PROJECT PHASE 1

SECD2613 - SYSTEM ANALYSIS AND DESIGN

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1.0 INTRODUCTION

This proposal covers the creation of an Hasta Travel and Tours Sdn. Bhd. for a local business that is based in Universiti Teknologi Malaysia (UTM), Johor Bahru. The process of renting a car at present is based on manual methods, which not only slows down the process but also makes it error-prone and inefficient. The system proposed here will modernize the whole process, making it convenient not just for the owners of the business but also for the customers by converting the process from manual and half-digital to fully automated and centralized. It will drastically boost the efficiency of work, minimize errors and enhance customer satisfaction.

2.0 BACKGROUND STUDY

Hasta Travel and Tours Sdn. Bhd. is a car rental company that is mostly catered to UTM Students. The main office of Hasta Travel and Tours Sdn. Bhd. is currently based in UTM. It offered a wide selection of cars for students to rent from with more affordable pricing for students compared to pricing offered outside UTM.

Currently, WhatsApp is the main method used by Hasta Travel and Tours Sdn. Bhd. to respond to client questions and confirm reservations. Although this unofficial approach facilitates rapid and direct communication, it is not integrated with the internal system, so employees must manually transfer information, which is ineffective and prone to mistakes.

A fragmented workflow is produced by the process's dual nature, which involves manual data entry after customer interaction via WhatsApp. This gap hinders operations, raises the possibility of misunderstandings, and makes it challenging to guarantee that all booking and client data is precisely recorded in real time.

At the beginning of the rental process, key client and booking information is manually gathered. Customers must also report the condition of the car before and after the rental time. Due to their lack of automation and heavy reliance on manual verification, these procedures add to the effort and decrease consistency.

The manual examination of vehicle status reports is directly related to the security deposit reimbursement procedure. It is more difficult to guarantee fairness and openness in the refund procedure because of the subjectivity and possible delays introduced by this evaluation's lack of systematisation.

It becomes very difficult to track fleet availability and vehicle status in real time without a centralised digital system. This restriction has an impact on the business's capacity to effectively monitor its assets, react swiftly to client demands, and make well-informed fleet utilisation decisions.

The existing manual configuration also hinders important operational duties like tracking mileage, fuel use, and dynamic pricing. Without automation, these tasks are challenging to handle and prone to mistakes that could affect sales and client satisfaction.
It is challenging to manage client data and address problems in the current disjointed system. It is challenging to produce insights, preserve data accuracy, and guarantee consistent service quality across various reservations and transactions when there is no single platform.

All things considered, the company's capacity to grow efficiently is constrained by its current operational model. These laborious and disjointed procedures will become more and more inefficient as the organisation expands, lower customer happiness, and threaten the company's long-term viability.

3.0 PROBLEM STATEMENT

- **The Booking Process is a Bit Clunky:**
  Right now, the whole booking process relies on old-school methods like paper forms and messaging apps. This setup is a recipe for human error—think wrong entries, missed bookings, or even double-booking the same time slot. All of this can really put a damper on the customer experience.

- **Scheduling Conflicts Are Common:**
  Without a centralized platform to keep track of availability, it's not uncommon for scheduling conflicts to pop up. When multiple customers try to book the same vehicle at once, it creates a lot of frustration and confusion for everyone involved.

- **Lack of Real-Time Updates:**
  The current system doesn't provide real-time updates on vehicle availability, which leaves customers in the dark about whether the car they want is actually free. This often leads to delayed responses and, at times, booking cancellations.

- **Keeping Records Manually:**
  Juggling customer information, bookings, and vehicle statuses by hand makes it tough to keep accurate records. It's hard to access customer data and generate useful reports quickly, and this manual approach also raises the risk of losing important data.

- **Hindrance to Business Growth:**
  Because of the inefficiencies tied to the manual system, the business is hitting a wall when it comes to growth. As rental demand increases, the current setup struggles to keep up with the higher volume of transactions, resulting in more mistakes and delays.

4.0 PROPOSED SOLUTIONS

To overcome the problems currently faced by Hasta Travel and Tour Sdn. Bhd., we proposed to make a web-based booking system with an invoice reporting system where the system may automate the booking process and accounting process for invoice reporting.

Feasibility Study :

The aim of this feasibility study is to evaluate the practicality of developing a web-based booking system for a car rental business. The business currently relies on manual methods, which are prone to errors and inefficiencies. This system seeks to streamline operations and improve scalability.

1. Technical Feasibility

   Technology Stack: The system can be built using widely available technologies such as:

   - Frontend: HTML, CSS, JavaScript, React or Vue.js
   - Backend: Node.js, PHP, or Python with frameworks like Express or Django
   - Database: MySQL, PostgreSQL, or MongoDB
   - Hosting: Cloud platforms such as AWS, Google Cloud, or DigitalOcean

   Availability of Skills: The required development skills are common in the industry, and hiring developers or outsourcing is viable.

   Infrastructure: The business will need internet access and basic hardware (PC or laptop) for the admin dashboard. No specialized infrastructure is required.

   Conclusion: Technically feasible

2. Economic Feasibility

- **Estimated Costs:**
  - Development Cost: RM75,000
  - Operational Cost : RM18,000

- **Expected Benefits:**
  - Reduced administrative workload
  - Improved booking accuracy
  - Enhanced customer satisfaction
  - Better data tracking and reporting
  - Scalability for business growth

- **Return on Investment (ROI):**
  - Faster booking cycles can increase the number of customers served.
  - Reduced labor costs and fewer errors lead to long-term savings.

Conclusion: Economically feasible with positive ROI

3. Operational Feasibility

- **Ease of Use:** User interfaces can be designed to be intuitive for both customers and staff.
- **Training Requirements:** Minimal training needed for staff to use the admin panel.
- **Customer Adoption**: Online booking is a familiar process for most users, so adoption should be smooth.

Conclusion: Operationally feasible

CBA (COST-BENEFITS ANALYSIS)

COST	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
DEVELOPMENT COST						
HARDWARE	30,000					
SOFTWARE	20,000					
CONSULTANT FEES	15,000					
STAFF TRAINING	10,000					
TOTAL DEVELOPMENT	**75,000**					
OPERATIONAL COST						
CLOUD LICENSES		5,000	5,250	5,513	5,789	6,078
IT SUPPORT & MAINTENANCES		10,000	10,500	11,025	11,576	12,154
SUPPLIES COST		3,000	3,150	3,308	3,473	3,647
TOTAL		**18,000**	**18,900**	**19,846**	**20,838**	**21,879**
TOTAL PRESENT VALUE		**17,100**	**16,245**	**15,433**	**14,661**	**13,928**
ACCUMULATED COST		**92,100**	**108,345**	**123,778**	**138,439**	**152,367**

BENEFITS	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
OPERATIONAL GAINS		30,000	31,800	33,708	35,730	37,874
INCREASED BOOKING		17,000	18,020	19,101	20,247	21,462
CUSTOMER LOYALTY		10,000	10,600	11,236	11,910	12,625
TOTAL BENEFITS		**57,000**	**60,420**	**64,045**	**67,887**	**71,961**
PRESENT VALUE (5% DISCOUNT)		**54,150**	**57,399**	**60,843**	**64,493**	**68,363**
ACCUMULATED BENEFITS (PV)		**54,150**	**111,549**	**172,392**	**238,885**	**305,248**
GAIN/LOSS		**(37,950)**	**3,204**	**48,614**	**114,554**	**152,881**
PROFITABILITY INDEX	**152,881 / 75,000 = 2.04**					

Discount rate = 5%

Operational costs annual increase = 5%

Operational gains and benefits annual increase 6%

5.0 OBJECTIVES

- **Simplify Booking Procedure:**

  With the establishment of an online booking procedure, we will eliminate the conventional booking procedure and enable effortless vehicle availability checking for customers with a reduction in errors and a quick and accurate procedure.

- **Prevent Scheduling Conflicts:**

  The system will ensure instant availability updates on cars to avert double bookings and scheduling conflicts, thereby ensuring smooth operation and enhancing customer satisfaction.

- **Offer Real-Time Car Availability Details:**

  The web-based system will offer customers real-time details on car availability, creating transparency and time efficiency. This will lead to fewer cancellations and improved customer trust.

- **Centralization of Data Management:**

  With all the customer, booking, and vehicle data consolidated in one place, the system will make it easy to access, trace, and manage the data. This will improve decision-making, offer improved data protection, and increase overall business efficacy.

- **Facilitate Business Scalability:**

  The booking process will be automated and automated, and the business will be able to process more volumes of bookings with fewer errors and latency. Scalability through this will facilitate future growth and expansion opportunities.

6.0 SCOPE OF THE PROJECT

Current features:

- Online Booking Interface for customers to browse and book vehicles.
- Real-time Car Availability Checking to ensure accurate booking information.
- Admin Portal to manage fleet and booking data.
- Customer Registration and Booking History Tracking for personalized services.
- Invoice Reporting System

Future planned features:

- Payment System Integration (e.g., FPX, credit card).
- GPS Vehicle Tracking.
- Mobile Application Development (this system will be web-based only).

7.0 PROJECT PLANNING

Project Planning is a critical step towards offering effective implementation and on-time delivery of the Online Car Rental Booking System. It is a process of specifying steps and plans required to design and implement the system, from gathering the requirements to deployment. This stage has resource allocation, task breakdown, and time-scheduling via Work Breakdown Structure (WBS), PERT charts, and Gantt charts. By clearly articulating these facets, we can successfully track progress, manage potential risks, and ensure that all deliverables and goals are reached as planned.

7.1 HUMAN RESOURCE

Name	Position	Responsibility
Dr. Aryati binti Bakri	Advisor	Provides guidance and strategic input throughout each phase to ensure the project outcome is accurate and aligned with objectives.
Goa Wei Siang	Project Manager	Plans, organizes, executes, and monitors the entire project. Drafts a task plan, identifies key milestones, manages team responsibilities, and acts as liaison to clients.
Nur Afiqa Afifie Binti Azman	Quality Assurance	Ensures service quality, reliability, and performance. Conducts various types of testing including functionality, usability, compatibility, performance, and security.
Abdulrahman Khaled Abdullah Shiekh	Front-End Web Developer	Develops the visual and interactive elements of the website. Translates UI/UX designs into web pages using HTML, CSS, JavaScript. Handles debugging and performance.
Zaky Zulhadi	Back-End Web Developer	Develops and maintains server-side components, including databases and APIs. Manages business logic, data handling, debugging, and server performance.
Muhammad Aiman Fikri Bin Zulkarnain	UI/UX Designer	Designs wireframes, mockups, and prototypes. Selects visual elements (colors, fonts, layout) using tools like Figma to enhance user experience and brand consistency.

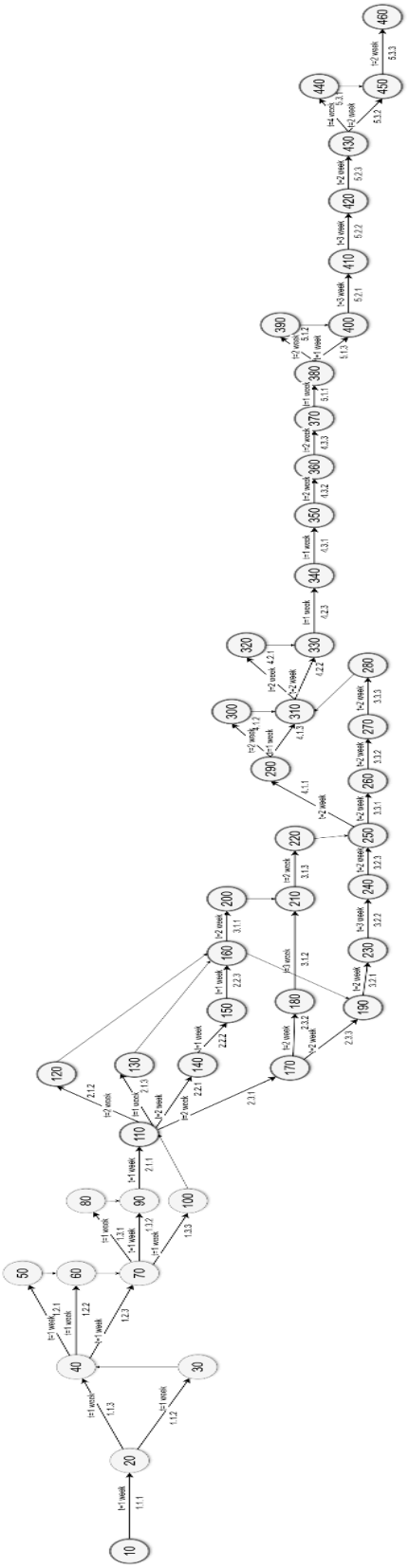
7.2 WORK BREAKDOWN STRUCTURE (WBS)

Booking System for Hasta Travel Group
1.0 Requirement Gathering
1.1 Define Project Scope
1.1.1 Outline Project Objectives
1.1.2 Determine Scope Boundaries
1.1.3 Establish key deliverables
1.2 Conduct Stakeholder Interviews
1.2.1 Interview Management Team
1.2.2 Interview Head of IT
1.2.3 Interview Operation Team
1.3 Document Current System Issues and Needs
1.3.1 Determine Manual Work Inefficiency
1.3.2 Research on Current Booking System
1.3.3 Identify Invoice System Requirement
2.0 Design
2.1 Generate Innovative System
2.1.1 Identify Automatable Process
2.1.2 Design Prototype of Booking System
2.1.3 Create Prototype of Invoice System
2.2 Design User Interface (UI)
2.2.1 Create Mock-Up and Prototype
2.2.2 Gather User Feedback on Design
2.2.3 Review and Finalise Design
2.3 Determine Database Structure and Model
2.3.1 Define Database Structure for Client Data
2.3.2 Design Booking Tracking System Schema
2.3.3 Integrate Invoice Report Data Structure
3.0 Development

3.1 Set up Booking System
3.1.1 Set Up Website for Booking
3.1.2 Set Up Booking Tracking System
3.1.3 Integrate Booking System with Existing Tools (Whatsapp,Email)
3.2 Set up Invoice System
3.2.1 Configure Database for Invoice Tracking
3.2.2 Set up Invoice Tracking System
3.2.3 Set up Reporting System for Invoice System
3.3 Integrate Booking System with Invoice System
3.3.1 Integrate Invoice System in Booking System
3.3.2 Ensure Correct Data Flow from Booking System to Invoice System
3.3.3 Integrate System with Existing System
4.0 Testing
4.1 Conduct unit test on Proposed System
4.1.1 Test Booking System and Invoice System Functionality
4.1.2 Ensure Correct Data Processing and Storage
4.1.3 Ensure User Interface Usability
4.2 Conduct Integration Test with Current System
4.2.1 Test Integrated System (Booking and Invoice) Functionality
4.2.2 Test Integrated System with Existing tools (Whatsapp and Email)
4.2.3 Verify Data from Integrated System and Data Stored Database
4.3 Run User Acceptance Test with Management, IT and Operation Team
4.3.1 Prepare UAT environment
4.3.2 Collect Feedback from Management, IT and Operation Team
4.3.3 Document and Resolve any Problem or Issues Encountered
5.0 Deployment
5.1 Prepare Deployment Plan
5.1.1 Develop Deployment Strategy and Transition Timeline
5.1.2 Prepare User Training Materials and Documentation
5.1.3 Prepare Backup and Recovery Plan

5.2 Deploy Booking System
5.2.1 Deploy Booking System in Phase
5.2.2 Transition data from Old System to New System
5.2.3 Ensure Booking System Full Functionality Post-Deployment
5.3 Provide Training, Guides and Documentation
5.3.1 Conduct Training Session
5.3.2 Provide User Guide and Manuals
5.3.3 Setting up Support and Troubleshooting System

7.3 PERT CHART



7.4 GANTT CHART

TASK NAME	WEEKS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Requirement Gathering														
1.1 Define Project Scope														
Outline project objectives														
Determine scope objectives														
Establish key deliverables														
1.2 Conduct Stakeholder Interviews														
Interview the management team														
Interview the head of IT														
Interview the operation team														
1.3 Document Current System Issues and Needs														
Determine manual work inefficiency														
Research on the current booking system														
Identify invoice system requirements														
2 Design														
2.1 Generate Innovative System														
Identify automatable processes														
Design a prototype of the booking system														

Create a prototype of the invoice system														
2.2 Design User Interface (UI)														
Create a mock-up and a prototype														
Gather user feedback on the design														
Review and finalize the design														
2.3 Determine Database Structure and Model														
Define the database structure for client data														
Design a booking tracking system schema														
Integrate the invoice report data structure														
3 Development														
3.1 Set up Booking System														
Set up a website for booking														
Set up a booking tracking system														
Integrate the booking system with existing tools (e.g., WhatsApp, Email)														
3.2 Set up Invoice System														
Configure the database for invoice tracking														
Set up an invoice tracking system														

Set up a reporting system for the invoice system													
3.3 Integrate Booking System with Invoice System													
Integrate the invoice system into the booking system													
Ensure correct data flow from the booking system to the invoice system													
Integrate the system with existing tools													
4 Testing													
4.1 Conduct Unit Test on Proposed System													
Test the booking system and invoice system functionality													
Ensure correct data processing and storage													
Ensure user interface usability													
4.2 Conduct Integration Test with Current System													
Test the integrated system (booking and invoice) functionality													
Test the integrated system with existing tools (e.g., WhatsApp and Email)													
Verify data from the integrated system and data													

stored in a database													
4.3 Run User Acceptance Test (UAT) with Stakeholders													
Prepare the UAT environment													
Collect feedback from management, IT, and operations teams													
Document and resolve any issues encountered													
5 Deployment													
5.1 Prepare Deployment Plan													
Develop a deployment strategy and transition timeline													
Prepare user training materials and documentation													
Prepare a backup and recovery plan													
5.2 Deploy Booking System													
Deploy the booking system in phases													
Transition data from the old system to the new system													
Ensure full functionality of the booking system post-deployment													

5.3 Provide Training, Guides, and Documentation														
Conduct training sessions														
Provide user guides and manuals														
Set up a support and troubleshooting system														
6 Final Review, feedback and Adjustments														
Evaluate the overall progress of the system implementation.														
Collect any remaining feedback from stakeholders.														
Make adjustments and fine-tune the system for final deployment.														

8.0 BENEFITS AND OVERALL SUMMARY OF PROPOSED SYSTEM

The proposed Car Rental Booking System offers significant improvements over the current manual process. By automating core operations, the system enhances customer experience, reduces human errors, and provides real-time data management. The web-based platform ensures accessibility and scalability, making it suitable for future enhancements such as online payments or mobile integration. Overall, the proposed system aligns with the business goals of efficiency, professionalism, and customer satisfaction, paving the way for sustainable growth.

Github Link: https://github.com/GaryGoaWeiSiang/Group9_Project1_SAD_20242025