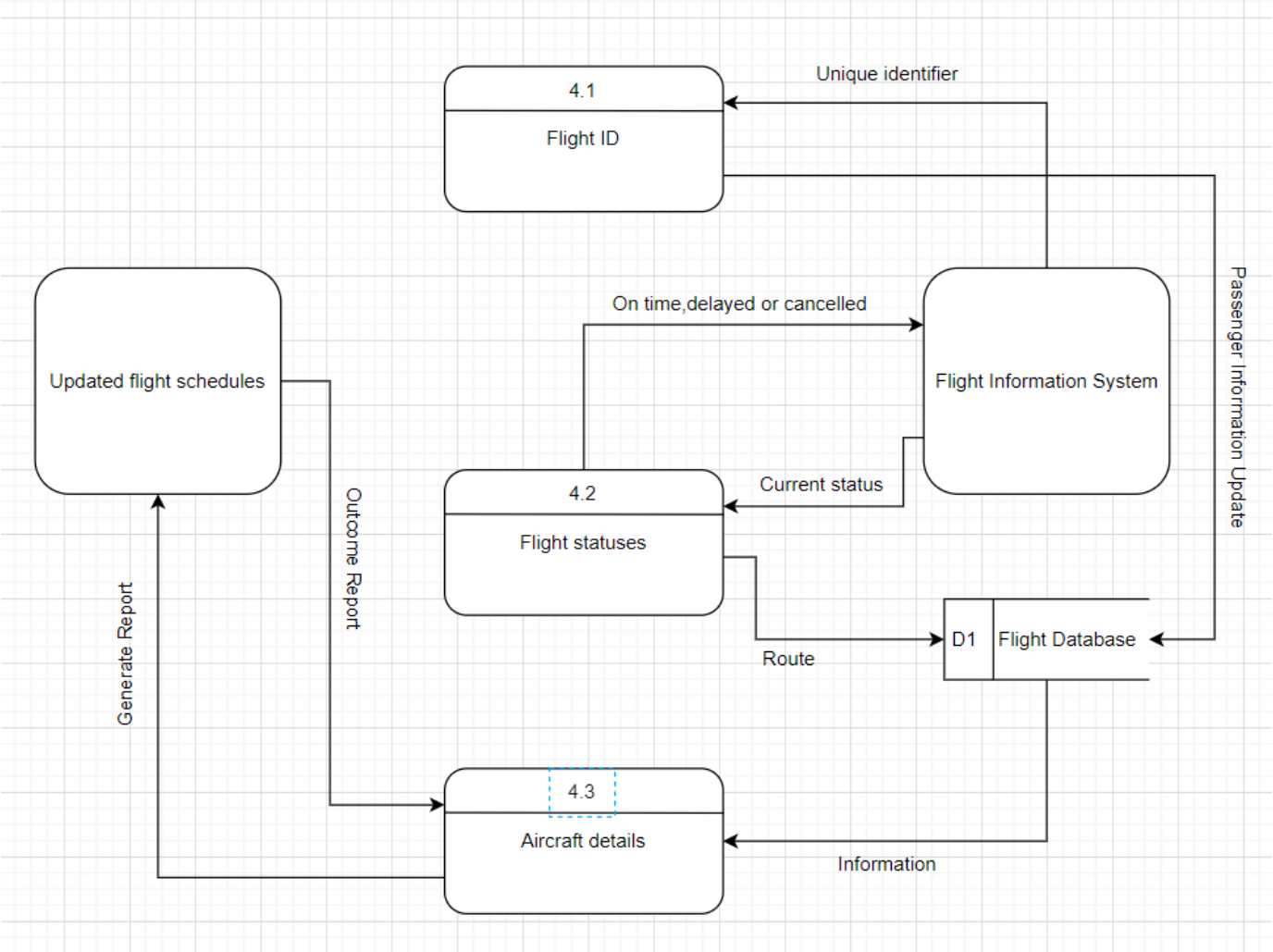
Data store:

Name	Flight records database
Description	Stores all flight information details
Input data flow	Flight details
Output data flow	Ticket confirmation, Correct details, Incorrect details
Data structure	(PassengerName)+(PassengerContactdetails) + (TravelDate) +(Flighttime)+(FlightPNR)+(BookingID)

Data flow:

Name	Airline booking confirmation
Description	Provides acknowledgement and booking confirmation to the customer
Origin/Source	Airline ticketing dashboard
Destination	Airline management system
Data structure	(BookingID) + (FlightPNR) + (PassengerName) + (PassengerContactdetails) + (Traveldate) + (Flighttime)+(BookingConfirmation)

8.5 Data Flow Diagram Level 1 (Flight information) – Aaron Justin (TP077609)



8.5.1 Data Dictionary

External Entities

Payment Gateway
Description: External service for processing payments. Attributes: i) Gateway ID: Unique identifier for the payment gateway. ii) Service Name: Name of the payment gateway service. iii) API Details: Information needed to integrate with the gateway.

Customers
Description: Individuals or organizations booking flights. Attributes: i) Customer ID: Unique identifier for each customer. ii) Name: Customer's full name. iii) Contact Information: Phone number, email address, and physical address. iv) Loyalty Program ID: Identifier for the customer’s loyalty program.

Airline Staff
Description: Employees managing flight operations and customer service. Attributes: i) Staff ID: Unique identifier for each staff member. ii) Name: Staff member's full name. iii) Role: Position or job title. iv) Contact Information: Email address and phone number.

External Systems
Description: Systems for flight tracking, weather updates, and other necessary integrations. Attributes: i) System ID: Unique identifier for each external system. ii) Service Name: Name of the external system service. iii) API Details: Information needed to integrate with the system.

Processes

Manage Flights
Description: Handles flight schedules, updates, and cancellations. Inputs: i) Flight details from D1 Flight Database. Outputs: ii) Updated flight schedules, statuses, and cancellations.

Handle Bookings
Description: Manages flight reservations, seat assignments, and ticket issuance. Inputs: i) Booking details from D2 Booking Database. ii) Customer information from D3 Customer Database. Outputs: i) Confirmed bookings, seat assignments, and issued tickets.

Manage Customer Information
Description: Stores and updates customer profiles and loyalty program details. Inputs: i) Customer details from D3 Customer Database. Outputs: i) Updated customer profiles and loyalty program details.

Process Payments
Description: Manages payment processing for bookings. Inputs: i) Payment details from customers. ii) Transaction details from Payment Gateway. Outputs: i) Payment confirmations and transaction records in D4 Payment Records.

Send Notifications
Description: Sends updates to customers about flight status, schedule changes, and other relevant information. Inputs: i) Flight status from D1 Flight Database. ii) Customer contact information from D3 Customer Database. Outputs: i) Notifications sent to customers.

Data Stores

D1 Flight Database
Description: Contains flight schedules, statuses, and related information. Attributes: i) Flight ID: Unique identifier for each flight. ii) Schedule: Departure and arrival times. iii) Status: Current status of the flight (on-time, delayed, canceled). iv) Aircraft Details: Information about the aircraft.

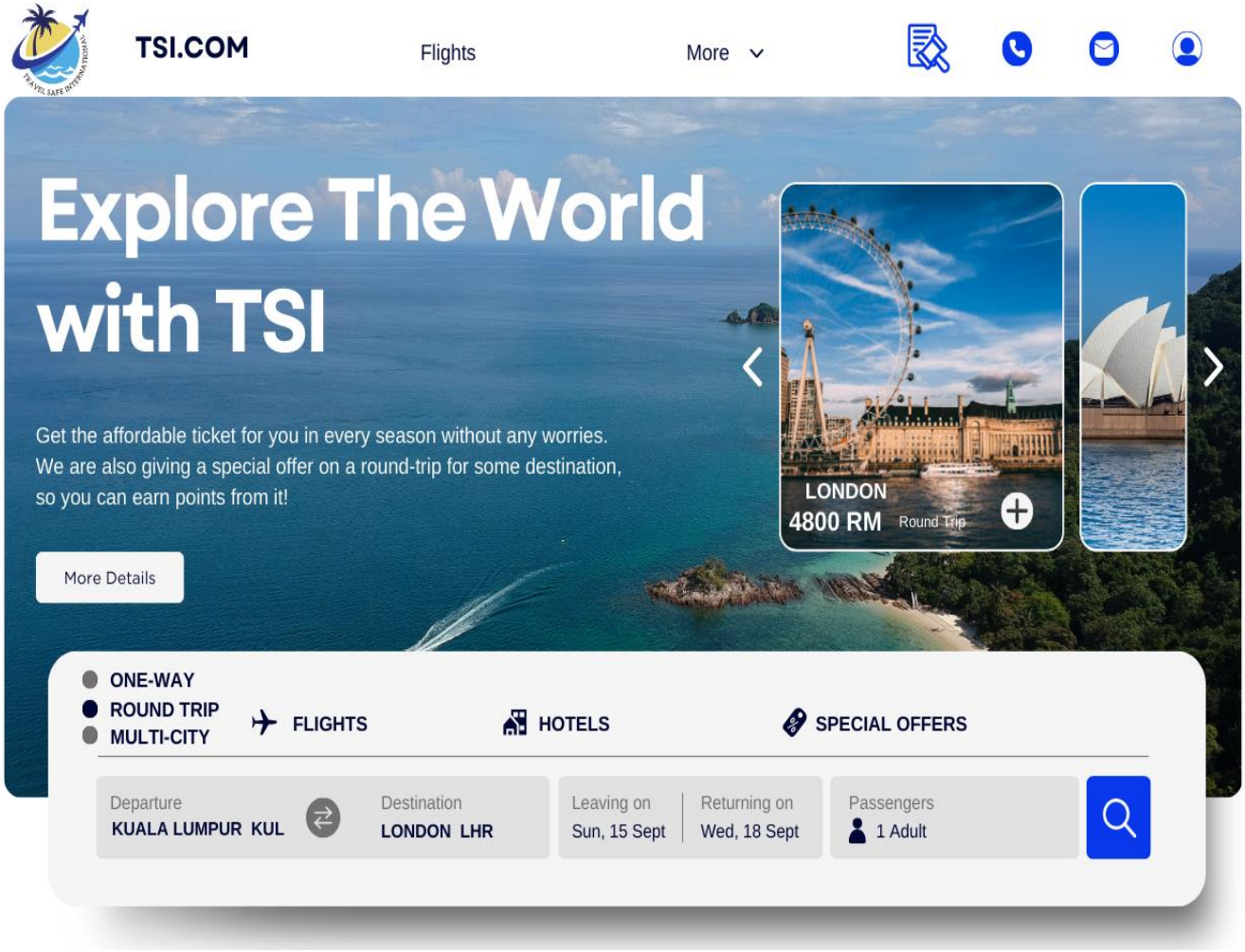
D2 Booking Database
Description: Stores booking details, seat assignments, and ticket information. Attributes: i) Booking ID: Unique identifier for each booking. ii) Customer ID: Identifier linking to the customer. iii) Flight ID: Identifier linking to the flight. iv) Seat Assignment: Assigned seat for the booking. v) Ticket Information: Issued ticket details.

D3 Customer Database
Description: Holds customer profiles, contact information, and loyalty program details. Attributes: i) Customer ID: Unique identifier for each customer. Name: Customer's full name. ii) Contact Information: Phone number, email address, and physical address. iii) Loyalty Program ID: Identifier for the customer’s loyalty program.

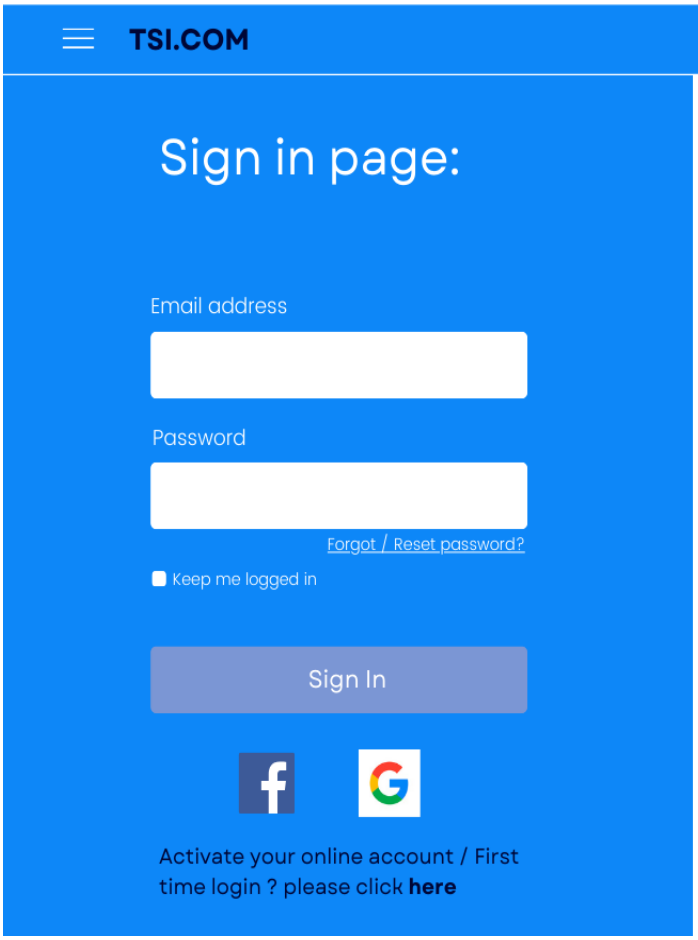
D4 Payment Records
Description: Contains payment transaction details. Attributes: i) Transaction ID: Unique identifier for each transaction. ii) Booking ID: Identifier linking to the booking. iii) Payment Method: Method used for payment (credit card, debit card, etc.). iv) Amount: Transaction amount. v) Status: Status of the payment (completed, pending, failed).

9.0 Interface Design

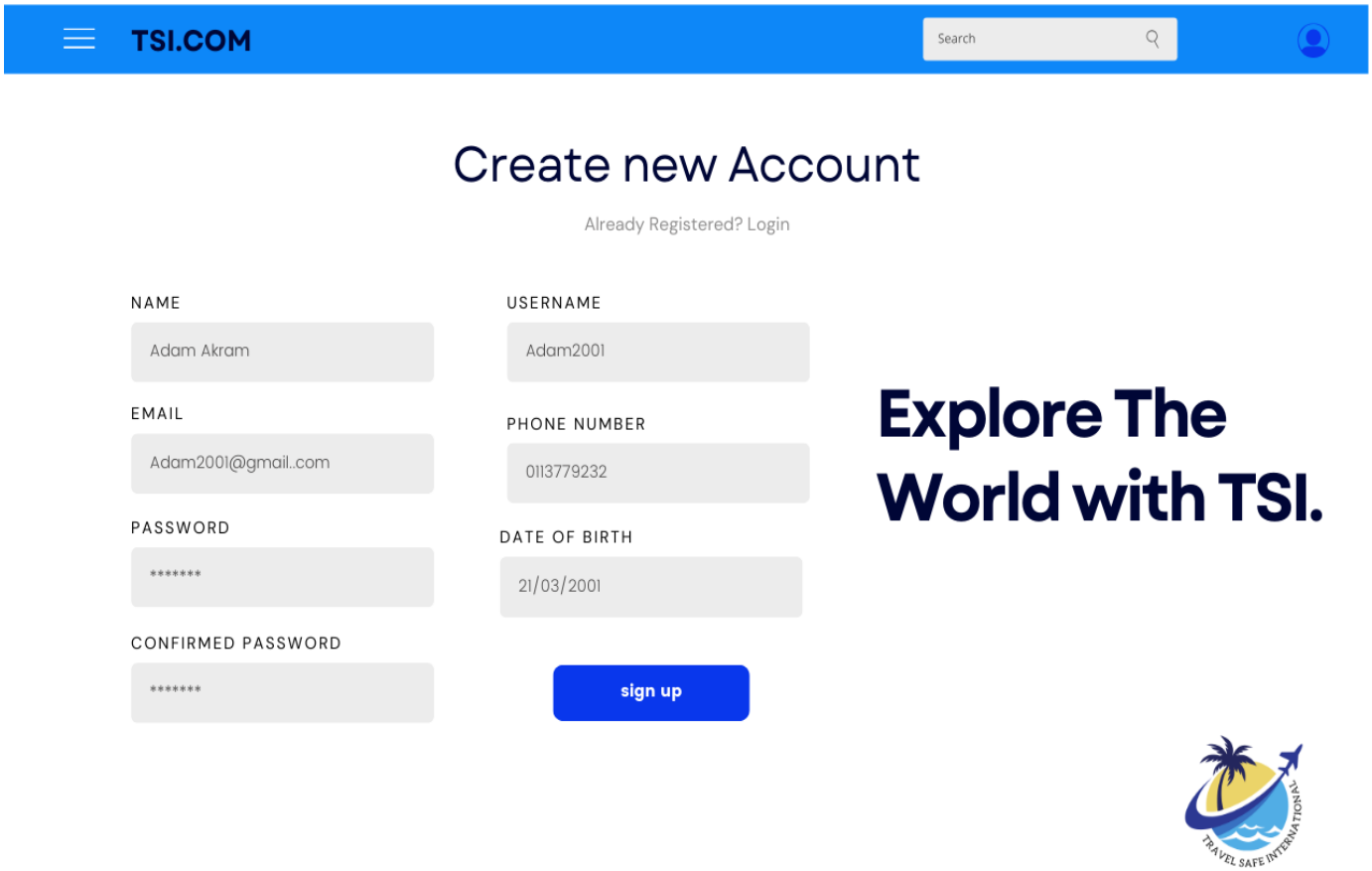
9.1 The main page



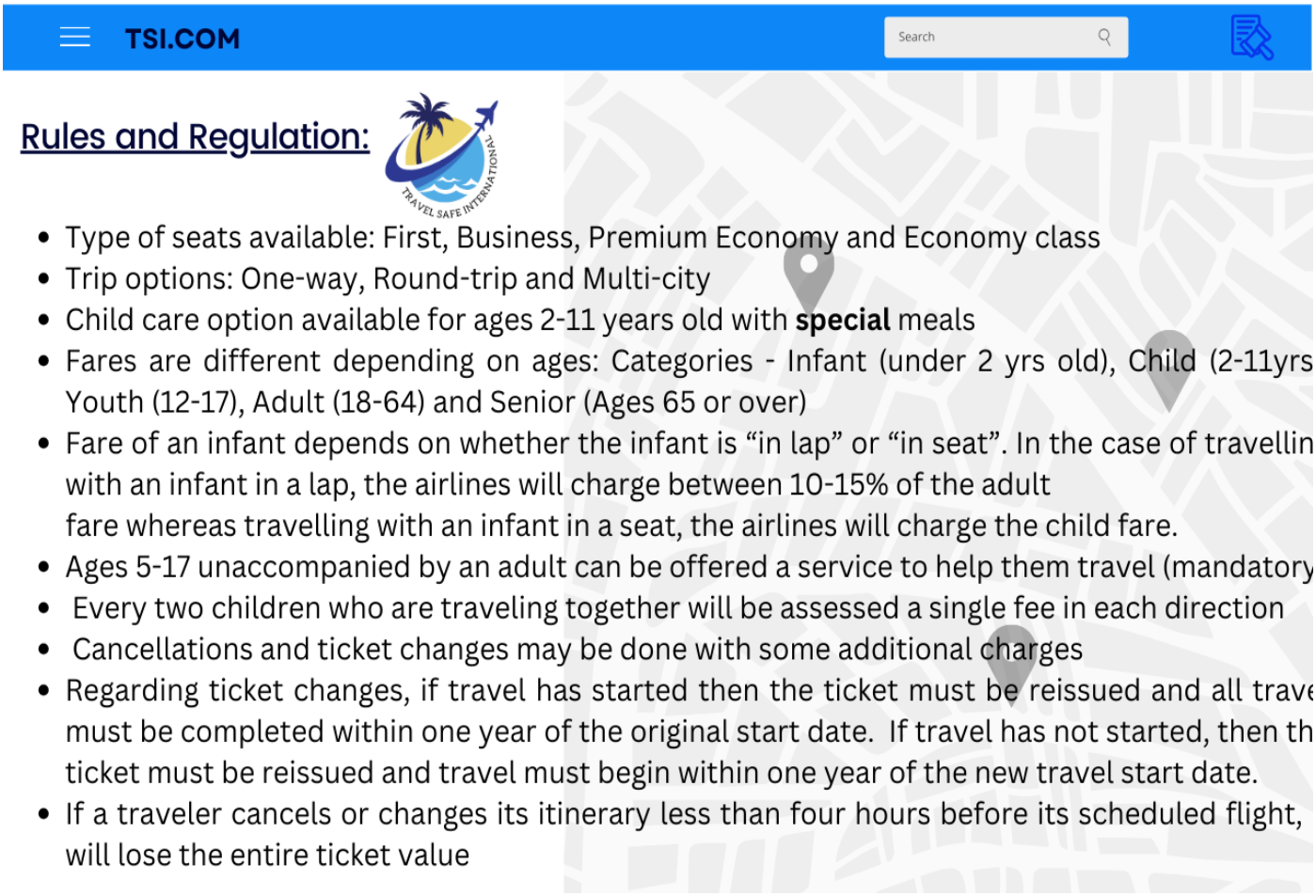
9.2 the login page



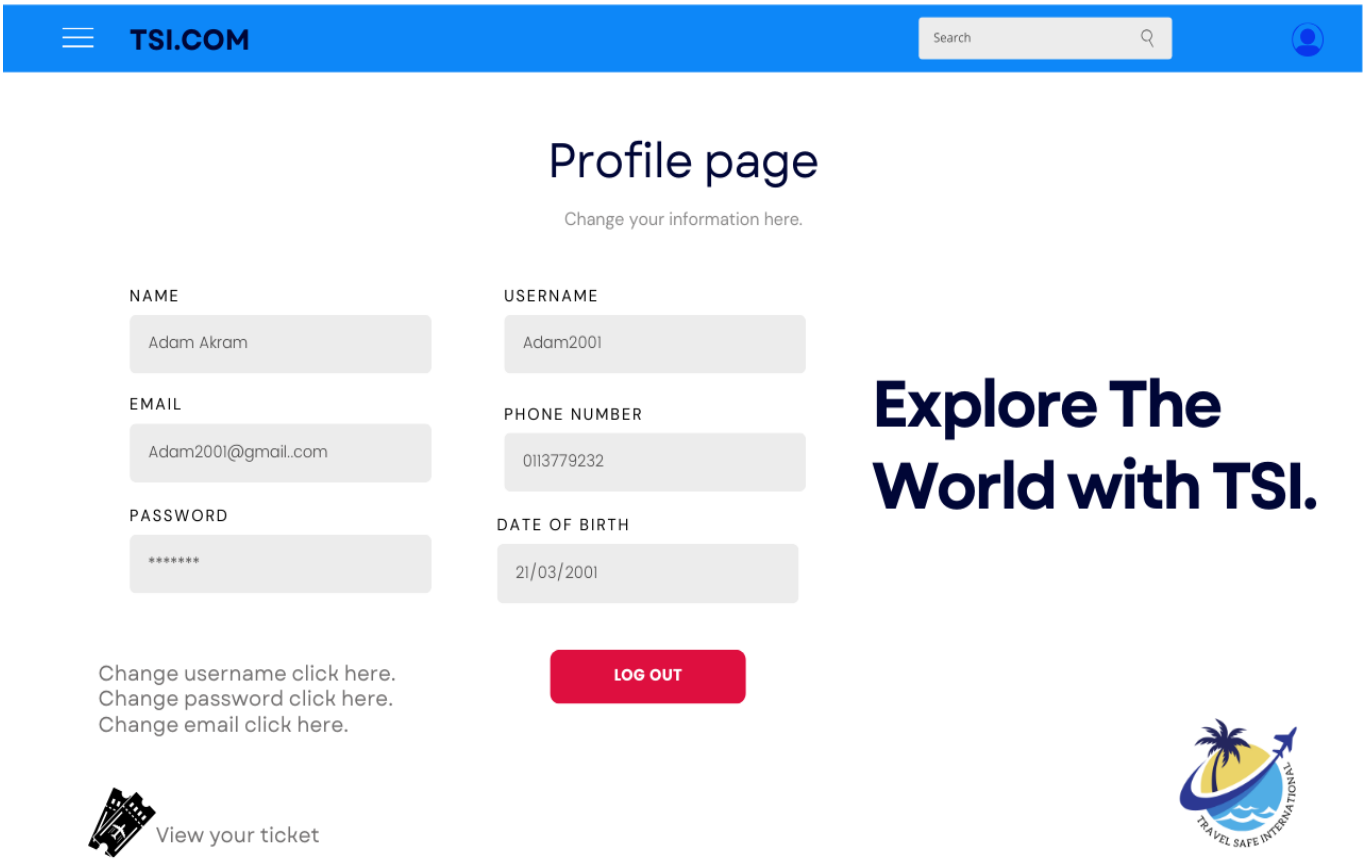
9.3 Sign-up page (Create new account)



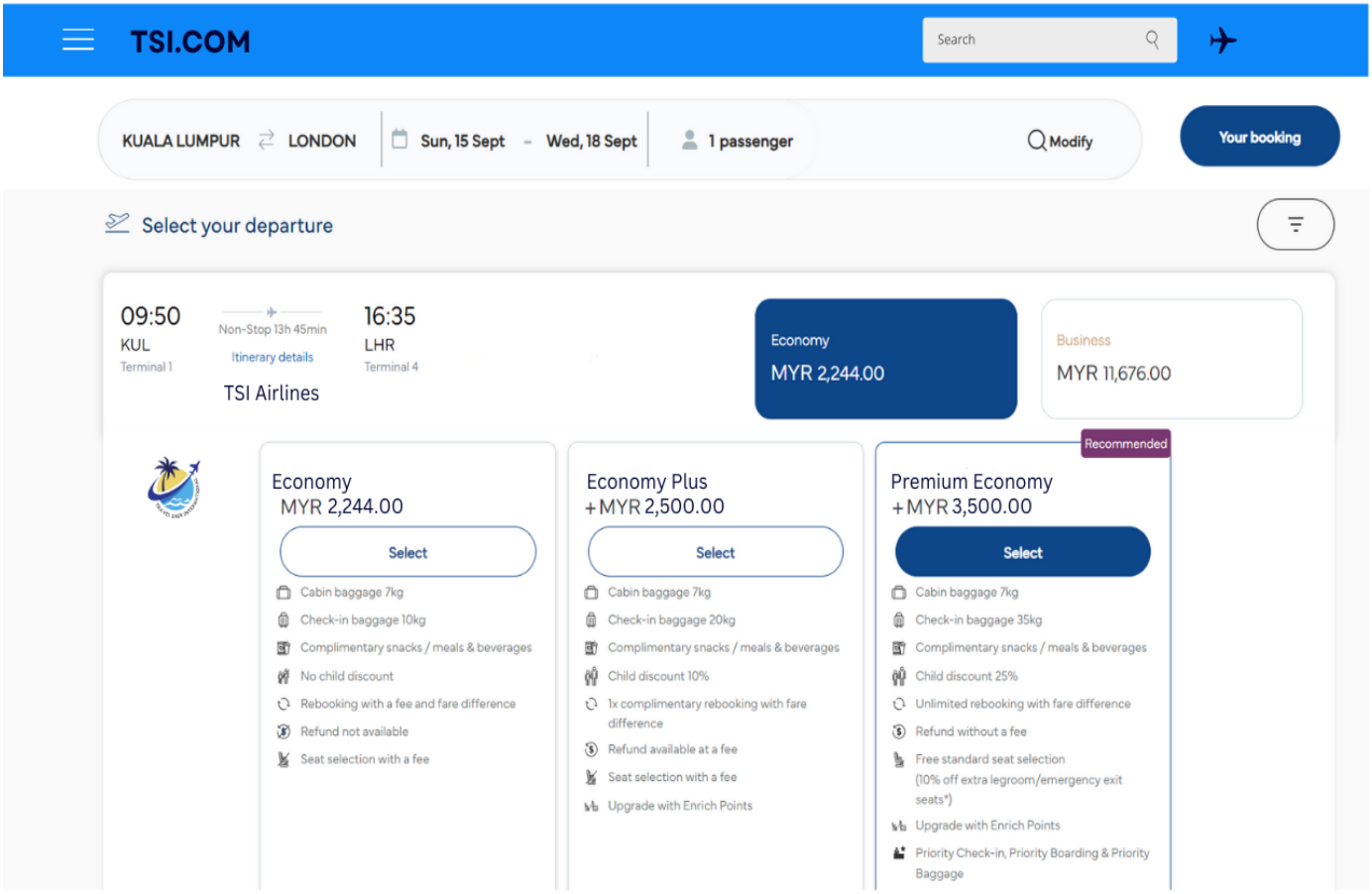
9.4 Rules and Regulation page



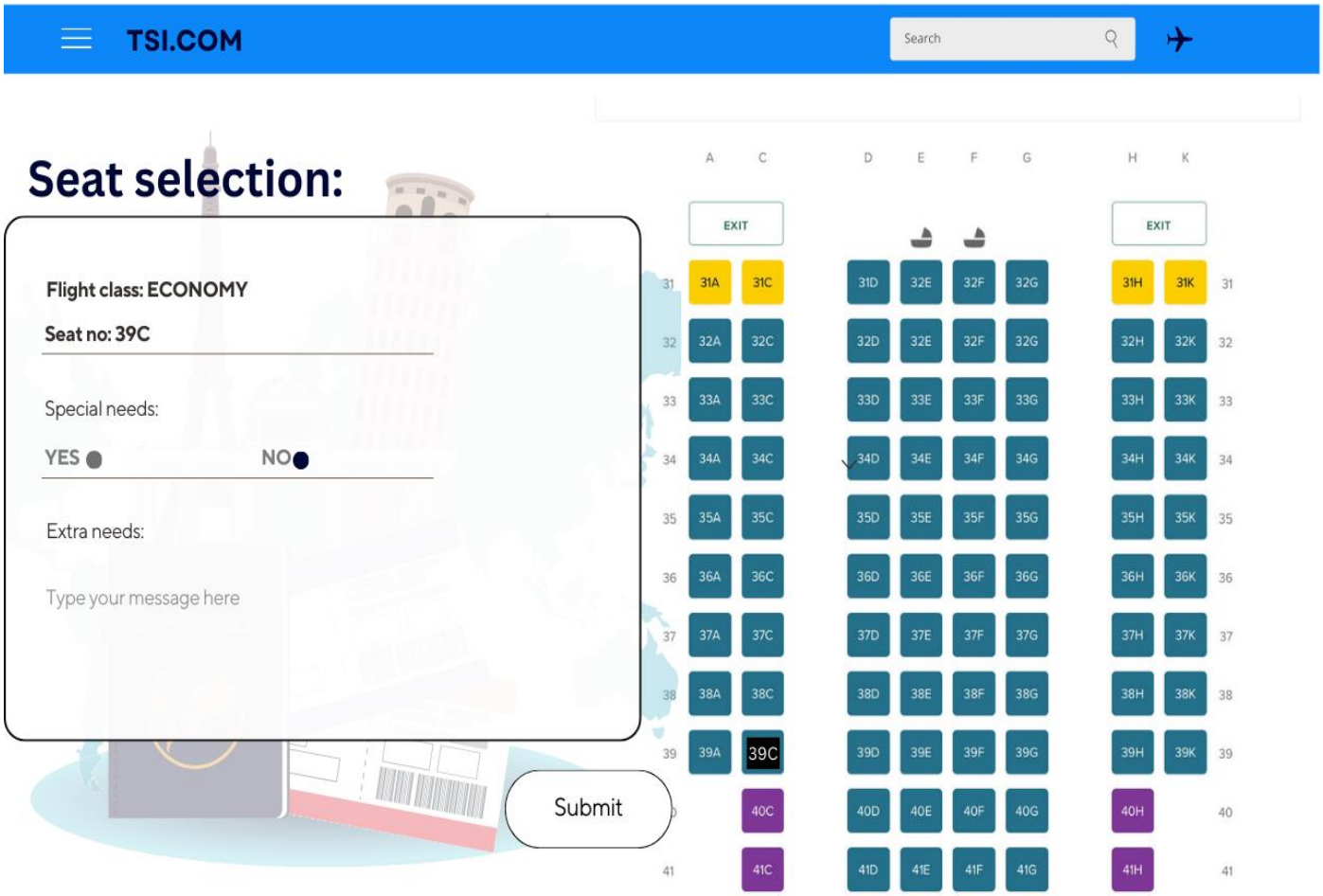
9.5 The Profile Page



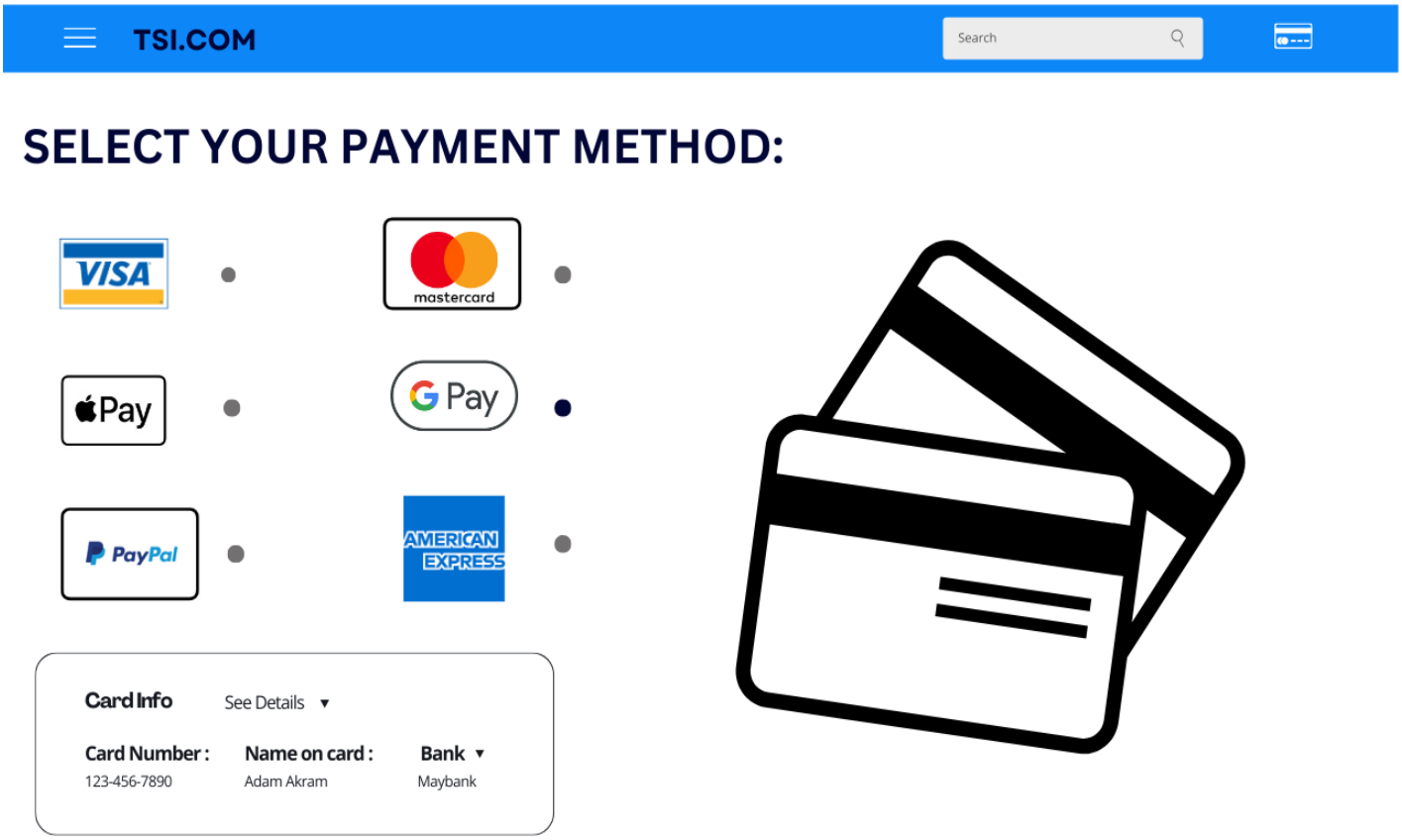
9.6 Flight Option Page



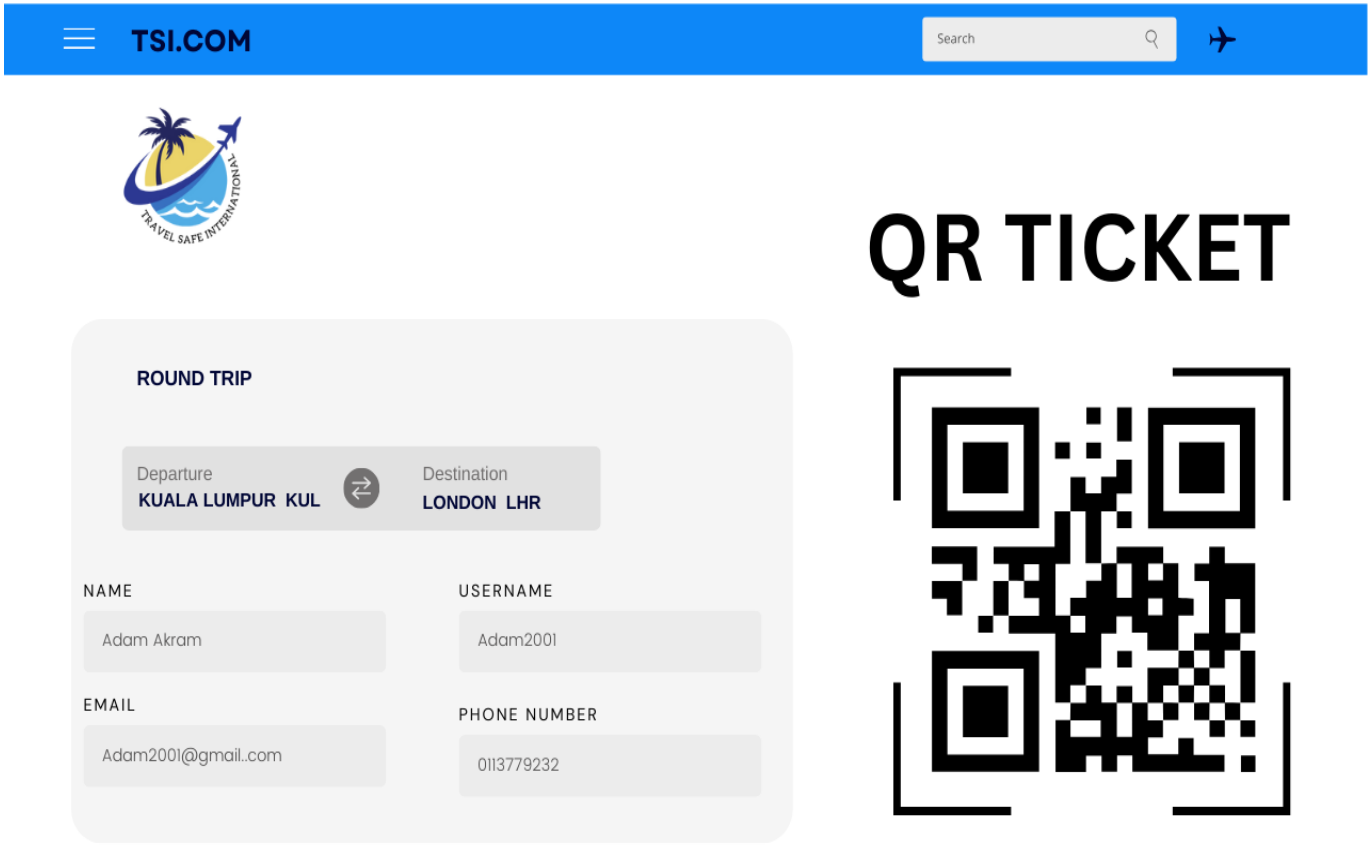
9.7 Seat Selection Page



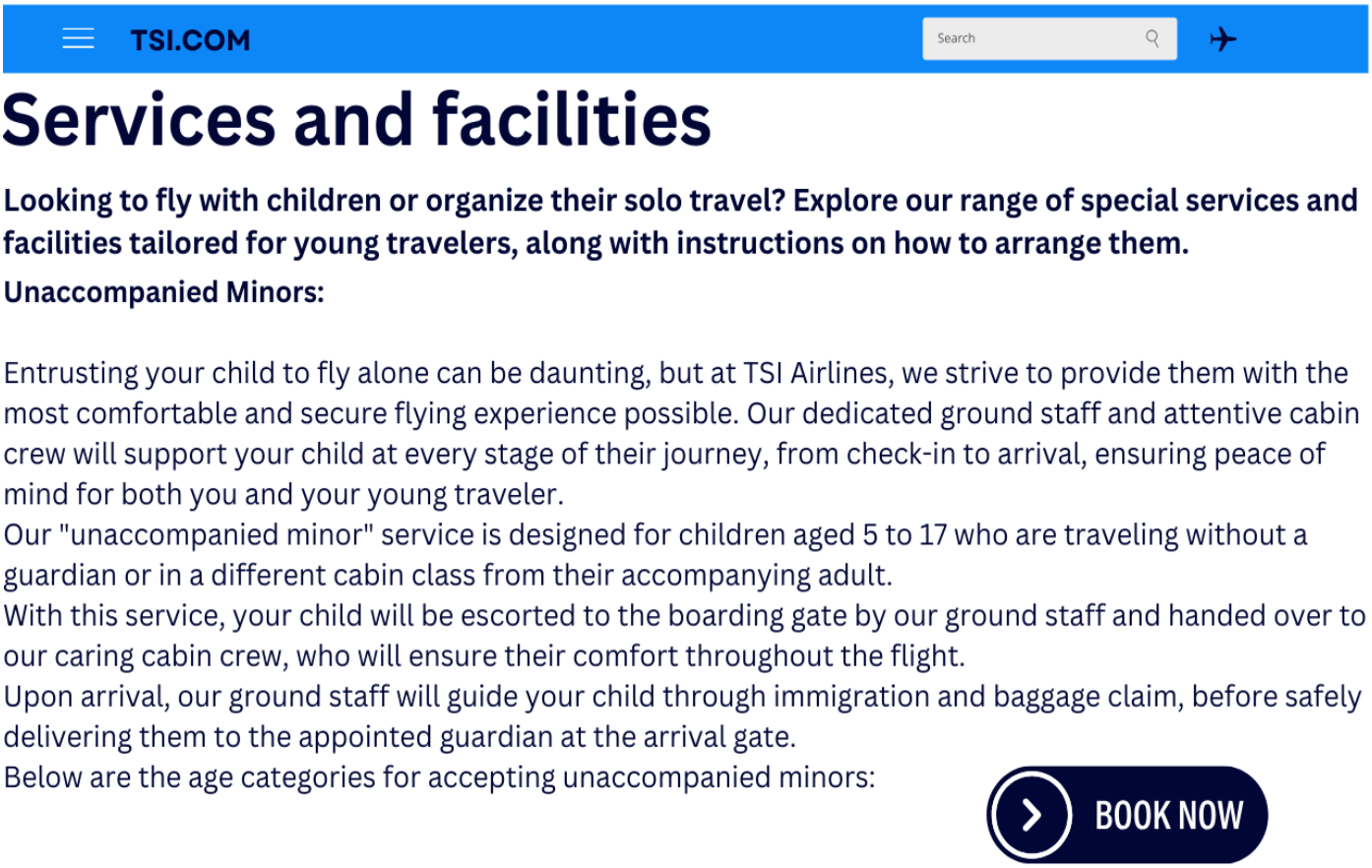
9.8 The Payment Page



9.9 The QR Ticket Page



9.10 The Service and Facilities Page



9.11 Concepts

1st page - This is the main homepage or landing page. It has a large hero image showcasing travel destinations along with a tagline "Explore The World with TSI". There are navigation links for flights, hotels, special offers, and other major sections of the site.

2nd page - This is the sign-in page where existing users can enter their login credentials (email/username and password). It provides options to sign in with Facebook or Google accounts as well. The layout is clean and focused on the sign-in form.

3rd page - This appears to be the account creation or sign-up page. It has form fields to enter personal details like name, email, phone number, date of birth, and create a password. The branding elements like the logo and tagline are present.

4th page - This is the user profile page after signing in. It displays the user's account information like name, email, phone number, password, and date of birth. There are options to log out or change account details.

5th page - A search or booking page for flights. It shows departure and arrival location inputs, along with calendars to select travel dates. Various flight options and pricing are listed below.

6th page - This could be an initial page for creating a new account, similar to the 3rd page. It has the same form fields for name, email, phone, date of birth, and password creation.

7th page - This image shows the seat map page where users can visually pick their seats for an Economy class flight on TSI.com. The layout displays a cabin seating diagram color-coded based on seat type/pricing. Users can indicate special needs like wheelchair accessibility and submit any other requests before making their selection.

The seat map interface follows the clean, user-friendly design seen across the website, allowing travelers to easily choose their preferred seats as part of the overall booking flow. This

functionality empowers customers to customize their flight experience by pre-selecting seats aligning with their needs and budget.

8th page - displays a payment page where users can select their preferred payment method such as Visa, MasterCard, Apple Pay, Google Pay, or PayPal. There's also an option to manually enter card details like number, name on card, and bank. This allows users to complete their bookings or purchases securely.

9th page seems to be a confirmation or ticket page after a booking is made. It shows the trip details like round-trip flight from Kuala Lumpur to London, along with the traveler's name, username, email, and phone number. Additionally, it has a QR ticket code for convenient mobile check-in or boarding.

10th page highlights the services and facilities offered by TSI Airlines, particularly for young travelers or unaccompanied minors. It explains their dedicated staff, procedures, and "unaccompanied minor" service to ensure a safe and comfortable travel experience for children flying alone. There's a prominent "Book Now" call-to-action button.

These 10 pages provide a comprehensive look at the user experience and main functionality of the TSI.com travel website and booking platform. The site follows a consistent design aesthetic with the TSI logo, blue and white color scheme, and travel-themed imagery like palm trees and airplanes.

9.12 Principles

The pages cover all the major steps in the travel booking process - from initially landing on the home page, creating an account, searching for flights, selecting payment method, choosing seats, all the way through to confirming the itinerary and receiving a mobile QR ticket. The user interface seems clean and straightforward for navigating these common booking tasks.

Additionally, supporting pages highlight ancillary services like facilities for unaccompanied minors traveling alone, which showcases attention to passenger experience. The payment options page also provides flexibility by accepting various credit cards as well as digital wallets.

Overall, the TSI.com is a modern, full-featured online travel agency platform that guides users seamlessly through researching, booking, and managing their travel plans while upholding brand consistency throughout the entire experience. The range of pages demonstrates the breadth of functionality and capabilities aimed at serving travelers' end-to-end needs.

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