



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECD2613 - 04

SYSTEM ANALYSIS AND DESIGN

SEMESTER 1 SESSION 2024/2025

GROUP PROJECT PHASE 1

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1.0 Introduction

In the majority of organizations today, especially those that rely on day-to-day operations to operate effectively, inefficiencies are most likely brought about by outdated systems or manual processes. This project thus proposes the development of a HASTA Travel UTM's system to solve such problems. The main aim is to come up with a system that will allow the company to manage its operations better, reduce errors, and make critical information more available and manageable.

By designing and developing an organization-specific system, we hope to exchange time-consuming procedures for faster, automated processes. Not only will the system improve day-to-day functionality, but it will also facilitate making informed decisions with complete and current information. Throughout this proposal, we hope to illustrate ways in which the new system can benefit the organization in the near future and the long run.

2.0 Background Study

2.1 Organizational Background

Presently, the company relies on a lot of manual work for vital processes like item tracking, booking, or information handling. This habitually leads to delays, errors, and miscommunications between departments. Staff sometimes have to double-check or redo work, which is time wastage and can contribute to frustration.

2.2 System Coverage (Scope)

To address these issues, the new system will focus on improving the most vital areas:

Within the system:

- Automated tracking and updating of data
- Secure login and user access levels
- Centralized information management system
- Rapid and precise report generating facilities

Not included in the first version:

- Additional financial functionality like integration with accounting systems
- Mobile app functionality
- Full migration of legacy historical data (only recent data will be migrated)

2.3 Contribution and Benefits

The new system will benefit the organization in the following manner:

- It will be a time-saver by reducing manual input and checking.
- Information will be more accurate and organized, which enables everyone to function more efficiently.
- The system makes it easier to manage tasks and resources, especially when things get busy.
- A more user-friendly interface will make the system easier to learn and use.
- As the business grows, the system can be adapted and expanded without starting from scratch.

3.0 Problem Statement

HASTA, is a campus car rental service, which uses manual processes for important functions like booking reservations, tracking vehicles and handling data. The use of outdated systems results in regular problems like booking conflicts as well as delayed confirmations and staff-to-customer communication errors. Without a centralized platform, vehicle availability information cannot be updated in real-time which creates challenges for customers who want to plan and reserve vehicles. Employees must often redo tasks and perform double checks which leads to time wastage and decreased operational efficiency. Management lacks an analytical tool to assess fleet performance metrics alongside customer behavior patterns and resource distribution. The company's service quality and customer satisfaction decline because inefficiencies stop operational growth and digital expansion potential.

Identified Issues:

- The manual booking system increases error probability and delays processing time.
- Without real-time data on vehicle availability customers face booking conflicts which leads to a negative experience.
- Without centralized information management systems data becomes inconsistent which creates operational delays.
- The lack of effective internal communication alongside missing customer notifications leads to diminished service efficiency.
- The business cannot grow or adapt due to system limitations in scalability, analytics capabilities and automation features.

4.0 PROPOSED SOLUTIONS

To address the inefficiencies and challenges faced by HASTA's current manual car rental process, we propose a web-based Car Rental Management System designed specifically for campus-based use. This system will serve as a centralized platform for booking, tracking, managing, and analyzing car rental operations, accessible to both staff and students.

Key Features of the Proposed Solution:

- Online Booking Interface for students/staff to reserve vehicles in real-time.
- Admin Dashboard for managing vehicle availability, user accounts, and bookings.
- Automated Notifications for booking confirmation, reminders, and updates.
- Data Analytics Module to monitor fleet usage, customer behavior, and operational performance.
- Secure Login System with role-based access (Admin, Staff, Student).

Feasibility Study

1. Technical Feasibility

- The system will be developed using standard web technologies (HTML/CSS, JavaScript, PHP/Python, MySQL).
- Easily deployable on existing university servers or cloud infrastructure (e.g., GitHub, Firebase).
- Compatible with any modern browser and responsive on desktops, tablets, and mobile devices.

2. Operational Feasibility

- Staff can be easily trained to manage the system via user-friendly dashboards.
- Students and users will benefit from a simple interface requiring minimal onboarding.
- Daily operations will improve significantly with centralized access to booking and vehicle status.

3. Economic Feasibility

- Initial development can be done in-house by the student team, minimizing upfront costs.
- Long-term savings through reduced manpower, fewer booking errors, and better time management.
- Potential for scalable integration of advanced modules (payments, GPS tracking) in the future.

COST-BENEFIT ANALYSIS (CBA)

The Cost-Benefit Analysis evaluates the financial feasibility of implementing the HASTA Car Rental Management System by comparing the estimated costs against the expected benefits over one year.

1. Estimated Costs

Item	Details	Estimated Cost (RM)
System Development	Developed by student team	0
Training Sessions	2 sessions × RM 50 (venue, printing)	100
Maintenance (Minor Fixes/Updates)	Monthly RM 12.50 × 12 months	150
Internet/Hosting (internal server)	Provided by university	0

2. Estimated Benefits (Yearly)

Benefit Area	Estimation Method	Estimated Benefit(RM)
Staff Time Saved	1 hr/day × RM15/hr × 260 workdays/year	39000
Reduced Booking Errors	5/month × RM20 error impact × 12 months	1200
Paper/Manual Process Savings	Reduced printing/admin costs	600
Operational Efficiency (fleet use)	Estimated resource optimization savings	500

Total Estimated Benefit: RM 6,200

3. Net Benefit & Ratio

Metric	Value
Total Benefit (1 Year)	RM 6,200
Total Cost (1 Year)	RM 250
Net Benefit	RM 5,950
Benefit-Cost Ratio (BCR)	$6,200 / 250 = 24.8$

The CBA reveals that the proposed system provides a net benefit of RM 5,950 annually, with a Benefit-Cost Ratio of 24.8, demonstrating high economic feasibility. The significant return on a very low investment makes the HASTA Car Rental Management System a cost-effective and impactful solution for the university.

5.0 Objectives

1. The project aims to create a car rental management system that meets HASTA's operational requirements for campus use.

The development of automated systems for booking and vehicle tracking will lead to a substantial decrease in both mistakes and administrative tasks.

2. A real-time vehicle availability feature will be implemented to boost booking accuracy and minimize customer complaints.

3. A centralized dashboard will be created to support data-driven decision-making by monitoring rental activity and fleet performance.

4. Future scalability of the system is guaranteed to support upcoming features like user roles management along with analytics functions and integration of digital services including notifications and campus ID logins.

6.0 SCOPE OF THE PROJECT

Goals of The Project:

To develop a centralized and automated Car Rental Management System for HASTA, which addresses existing operational inefficiencies, enhances service quality, and supports digital scalability while providing a smooth and transparent vehicle booking experience for students and staff.

Project Implementation:

1. Online Booking System

- Users can view available vehicles in real-time.
- Bookings can be made instantly through a web-based interface.
- Eliminates double bookings and minimizes conflicts.

2. Centralized Vehicle Inventory Management

- Real-time vehicle tracking and availability updates.
- Admin dashboard to manage fleet status, maintenance, and scheduling.
- Ensures all staff access consistent and updated data.

3. Notification & Communication System

- Automated notifications for booking confirmations, changes, and reminders.
- Internal alerts for staff regarding upcoming reservations and vehicle statuses.
- Promotes better customer engagement and internal coordination.

4. Customer and Staff Portal

- Role-based access for admins, staff, and users.
- Secure login and profile management.
- Booking history and activity logs for transparency and record-keeping.

5. Analytics Dashboard

- Management view of fleet performance metrics, popular vehicle usage, and customer trends.
- Helps identify bottlenecks, peak usage periods, and resource allocation gaps.
- Supports data-driven decision-making.

System Boundaries (What will not be included):

- No third-party payment integration in the initial version.
- No mobile application (limited to web-based platform only).
- Advanced AI-based recommendation systems are out of scope.
- External API integration with external GPS trackers not included.

Expected Benefits:

- Streamlined car rental process reducing manual effort.
- Enhanced customer satisfaction through improved booking experience.
- Centralized and accurate data management.

- Improved communication among staff and users.
- Data visibility for strategic planning and performance monitoring.

7.0 project Planning:

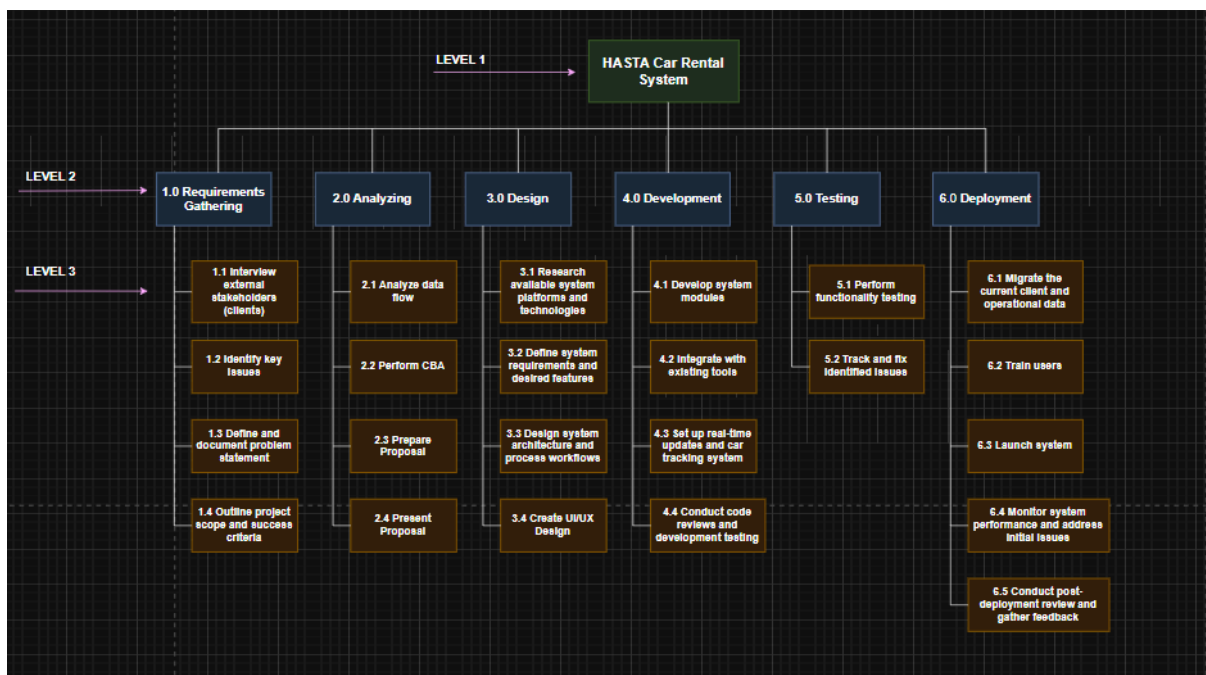
7.1 Human Resource Allocation

The following table outlines the roles and responsibilities allocated to each team member for Phase 1 of the System Analysis and Design (SECD2613) project proposal and planning. These assignments ensure effective collaboration and comprehensive task coverage.

Team Role	Member Name	Responsibilities
Project Manager	Azaam	Oversees the entire project, coordinates tasks, creates WBS, PERT & Gantt charts.
System Analyst	Nishat	Defines problem statement, determines scope, outlines system features.
Research Lead	Rendy	Conducts organizational background study, identifies existing problems.
Technical Analyst	Firdaus	Handles technical feasibility, assesses system compatibility and infrastructure needs.
Operational Analyst	Azaam	Studies operational feasibility and organizational impact.
Financial Analyst	Nishat	Conducts economic feasibility, prepares cost-benefit analysis (CBA).
Documentation Lead	Rendy	Compiles proposal document, maintains formatting, integrates team input.
Quality Reviewer	Firdaus	Reviews proposal draft, ensures clarity, coherence,

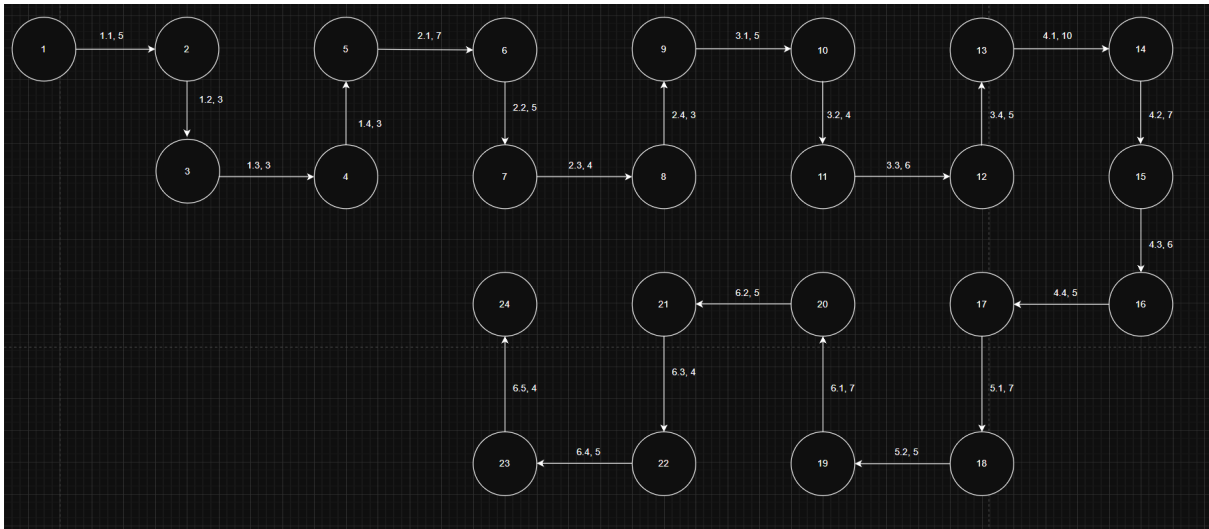
		and alignment with guidelines.
GitHub Coordinator	Rendy	Sets up repository, manages commits, organizes Kanban board, tracks team progress.

7.2 WBS

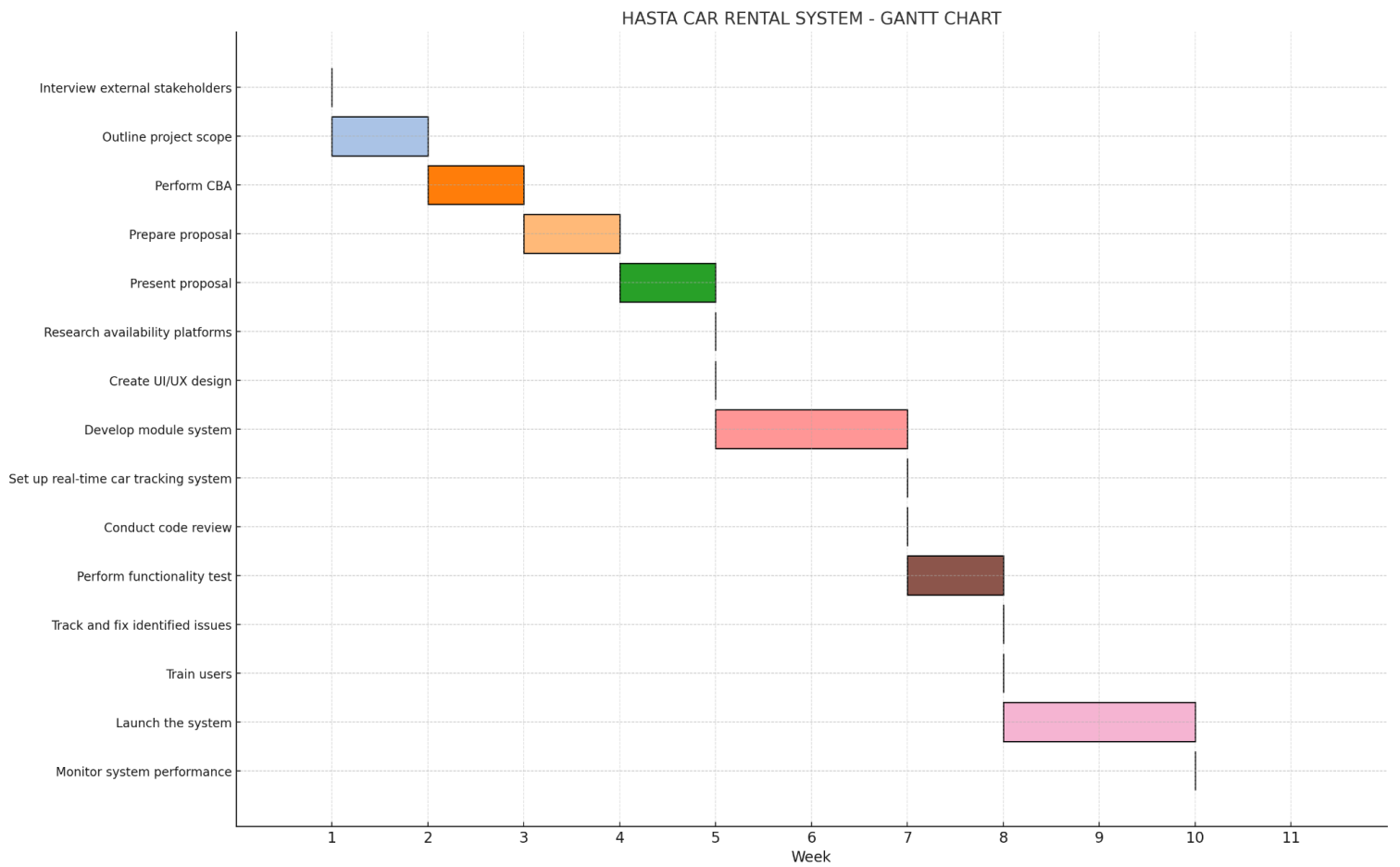


7.3 Pert Diagram

Activity	Description	Predecessor	Duration (Days)
1.1	Interview external stakeholders (clients)	none	5
1.2	Identify key issues	1.1	3
1.3	Define and document problem statement	1.2	3
1.4	Outline project scope and succes	1.3	7
2.1	Analyze data flow	1.4	5
2.2	Perform CBA	2.1	4
2.3	Prepare proposal	2.2	3
2.4	Present Proposal	2.3	5
3.1	Research available system platforms and technologies	2.4	4
3.2	Define system requirements and desired features	3.1	6
3.3	Design system architecture and process workflows	3.2	5
3.4	Create UI/UX Design	3.3	5
4.1	Develop system modules	3.4	10
4.2	Integrate with existing tools	4.1	7
4.3	Set up real-time updates and car tracking system	4.2	8
4.4	Conduct code reviews and development testing	4.3	5
5.1	Perform functionality testing	4.4	7
5.2	Track and fix identified issues	5.1	5
6.1	Migrate the current client and operational data	5.2.	7
6.2	Train users	6.1	5
6.3	Launch system	6.2	4
6.4	Monitor system performance and address initial issues	6.3	5
6.5	Conduct post-deployment review and gather feedback	6.4	4



7.4 GANTT CHART



8.0 BENEFITS AND OVERALL SUMMARY OF PROPOSED SYSTEM

Benefits of the Proposed System

1. Real-Time Vehicle Availability
 - Enables users to instantly view and reserve available cars, reducing booking conflicts and improving user satisfaction.
 2. Improved Operational Efficiency
 - Automation of booking, tracking, and notification processes minimizes manual work, reduces errors, and saves staff time.
 3. Centralized Data Management
 - A unified system ensures consistent and accurate vehicle and user data, streamlining daily operations and decision-making.
 4. Enhanced Communication
 - Integrated notifications and alerts improve coordination between staff and customers, enhancing the overall service experience.
 5. Data-Driven Insights
 - Built-in analytics allow management to monitor fleet performance, identify trends, and optimize resource usage for future planning.
 6. Scalability & Adaptability
 - The system is designed to support future upgrades and expansion, such as payment integration, mobile apps, or external fleet partnerships.
 7. User Convenience
 - A web-based portal simplifies the reservation process, provides booking history, and builds trust through transparency.
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Overall Summary

The HASTA Car Rental Management System aims to transform the university's outdated, manual vehicle rental process into a modern, automated, and centralized platform. By addressing key pain points such as booking delays, communication gaps, and inefficient fleet tracking, the proposed system ensures a smoother user experience and a more productive operational workflow. This project will not only increase customer satisfaction and internal efficiency but also position HASTA for digital growth and long-term service enhancement.

