UNIVERSITI MALAYSIA TERENGGANU

FACULTY OF COMPUTER SCIENCE AND MATHEMATICS

CSE3403

SOFTWARE PROJECT MANAGEMENT

INTEGRATED MALL INFORMATION SYSTEM

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SEMESTER I 2024/2025

TABLE OF CONTENTS

MILESTONE 1

MILESTONE 2

MILESTONE 3

MILESTONE 1

1. INTRODUCTION

1.1 PROJECT OVERVIEW

This project aims to create an online map and information system covering all major shopping malls in Malaysia. The Integrated Mall Information System (IMIS) will offer users interactive maps with detailed information about each mall, such as store listings, current discounts, parking status, available amenities, and upcoming events.

Additionally, the platform will provide navigation aids to improve the user experience when visiting malls. The IMIS will be available via both a mobile app and a web interface, allowing customers to easily receive relevant information. By integrating critical facts into a single source, this platform intends to greatly improve users' shopping and leisure experiences, making it a useful tool for both customers and mall managers.

1.2 PROJECT JUSTIFICATION

In Malaysia, the proliferation of shopping malls presents challenges for consumers in terms of navigating complex layouts and staying informed about ongoing promotions and events. The Integrated Mall Information System (IMIS) serves as a comprehensive solution to this issue by offering a centralised platform that benefits shoppers, mall operators, and retailers alike. By streamlining access to information regarding mall offerings, IMIS enhances the overall visitor experience, facilitating easier planning of mall visits and encouraging customers to engage with current promotions.

The implementation of IMIS is anticipated to result in increased foot traffic to malls, thereby positively influencing sales for retailers. As shoppers gain improved navigation and timely updates on events and promotions, their likelihood of visiting the mall and making purchases increases significantly. This initiative ultimately fosters a more vibrant retail environment, driving economic growth within the sector while enhancing customer satisfaction.

2. SWOT ANALYSIS

The SWOT analysis for the Integrated Mall Information System focuses on the potential to improve the shopping experience significantly by offering a centralized system to store information, navigation, events and real-time updates promotions. Figure 1 shows the strengths, weaknesses, opportunities and threats analysis of the system.

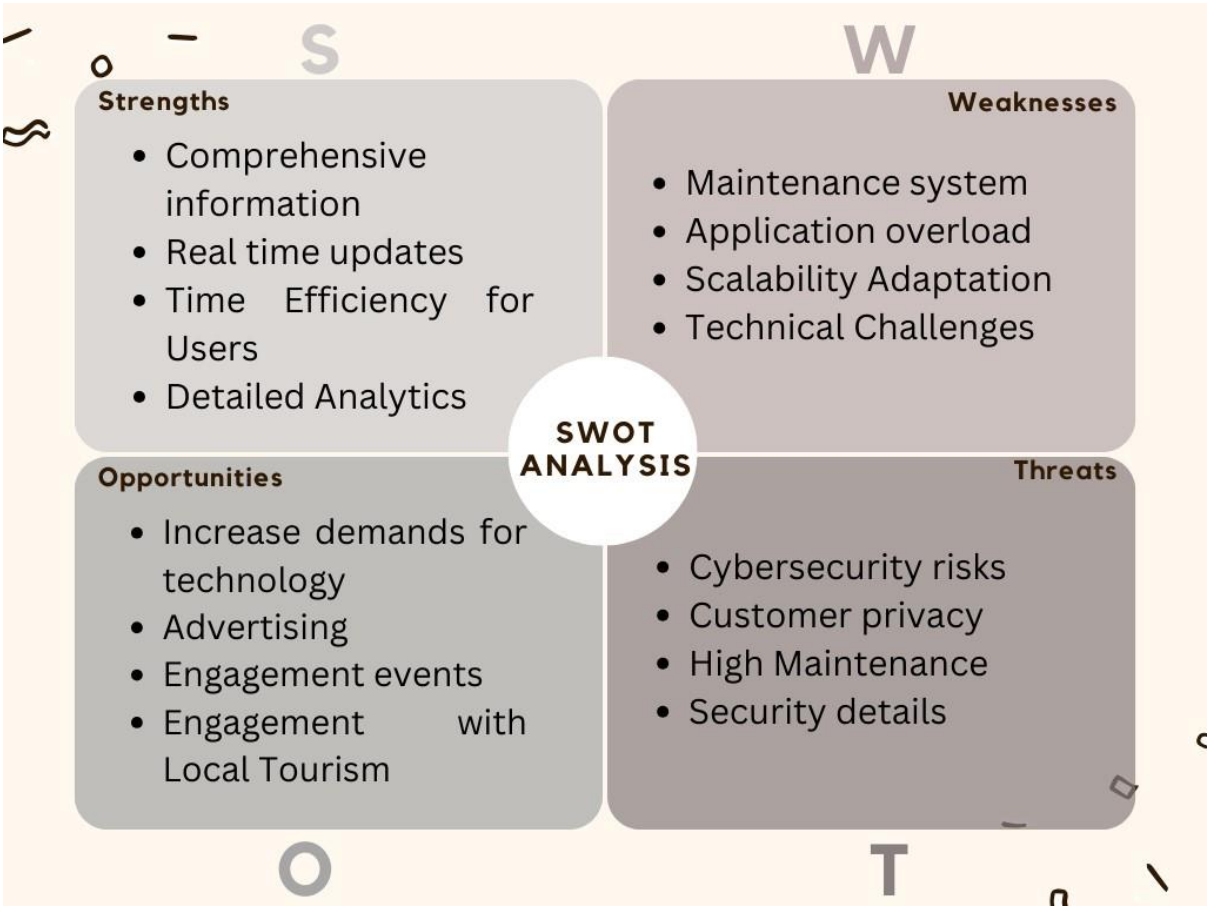

Figure 1: The SWOT Analysis

STRENGTH

- **Comprehensive Information:** It provides users with various detailed information on all aspects needed, like store directories, promotions, events, and navigation assistance. This breadth of information enhances the user experience and diverse user needs.
- **Self-updating system:** It updates real-time and thus will provide customers with real time updates regarding data on promotions, availability of stores, events, and information connected to time, etc. Especially useful in a dynamic environment where change occurs now and then.
- **Time Efficiency to Users:** The system offers users information and ways of navigation quicker, thus saving time which can be used on other things like researching. This saves the user, for instance, when in a rush or trying to locate particular stores or events.
- **Analytics in-depth:** The system would be able to generate detailed analytics, such as user behaviour, store popularity, and other high-traffic spots. This also helps in making informed decisions for mall management or any business inside the mall about marketing or space usage.

WEAKNESSES

- **System Maintenance:** The system is to be brought up to date with enhancements and deployments; troubleshooting and technical support have to be provided for the smooth running of the systems. Failure to do this may result in downtime and/or non-performance of the system.
- **Overload of Application:** An effort by the system to handle or feature a lot in terms of functionality can make it very complex, confusing, or slow, which may impact user experience. A trade-off between richness of features and simplicity needs to be avoided.
- **Adaptation to Scalability:** The scalability factor could be very challenging because scaling it to the growth of malls or systemic expansion into several locations for data, users, or features is not that easy. For scalability, proper planning should be in place; otherwise, it can lead to bottlenecks in performance.
- **Technical Challenges:** The implementation of the system may involve a lot of technical complexities, from ensuring GPS accuracy for navigation features to integrating real-time data from multiple sources. Advanced technical capabilities may be required to overcome such challenges.

OPPORTUNITIES

- **Increased Demand for Technology**: There is a growing interest in digital solutions and smart technology in retail environments. The system can tap into this trend, positioning itself as a modern solution for mall navigation and information access.
- **Advertising:** The platform shall give an opportunity for highly targeted advertising within the mall. Stores will be able to utilise the system to reach out with promotions in sales, events, and new products directly to shoppers, potentially opening additional revenue streams.
- **Events for Engagements:** Malls can utilise the facility to promote or provide certain engagement events that increase footfall and contribute to the sense of community in a mall. This could be on occasions related to store opening, holiday events, or promotions that ensure direct benefit through higher footfalls.
- **Local Tourism Engagement:** The system will attract the tourists with complete guidance on the mall, which can recommend shopping, diners, and amusement places. Hence, engagement with the tourism authorities of the area could lead to a significant increase in its usage among visitors.

THREATS

- **Security Risks:** Since this system involves the processing of data and may involve personal information, it could attract interest in cyber-attacks. Ensuring data security will be important in blocking breaches that would lead to loss of confidence by users.
- **Customer Privacy:** The collection of user data, even for analytics or targeted advertising, may raise issues with privacy. The system needs to comply with privacy and transparency regulations in terms of data collection to retain users' trust.
- **High maintenance:** The need for regular updates and maintenance necessary to make the system reliable can result in extremely high operational costs. Effective cost management will therefore be critical for sustaining the service for a longer period of time.
- **Security information:** Tracking users and providing real-time updates may present challenging requirements for the security of location and sensitive data. If such information is not secured, there may be security hazards involved.

3. PROJECT CHARTER

A project charter is a formal document delineating the project's purpose, scope, project concern, goals, and comprehensive plan. The table 1 below shows the draft of the project charter for Integration Management Information System.

Title	The Integrated Mall Information System (IMIS)
Start Date	24 October 2024
End Date	24 October 2025
Project Manager	Aerisha Fashahira Bt Mohd Puad, aerisha@gmail.com
Project Description	This project addresses the growing demand from users for a secure, reliable alternative to Google for finding nearby mall information. New residents, in particular, prefer a dedicated platform to access accurate mall data. Users face challenges in quickly finding trustworthy, detailed information about nearby malls. Existing platforms may not offer the depth of information desired, such as store listings, discounts, parking status, and event updates, all in one place. The Integrated Mall Information System (IMIS) will provide users with interactive maps and comprehensive mall details, enhancing convenience and supporting local exploration. With real-time updates and a focus on secure information, IMIS improves the user

	experience by providing a single, reliable source for mall-related inquiries.
Project Goals	The goal of the IMIS project is to save users' time by providing a comprehensive list of mall features and offerings in one system. Additionally, it aims to simplify parking information access, making it easier and more convenient for users to plan their visits and enjoy a seamless mall experience.
Project Scope	The scope of the Integrated Mall Information System (IMIS) includes developing a digital platform with interactive mall maps, store listings, parking availability, discounts, amenities, and event details.
Approach	● Conduct public surveys to assess interest and gather feature preferences. ● Collect accurate information on stores, parking, and facilities from reliable sources. ● Research software to provide security, manage user inputs and make sure it's user-friendly. ● Develop a flexible, sustainable platform for long-term use across Malaysia.

Project Cost	The firm has allocated RM 500 000 for this project. ● Platform Development (RM 150,000.00). ● User Interface (UI) and User Experience (UX) Design (RM 70,000.00). ● Data Security and Privacy (RM 50,000.00). ● System Maintenance and Updates (RM 60,000.00). ● Marketing and User Training (RM 30,000.00). ● Testing (RM 40,000.00). ● Contingency Fund (RM 50,000.00).
Project Concerns	**Data Security:** Guaranteeing protection and managed access to information and data of the users rather than cursing round the issue of privacy. **Data Accuracy and Real-Time Updates:** Provision of up-to-date information on the mall and its facilities to eliminate user frustration as a result of out-of-date or inaccurate information. **User Accessibility:** Making sure that the system can be operated easily and works properly on all types of devices. **System Maintenance and Technical Support:** Planning for additional support for smooth running of the system and troubleshooting of problems.

Roles and responsibilities		
Name	Role	Contact Information
Mohd Fakhrul B Mohd Fahmi	Sponsor	fakhrul@gmail.com
Zamir Harith B Ismail	Team Member	zamir@gmail.com
Putri Balqis Bt Hanafi	Team Member	balqis@gmail.com
Hazrien Nur Qistina bt Haswadi	Team Member	hazrien@gmail.com
Dr Viwied Virgiyanti	Advisor	viwied@gmail.com

Charter Approval	Project Sponsor	Fakhrul Name : Mohd Fakhrul B Mohd Fahmi Date : 24 Oct 2024
	Project Manager	Aerisha Name : Aerisha Fashahira Bt Mohd Puad Date : 24 Oct 2024

Table 1

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MILESTONE 2

1.APPROACH FOR COLLECTING REQUIREMENTS

“Requirement is a condition or capability that is necessary to be present in a product, service, or result to satisfy a business need” (The Standard for Project Management and a Guide to the Project Management Body of Knowledge (PMBOK Guide) - Seventh Edition, 2021). When building the system,the stakeholders are the most important factor that needs to be studied. The primary stakeholders for the Integrated Mall Information System(IMIS) are the mall managements, store owners, customers and users of the system. Good communication between stakeholders and project team members is important as it will impact the project if the project fails (Lane et al., 2016) . There are few ways that can do for requirements gathering:

1. **Stakeholder Interviews**

   Conduct the interviews between store owners and mall management to gather insight and understand their expectations about the integrated mall information system(IMIS).

2. **Surveys and questionnaires**

   Print surveys and distribute to the customers and tenants to collect data about their opinions for features and functionalities that are available on the system.Ask some questions about their point of view about the navigation experiences within the mall.

3. **Observation**

   Observe the customers that like to go shopping to identify problems when looking for a store in a big and scattered mall. Observe other mall information systems for improvement about store locations and promotions.

2. REQUIREMENTS TRACEABILITY MATRIX

Requirements Traceability Matrix(RTM) is a table that captures the user and system requirements.The requirements are being talked through for verification of the system functionality.Below shown a table that tracks the development process to ensure all stakeholders needs are met.

Requirement ID	Requirements	Requirements Description	User Story/ Observation	Status
R1	Login	The system will be able to login.	As a customer, I should be able to login into the system.	Complete
			The system has an option to login or not the system but the users only have limited access.	Complete
R2	Update profile	The system will be able to update profiles, especially addresses.	As a customer, I should be able to update profiles to get information near my house.	Complete

R3	Search the information	The system will be able to search for information about malls like status of shops, parking availability, promotion by search based on category.	As a customer, I should be able to search for mall information by type on the top screen.	Complete
R4	Manage mall information	The system will be able to manage information by admin.	As an admin, I should be able to manage stores, parking information based on real time data.	Complete
R5	Push notifications and updates	The system will be able to send push notifications and updates by admin. The system will be able to receive push notifications and update if the user login to this system.	As a customer, I should be able to receive notifications especially about the promotions at the mall near me, or any updates about the parking. As an admin, I should be able to send notifications automatically to the user who has logged into the system.	Complete

3. WORK BREAKDOWN STRUCTURE

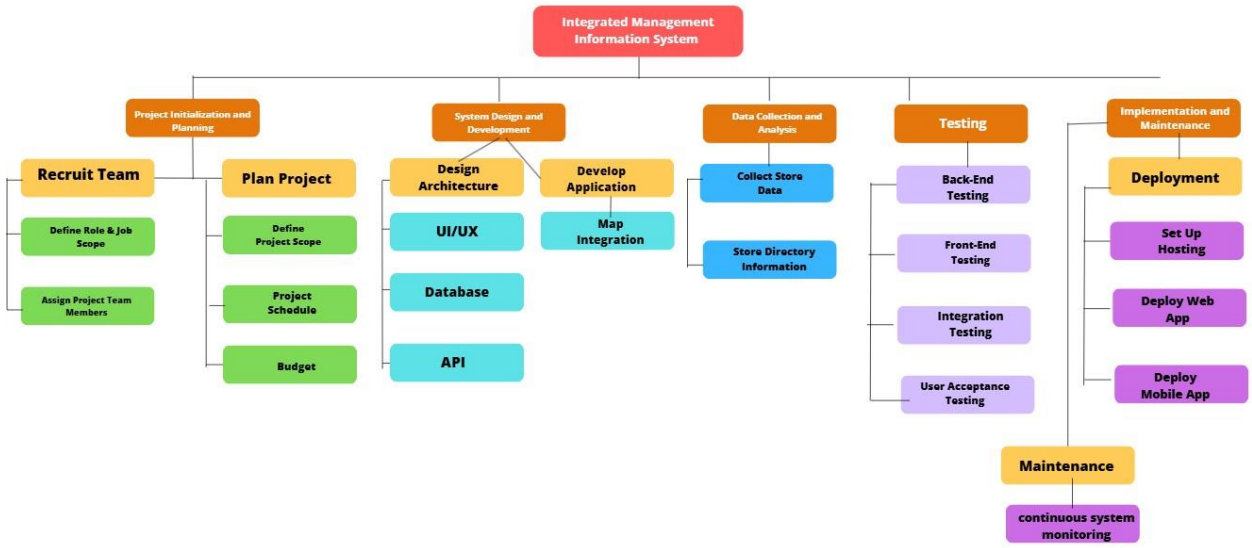

FIGURE 1 :

Work Breakdown Structure of Integrated Mall Information System

3.1 WORK BREAKDOWN STRUCTURE DESCRIPTION FOR INTEGRATED MALL MAP SYSTEM

1.0 Integrated Mall Map System

The Integrated Mall Information System (IMIS) aims to develop a system that includes the interactive mall maps as well as detailed information that could facilitate navigation and store directories of the shopping centers in Malaysia.

1. Project Initialization and Planning
This phase focuses on establishing the project's base.
1.1.1 Recruit Team: Form the project team.
1.1.1.2 Define Roles & Job Scope: Identify team roles and assign responsibilities.
1.1.1.2 Assign Project Team Members: Divide people into groups by their skills and give them specific tasks.
1.1.2 Plan Project: Outline the project plan that will be used to guide the development of the project.
1.1.2.1 Define Project Scope: Defining the goals, what will be delivered, and what will not be done.
1.1.2.2 Project Schedule: Create a timeline with the various milestones and the expected time of completion.
1.1.2.3. Budget: It entails assigning resources and coming up with the financial needs assessment.

1.2 System Design and Development

This phase includes the design and implementation of the system architecture, the interface, and the database.

1.2.1 Design Architecture: Define the overall design of the system structure and data transmission.

1.2.1.1 UI/UX: Create simple and easy-to-use interfaces for the web and mobile applications.

1.2.1.2 Database: Design a relational database for storing information about the mall and users.

1.2.1.3 API: Create APIs to support cooperation between the different subsystems of the system.

1.2.2 Develop Application: Design the application that incorporates all the above-mentioned functions into the system.

1.2.2.1 Map Integration: The integrated maps should also have real-time navigation features.

1.3 Data Collection

This phase involves gathering and organizing the data required for the system.

1.3.1 Store Directory Information: Collect and compile data for stores, events, and amenities.

1.3.1.1 Collect Store Data: Gather details such as store names, categories, and contact info.

1.3.1.2 Back-End Development: Implement backend systems to store and process collected data.

1.3.1.3 Front-End Development: Develop front-end interfaces to display data attractively to users.

1.4 Testing

This phase ensures the system is tested before deployed.

1.4.1 Back-End Testing : Ensures the functionality, reliability, and performance of the server-side components of the system.

1.4.2 Front-End Testing : make sure the user interface meets design and usability standards.

1.4.3 Integration Testing: Ensures that the various modules of the system work together as expected.

1.4.4 User Acceptance Testing: ensure the entire system satisfies the business requirements and is ready for deployment.

1.4 Implementation and Maintenance

This phase ensures the system is deployed effectively and maintained for long-term success.

1.4.1 Deployment: Launch the system for public use.

1.4.1.1 Set Up Hosting: Establish hosting for web and mobile platforms.

1.4.1.2 Deploy Web App: Make the web-based system live for user access.

1.4.1.3 Deploy Mobile App: Publish the mobile app for iOS and Android users.

1.4.2 Maintenance: Ensure smooth operation and regular updates.

1.4.2.1 Continuous System Monitoring: Monitor performance, address issues, and updates.

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MILESTONE 3

1.GANTT CHART

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Integrated Mall Information System**	**262 days?**	**Thu 24/10/2**	**Fri 24/10/25**
2		**Project Initialization and Planning**	**62 days?**	**Thu 24/10/2**	**Fri 17/1/25**
3		Recruit Team	11 days	Thu 24/10/2	Thu 7/11/24
4		Define Role & Jobscope	8 days	Thu 24/10/24	Mon 4/11/24
5		Assign Project Team Member	3 days	Tue 5/11/24	Thu 7/11/24
6		Plan Project	31 days	Fri 6/12/24	Fri 17/1/25
7		Define Project Scope	10 days	Fri 6/12/24	Thu 19/12/24
8		Project Schedule	10 days	Fri 20/12/24	Thu 2/1/25
9		Budget	10 days	Fri 3/1/25	Thu 16/1/25
10		Completion of Project Initialization and Planning	0 days	Fri 17/1/25	Fri 17/1/25
11		**System Design and Development**	**46 days**	**Sat 18/1/25**	**Fri 21/3/25**
12		Design Architecture	30 days	Sat 18/1/25	Thu 27/2/25
13		UI/UX	10 days	Sat 18/1/25	Thu 30/1/25
14		Database	10 days	Fri 31/1/25	Thu 13/2/25
15		API	10 days	Fri 14/2/25	Thu 27/2/25
16		Develop Application	15 days	Fri 28/2/25	Thu 20/3/25
18		Completion of System Design and Development	0 days	Fri 21/3/25	Fri 21/3/25
19		**Analysis Data Collection**	**45 days**	**Fri 21/3/25**	**Thu 22/5/25**
20		**Store directory information**	**44 days**	**Fri 21/3/25**	**Wed 21/5/25**
24		Completion of Data Analysis Collection	0 days	Thu 22/5/25	Thu 22/5/25
25		**Testing**	**22 days**	**Fri 23/5/25**	**Mon 23/6/25**

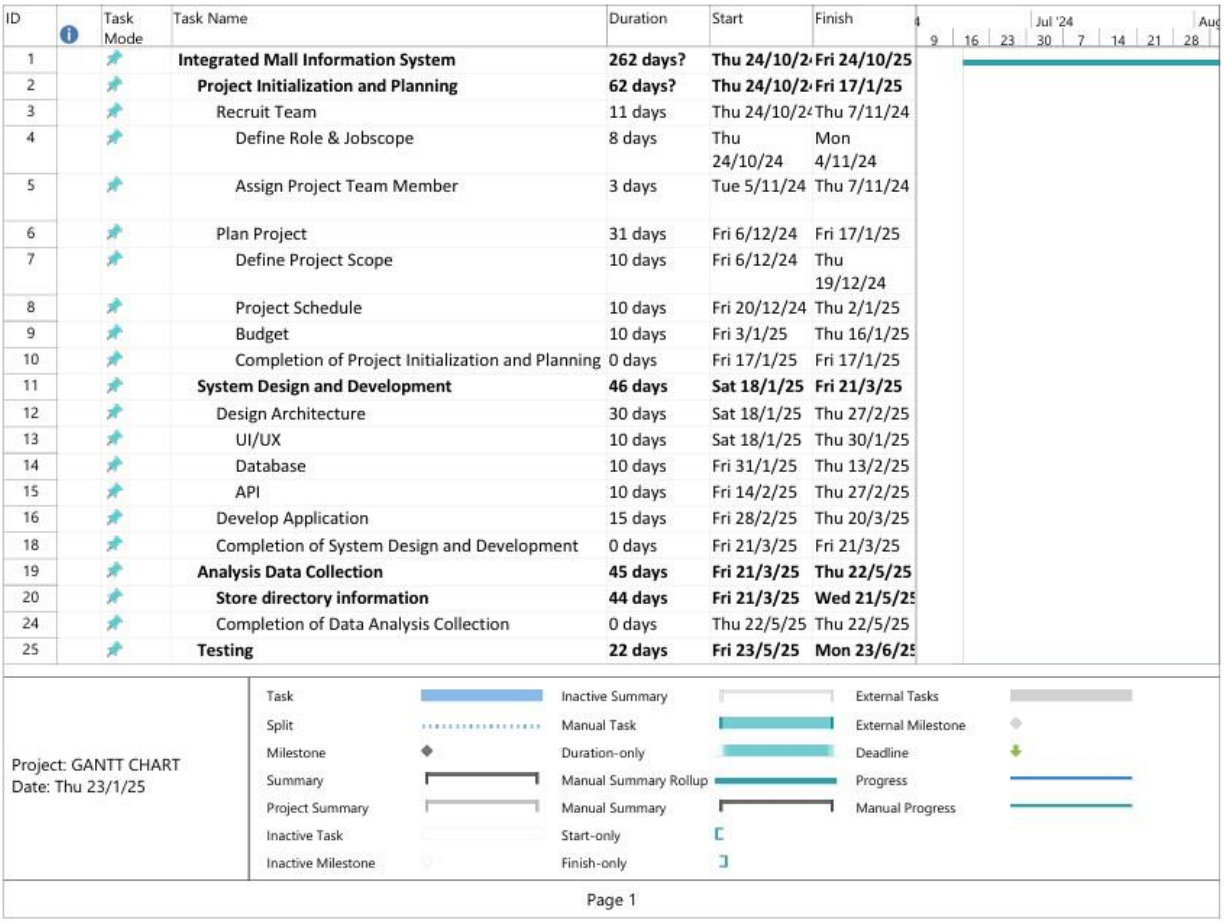
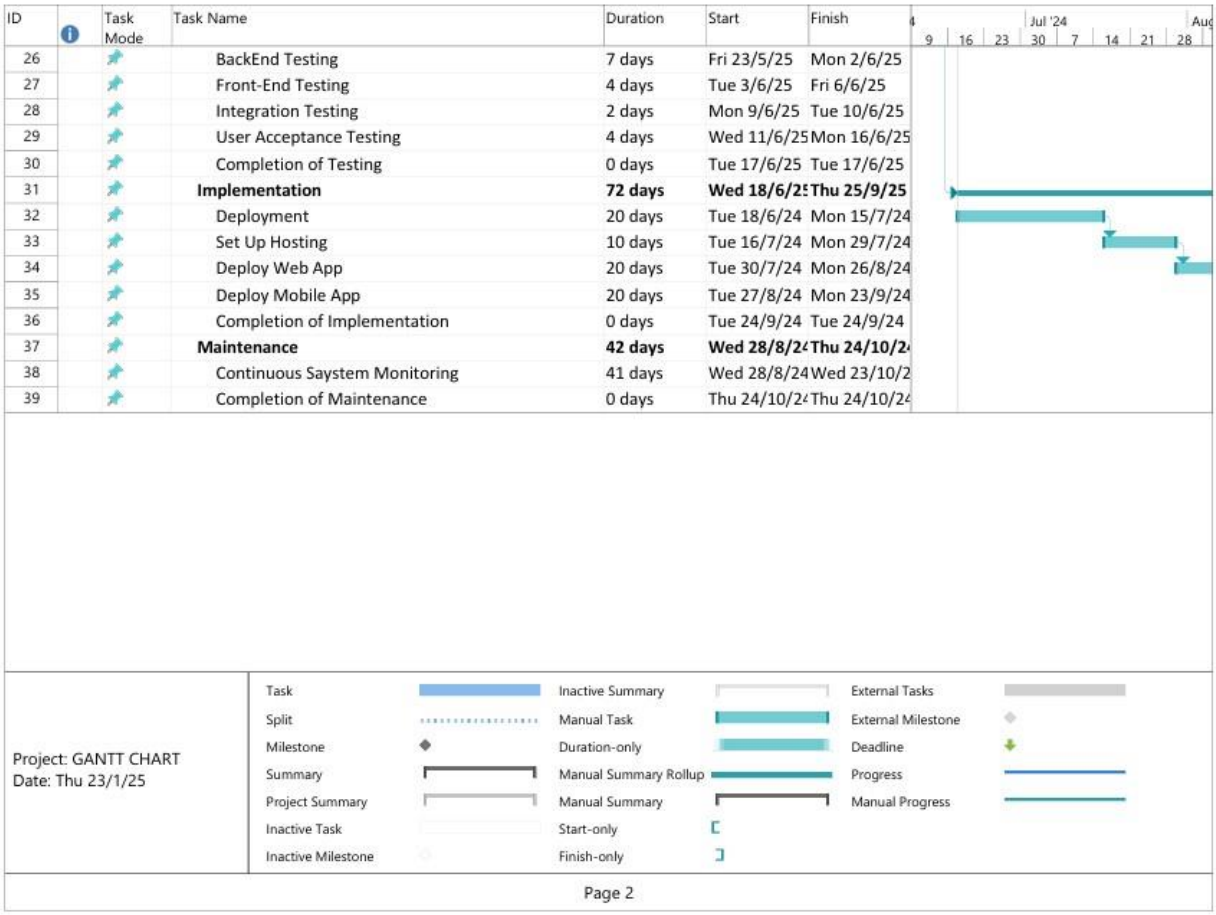


Figure 1:Gantt Chart Task Name page 1



ID	Task Mode	Task Name	Duration	Start	Finish
26		BackEnd Testing	7 days	Fri 23/5/25	Mon 2/6/25
27		Front-End Testing	4 days	Tue 3/6/25	Fri 6/6/25
28		Integration Testing	2 days	Mon 9/6/25	Tue 10/6/25
29		User Acceptance Testing	4 days	Wed 11/6/25	Mon 16/6/25
30		Completion of Testing	0 days	Tue 17/6/25	Tue 17/6/25
31		**Implementation**	**72 days**	**Wed 18/6/2**	**Thu 25/9/25**
32		Deployment	20 days	Tue 18/6/24	Mon 15/7/24
33		Set Up Hosting	10 days	Tue 16/7/24	Mon 29/7/24
34		Deploy Web App	20 days	Tue 30/7/24	Mon 26/8/24
35		Deploy Mobile App	20 days	Tue 27/8/24	Mon 23/9/24
36		Completion of Implementation	0 days	Tue 24/9/24	Tue 24/9/24
37		**Maintenance**	**42 days**	**Wed 28/8/2**	**Thu 24/10/2**
38		Continuous Saystem Monitoring	41 days	Wed 28/8/24	Wed 23/10/2
39		Completion of Maintenance	0 days	Thu 24/10/2	Thu 24/10/2

Figure 2:Gantt Chart Page 2

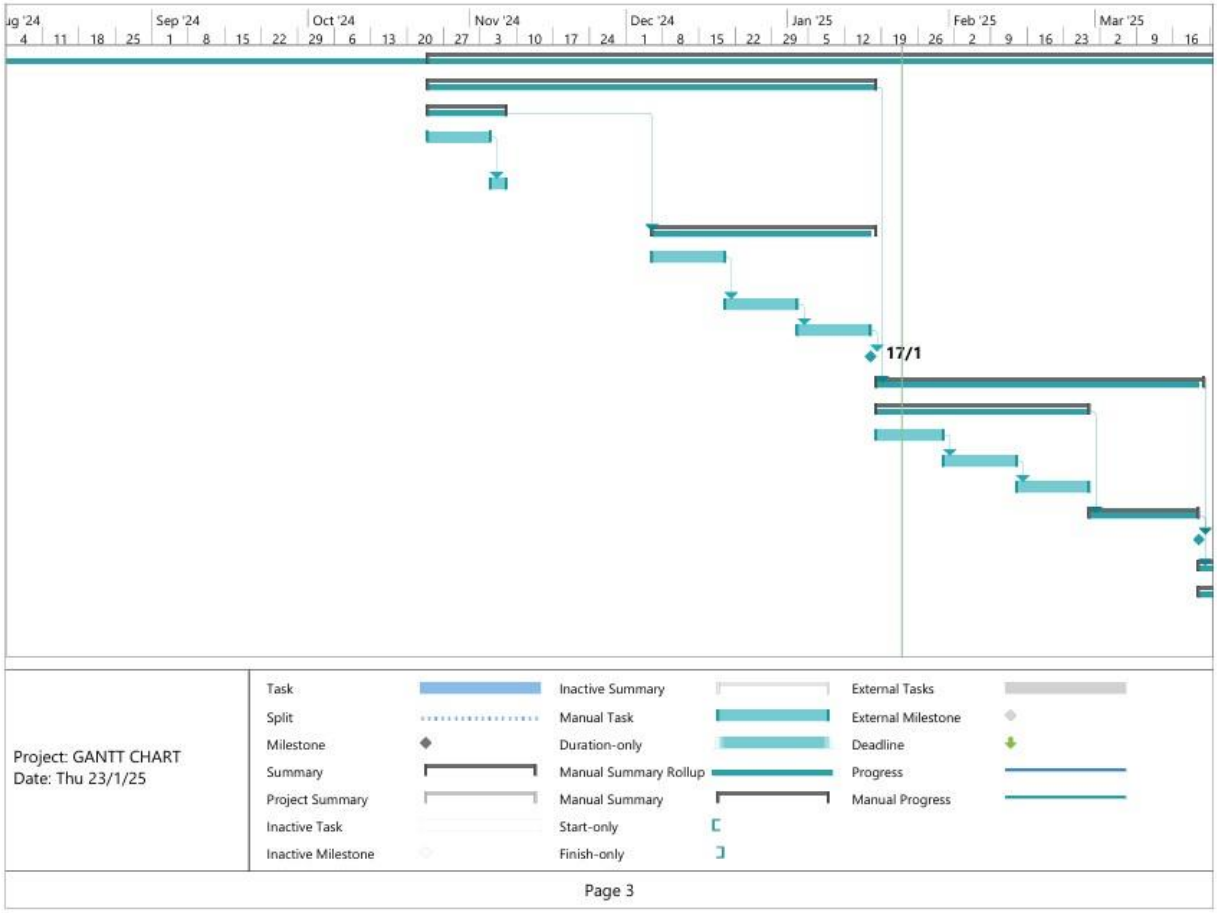


Figure 3:Gantt Chart Page 3

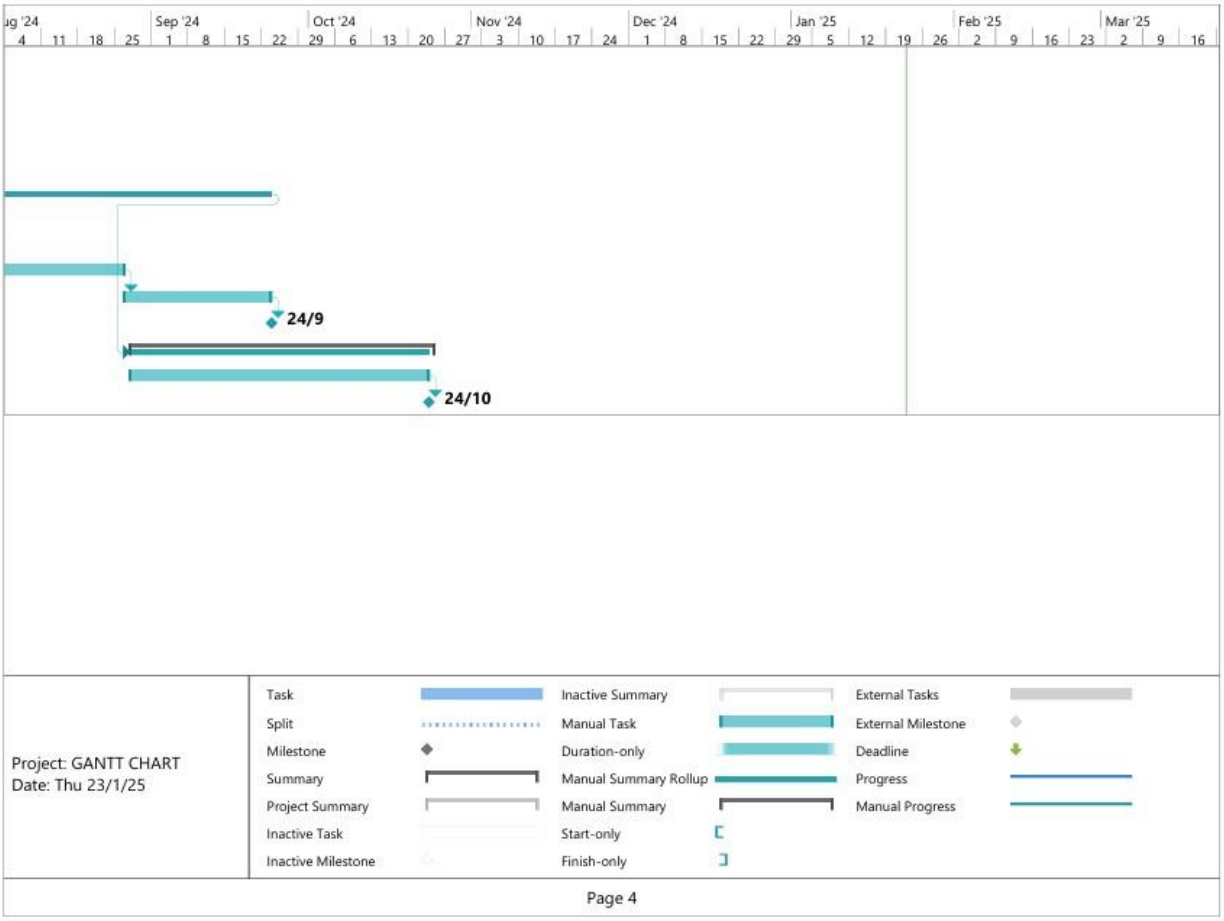


Figure 4:Gantt Chart Page 4

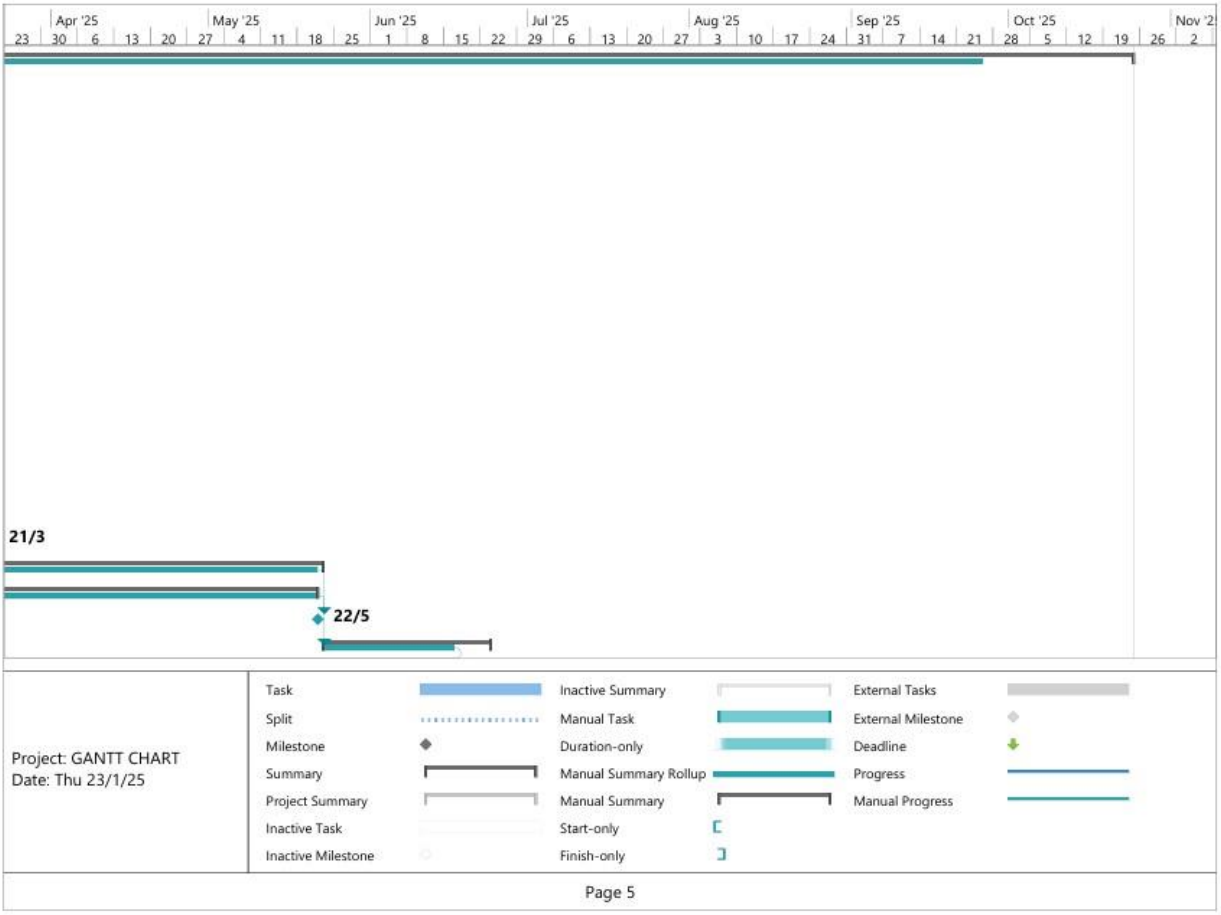


Figure 5:Gantt Chart Page 5

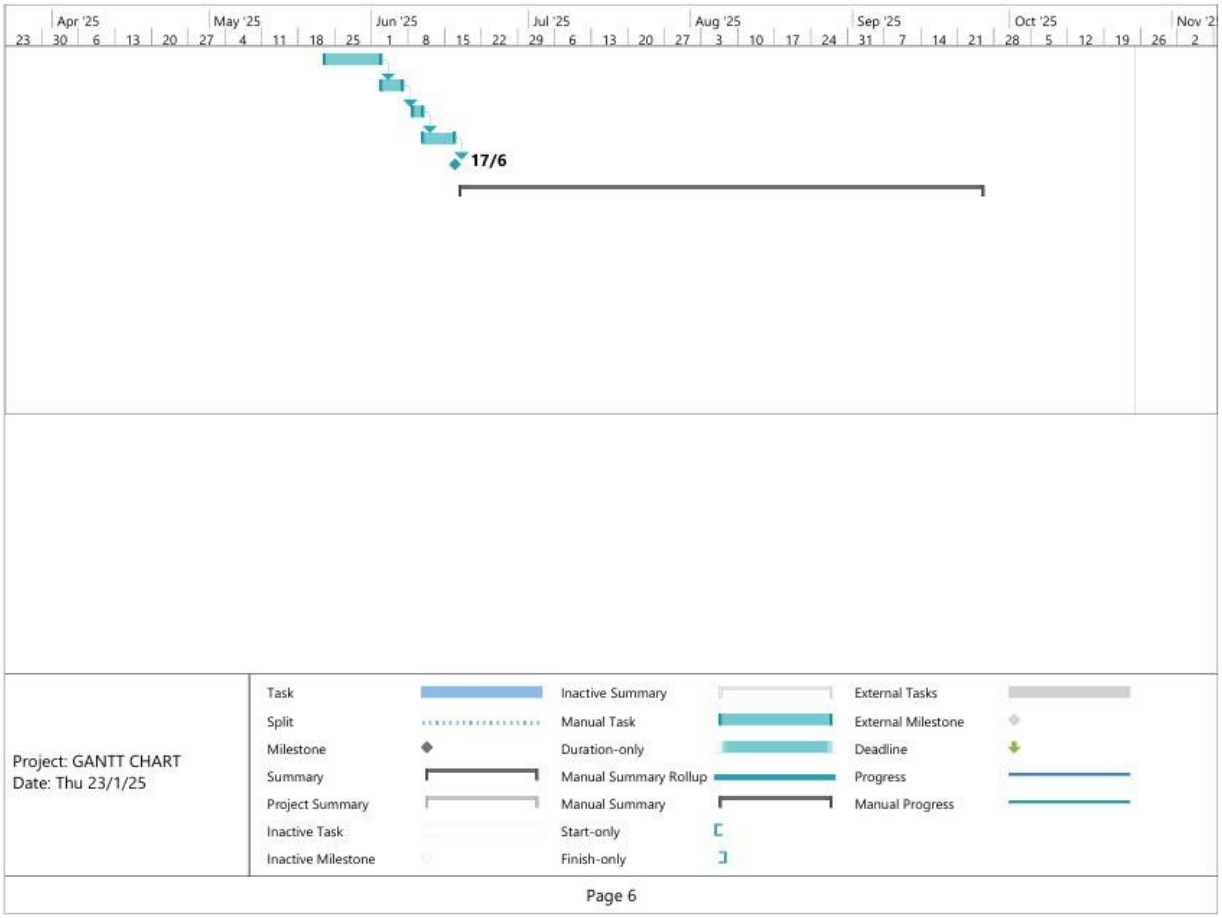


Figure 6: Gantt Chart Page 6

Above, the Gantt chart from figure one to four shows the elaborative picture for the project timeline of the Integrated Mall Information System, which is 262 days, starting from October 24, 2024, and ending on October 24, 2025. It has highlighted all the major activities and milestones with task dependencies to be executed in sequence. Project Initiation and planning commencement is on 24th October 2024 to 7th November 2024; hence, it takes altogether 15 days. At this stage, it is expected the preparation of a scope, requirement gathering, and defining the roles regarding the project in question. Next, the System Design stage will start from November 8, 2024, and go up to December 22, 2024; this covers 45 days related to system architecture development, database schema, and user interface.

Data Collection from 23rd December 2024 to 19th January 2025 will last for 20 days in order to collect critical data on store directory, promotion, parking, and other important information. For System Development, the development and testing shall start on January 20, 2025 and end on April 14, 2025. It shall take about 65 days to code both the back-end and front-end systems, including API integration. The testing of the system shall follow next, starting from April 15, 2025, up to May 15, 2025, lasting for 30 days of finding bugs and resolving them, some usability issues, and problems in performance.

The last phase is Deployment and Maintenance. This activity will be deployed and it will occur from May 16, 2025, to May 29, 2025, that last for 10 days where the system goes into production.The maintenance Phase progress from May 30th, 2025, to October 24th, 2025 during which tuning up of the system, fixing post-launch problems, and updating if need to be is included. Major steps included in the timeline are system design on December 22, 2024; collection on January 19, 2025; development on April 14, 2025; testing on May 15, 2025; and final deliverable on October 24, 2025. With these dependencies, proper sequencing of tasks and smooth flow will further be enhanced; hence, F2S and S2S.

2.NETWORK DIAGRAM

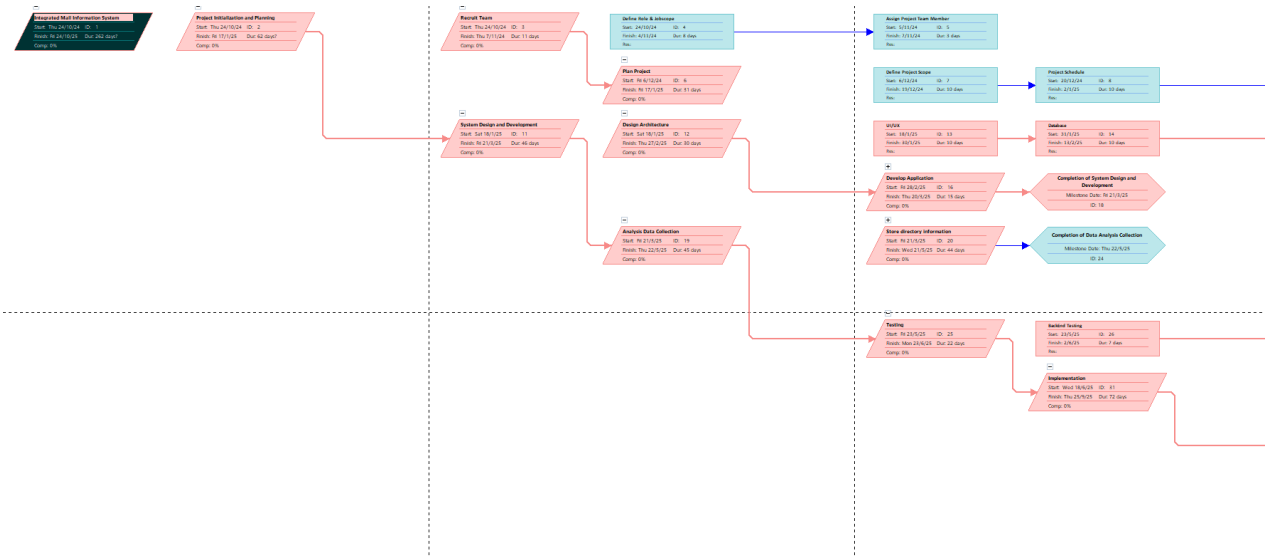


Figure 5: Network Diagram Page 1

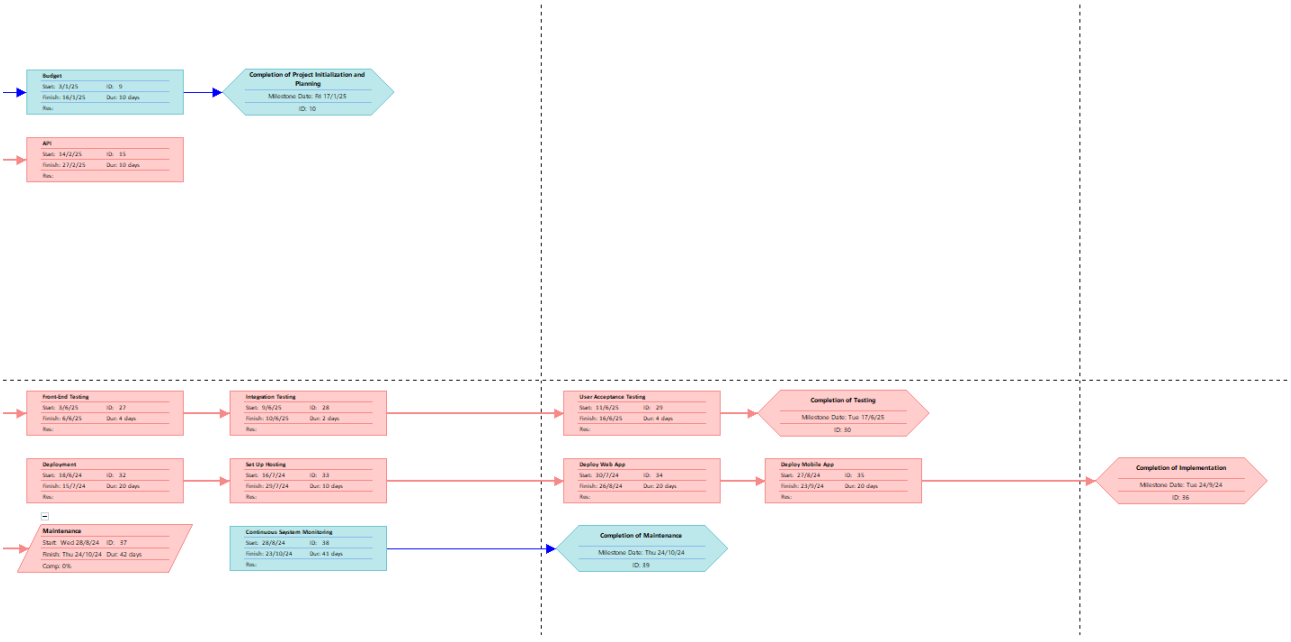


Figure 6: Network Diagram Page 2

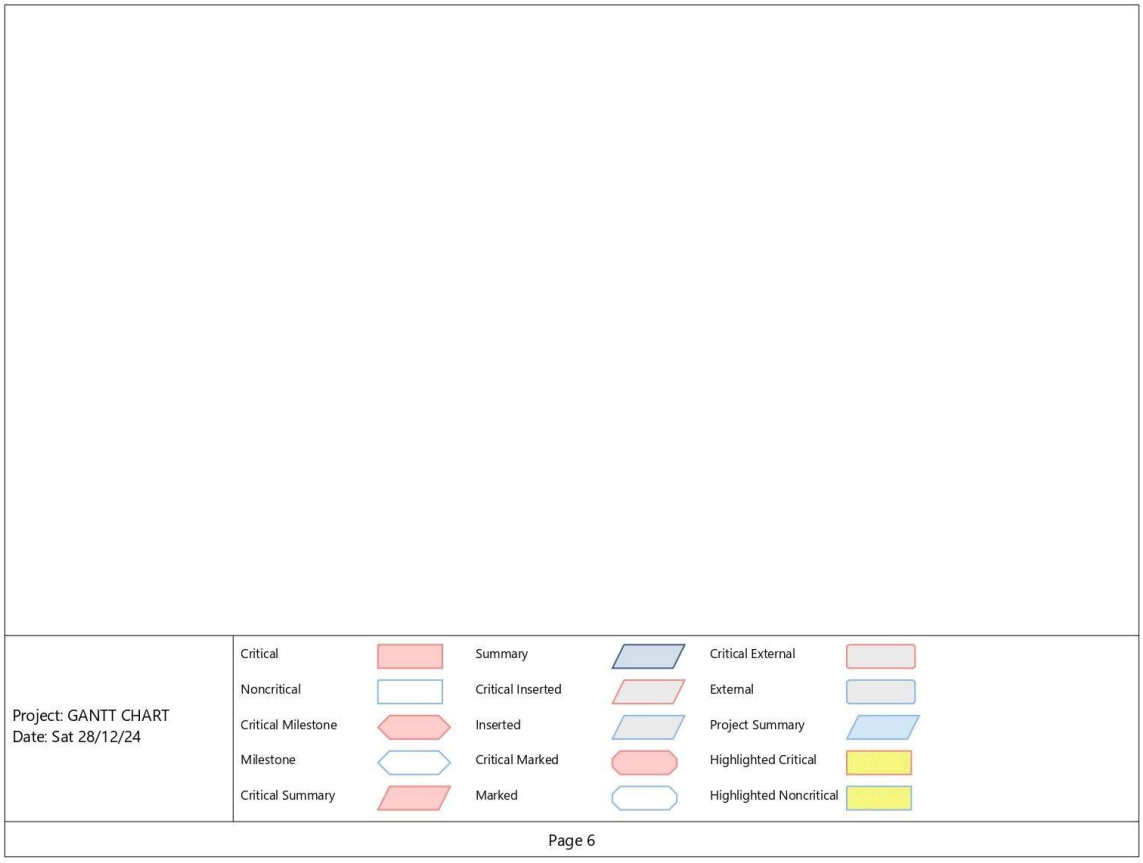


Figure 9: Network Diagram Page 3

The network shown in diagram one to nine enhances the Gantt chart by providing a visual representation of the workflow and highlighting the important path, dependencies, and logical job sequencing. Activities follow this order: project planning and initialisation, system design, data collection, development, testing, and deployment, in that order. Each activity is dependent upon the others; arrows are used to indicate predecessors and successors. For example, data collection would not start until System Design is completed; therefore, that relationship would be F2S.

The critical path underlines activities that link directly to the overall project timeline, such as system design, system development, and system testing. These activities would have to be strictly followed to avoid any delay at all in the overall project timeline. Events to be marked will include the completion of the system design on December 22, 2024, completion of the testing on May 15, 2025, and the final deliverable on October 24, 2025.

The main features of the network diagram are the duration of the tasks, start and end dates, and interdependencies that give full insight into which tasks can be done concurrently and which ones have to be done sequentially. This structure allows the identification of bottlenecks and gives support for mitigation of risks. This network diagram plots the dependency and underlines critical tasks so that the team would be focused on high-priority activities and be proactive about measures to mitigate the risk.

It supplements the Gantt chart, with a whole view into the schedule of a project necessary for efficient flow of working, timely reaching of milestones, and thereby successful closure of projects.

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