



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SECD 2613: System Analysis and Design

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Project 1

Phase 1- Project Proposal and Planning

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Case study

NexScholar Student Supervisor Management System

University Technology Malaysia (UTM) has recently adopted NexScholar, a new academic collaboration platform designed to simplify research management and communication. A crucial module within NexScholar is the "Student Supervisor Management System," specifically intended for postgraduate students and their supervisors. The university administration has realized the existing manual processes—email communications, Excel tracking sheets, and informal meetings—are inefficient and problematic.

Currently, postgraduate students select their supervisors themselves; however, this selection process relies heavily on informal communications via email or WhatsApp. Students frequently complain about difficulties in reaching supervisors for guidance, slow feedback on drafts, uncertainty about meeting schedules, and unclear progression milestones.

Supervisors, on their side, struggle to manage communications, track the progression of multiple supervisees, and ensure timely feedback due to fragmented information and manual monitoring. This situation has led to delays in research progress, frustration among students, and even cases of students dropping out of programs.

Although UTM currently uses the Graduate Student Management System (GSMS), it is an outdated platform primarily focused on monitoring student statuses, such as enrollment status and academic standing, but lacks functionalities for actively managing supervisor-student relationships.

To address these issues, UTM's Faculty of Computing has approached your team as System Analysts to propose a new integrated digital solution as part of NexScholar. The envisioned system should automate and streamline the entire student-supervisor engagement lifecycle from assignment through ongoing supervision until the completion of research.

As a system analyst, please ask relevant questions based on the case study.

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1.0 Introduction

The University Technology Malaysia (UTM) has recently adopted NexScholar, a new academic collaboration platform. The NexScholar Student Supervisor Management System is being developed to address critical inefficiencies in postgraduate research supervision at University Technology Malaysia (UTM). As part of this initiative, our team has been approached by the Faculty of Computing at UTM to propose a new integrated digital solution: the "Student Supervisor Management System." Currently, the supervision process relies heavily on manual methods, including email correspondence, WhatsApp communications, and Excel-based tracking, which have proven inadequate for managing the complex student-supervisor relationship. These outdated practices have led to significant delays in research progress, with students reporting difficulties in obtaining timely feedback, unclear milestone expectations, and challenges in scheduling meetings. Supervisors, on the other hand, struggle to manage multiple supervisees effectively due to the lack of a centralized system for tracking progress and communications. The existing Graduate Student Management System (GSMS) is limited to monitoring enrollment status and academic records, failing to provide the necessary tools for active supervision management. This proposed system is specifically intended for postgraduate students and their supervisors and aims for streamlining research management and automating key processes such as supervisor-student matching, milestone tracking, and document sharing communication within the NexScholar platform. This report outlines the background of the problems currently faced by the postgraduate students and supervisors at UTM, proposes initial solutions, defines the scope and objectives of the intended system, and highlights the potential benefits of its implementation.

2.0 Background Study

Currently, the management of postgraduate student supervision at UTM relies heavily on manual. The manual matching process for students and supervisors is inefficient, often leading to mismatches in research interests or availability. The GSMS, which is functional for administrative purposes, does not support dynamic supervision activities, forcing faculty members to complain too about the time-consuming workarounds. Additionally, the case study also highlights that postgraduate students select their supervisors through informal communication channels, primarily email or WhatsApp. The absence of a unified platform means that critical documents, feedback, and meeting schedules are scattered across multiple systems, making it difficult to track progress. This fragmented approach has created bottlenecks in research completion, with many students experiencing extended delays due to inconsistent feedback and poor milestone visibility.

On the other hand, supervisors struggle to effectively manage communication with multiple supervisees, track their progress efficiently, and ensure timely feedback due to the fragmented nature of information and the reliance on manual monitoring. This situation has been identified as a contributing factor to delays in research progress, increased frustration among both students and supervisors, and, in some unfortunate cases, students dropping out of their programs.

The existing Graduate Student Management System (GSMS) at UTM, is useful for monitoring student enrollment and academic standing, that is already described as outdated and lacking the specific functionalities required for effectively managing the dynamic relationship between supervisors and their students throughout the research journey.

Therefore, the proposed system aims to consolidate these processes into a single, user-friendly platform, providing real-time updates, automated reminders, and structured workflows to streamline the entire supervision lifecycle from initial matching to thesis completion. The need for a dedicated, integrated solution within the NexScholar platform has become apparent.

3.0 Problem Statement

The current reliance on manual processes and the absence of a dedicated digital platform for managing student-supervisor interactions in postgraduate studies at UTM result in significant challenges, including:

- **Inefficient Communication:** The use of email and WhatsApp, leading to delays, miscommunication and lack of centralized records.
- **Lack of Progress Transparency:** Students lack clarity on expected progression milestones, and supervisors find it difficult to gain a holistic view of each student's progress.
- **Supervisor Overload:** As faculty members juggle multiple supervisees without tools to prioritize tasks or manage workloads effectively.
- **Delayed Feedback Mechanisms:** The manual feedback process is often slow and can hinder students' research momentum.
- **Difficulties in Scheduling and Coordination:** Arranging meetings and coordinating supervision-related tasks are cumbersome without a dedicated system.
- **Limited Functionality of Existing Systems:** The current GSMS does not address the specific needs of managing the student-supervisor relationship effectively.

These issues collectively contribute to a suboptimal research environment, potentially leading to prolonged research timelines, decreased satisfaction among both students and supervisors, and an increased dropout rates.

4.0 Proposed Solutions

4.1 Feasibility Study

4.1.1 Technical Feasibility

From a technical standpoint the implementation of NexScholar Student Supervisor Management System is technically feasible. The IT infrastructure is already strong enough by the support of Graduate Student Management System (GSMS) that help in monitoring students. By the look of it, modern development tools, cloud services, and skilled IT personnel are available to support the project. Furthermore, this system can integrate with communication platform to ka esure that technical implementation is achievable.

4.1.2 Operational Feasibility

Operationally, this project is feasible by looking at the current environment at UTM. Students and supervisors are already adapted to using digital communication tools, which will ease the transition to the NexScholar platform. The new system is expected to improve supervisor-student communication, research tracking, and feedback timelines, ultimately reducing frustrations and dropout rates.

4.1.3 Economic Feasibility

To assess the economic viability of the GSMS System, Cost-Benefit Analysis (CBA) has been conducted over a 3-year period using the data provided.

Table 1: CBA

Estimated Cost	
Software development	RM24000
Infrastructure setup	RM7500
System maintenance	RM2000/year
Cloud Hosting Fees	RM4000/year
Testing and Employment	RM3000/year
Technical support	RM2500/year

Estimated Benefit	
Reduced Administrative overhead	RM9000/year
Reduce dropout list	RM13000/year
Reduce structure of communication	RM7000/year

Assumptions	
Discount Rate	10%
Sensitivity Rate (cost)	1.1
Sensitivity Rate (benefit)	0.9
Annual change in production cost	7%
Annual change in benefit	5%

Cost	Year 0	Year 1	Year 2	Year 3
Development Costs				
Software development	26400			
Infrastructure setup	8250			
Total	34650			
Production Costs				
System maintenance		2200	2354	2519
Cloud Hosting Fees		4400	4708	5038
Testing and Employment		3300	3531	3778
Technical support		2750	2943	3149
Annual Production Costs		12650	13536	14484
Present Value		11500	13402	14470
Accumulated Costs		46150	59552	74022

Benefits	Year 0	Year 1	Year 2	Year 3
Reduced Administrative overhead		8100	8505	8930
Reduce dropout list		1170	1229	1290
Reduce structure of communication		6300	6615	6945
Present Value		5727	5466	5739
Accumulated Benefits		5727	11193	16932
Gain or loss		40423	48359	57090
Profitability Index	1.65			

Profitability Index = $57090/34650 = 1.65$

Our group be of the same mind to deduce the estimate cost and benefit to meet a good investment from the system. According to the CBA table, the total cost of the system including initial investment and increasing annual operating expenses is RM 34650. Total benefit gained is RM 16932. The profitability index is 1.65. This result shows that for every RM 1 invested the company expects to receive RM 1.65 in return. This results the system, NexScholar Student

Supervisor Management is considered economically feasible.

4.2 Suggested Solution

The proposed NexScholar Student Supervisor Management System aims to address the problems by introducing a centralized and integrated digital platform with the following key functionalities:

- **Centralized Communication Tools:** Secure messaging and notification features to facilitate direct and organized communication between students and supervisors. Integrate seamlessly with the existing NexScholar platform.
- **Progress Tracking and Milestone Management:** A system for defining, tracking, and visualizing research progress incorporates progress tracking and milestone management.
- **Document Sharing and Feedback Management:** A platform for students to submit research documents (proposals, drafts, etc.) and for supervisors to provide structured and timely feedback.
- **Meeting Scheduling and Management:** Tools for scheduling supervision meetings, sending reminders, and potentially recording meeting minutes.
- **Task Management and Assignment:** Features for supervisors to assign specific tasks to students with deadlines and track their completion.
- **Supervisor Allocation Management:** A module to manage the assignment of supervisors to students (the specifics of this will be further explored in the feasibility study).

5.0 Objectives

The primary objectives of the NexScholar Student Supervisor Management System are to:

- Improve communication efficiency between postgraduate students and their supervisors.
- Enhance transparency in research progress and milestones.
- Streamline the feedback process on student work.
- Facilitate easier scheduling and management of meetings.
- Provide tools for effective task management and assignment.
- Integrate seamlessly with the existing NexScholar platform.
- Ultimately contribute to a more productive and satisfactory postgraduate research experience.
- Decrease postgraduate dropout rates within two years of implementation.

6.0 Scope of the Project

The NexScholar Student Supervisor Management System will be developed and implemented in phases. The initial scope of the project, focusing on the first phase of development, will include several core functionalities to address the most pressing needs identified in the problem statement. This encompasses the development of a user management system, providing secure login and role-based access control for both postgraduate students and supervisors. Also, a communication module will be implemented to facilitate direct messaging, announcements, and notifications specifically related to supervision activities. Progress tracking functionality will be included, enabling the definition, updating, and visualization of research progress against established milestones.

Furthermore, the system will feature a document management component, providing a secure repository for students to submit research-related documents and for supervisors to access them. To streamline the feedback process, tools for supervisors to provide structured written feedback on submitted documents will be integrated. Meeting management features will be developed, allowing for the scheduling and sending of reminders for supervision meetings. Finally, task management functionality will be incorporated, enabling supervisors to assign tasks to students, set deadlines, and track task completion.

It is important to note that the initial scope of the project will specifically exclude certain features. Integration with external systems beyond the core NexScholar platform, such as plagiarism detection software or library resources, will not be included in this phase. Advanced analytics and reporting capabilities related to supervision activities are also outside the initial scope. The automated matching of students and supervisors, while a potentially valuable feature, will not be addressed in the first phase of development. Support for undergraduate student supervision is also excluded from the current scope. Additionally, the development of dedicated mobile applications will not be part of the initial implementation; access to the system will primarily be through a web-based interface. For offline functionality, the Student Supervisor Management System will leverage UTM's current infrastructure, such as GSMS for enrollment data, but will not modify core functionalities of these legacy systems. By maintaining this focused scope, the project ensures efficient resource allocation and timely delivery of high-impact features to resolve the most pressing supervision challenges identified in the case study.

7.0 Project Planning

7.1 Human Resource

Table 2: Human Resource

Team Members	Role	Description
ELEANOR TING PIK EN	Project Manager	Oversees progress, monitors deadlines, coordinates meetings.
NUREEN FATINI	System Analyst	Works on requirements gathering, feasibility study, and system design.
WONG ZI NING	UI/UX Designer	Focuses on wireframes, user interface design, and user experience research.
SEAH ZHANG JIAN	Developer & Tester	Handles coding (backend/frontend), integration, and testing phases.

7.2 Work Breakdown Structure (WBS)

For the NexScholar Student Supervisor Management System project, we developed a detailed Work Breakdown Structure (WBS) to organize the project's scope into manageable tasks. The WBS is structured based on the project phases, including initiation, planning, requirements analysis, system design, development, testing, deployment and maintenance. Each major deliverable is broken down into smaller activities, allowing the team to allocate responsibilities, manage timelines and monitor progress efficiently. This structure ensures that all critical aspects such as communication improvements, research tracking, scheduling system, feedback mechanisms and system integration are properly addressed throughout the project lifecycle.

Level 1: NexScholar Student Supervisor Management System Development

Level 2: Project Phases

1. Project Initiation

- 1.1 Define Project Scope
- 1.2 Identify Stakeholders
- 1.3 Feasibility Study
- 1.4 Project Approval
- 1.5 Risk Assessment

2. Planning

- 2.1 Develop Project Plan
- 2.2 Define Budget
- 2.3 Set Timeline & Milestones
- 2.4 Resource Allocation
- 2.5 Develop Communication Plan

3. Requirements Analysis

- 3.1 Gather Business Requirements
- 3.2 Conduct User Research
- 3.3 Define Functional & Non-Functional Requirements
- 3.4 Stakeholder Sign-off
- 3.5 Develop Use Cases

4. System Design

- 4.1 System Architecture
- 4.2 UI/UX Wireframes
- 4.3 Database Schema
- 4.4 API & Integration Planning
- 4.5 Security Framework
- 4.6 Develop Data Flow Diagrams (DFD) for Process Optimization

5. Development

- 5.1 Backend Development
- 5.2 Frontend Development
- 5.3 Database Setup

- 5.4 Messaging System Integration
- 5.5 Supervisor-Student Matching Algorithm
- 5.6 System Integration

6. Testing & QA

- 6.1 Unit Testing
- 6.2 System Testing
- 6.3 User Acceptance Testing (UAT)
- 6.4 Performance Testing
- 6.5 Security Testing
- 6.6 Regression Testing

7. Deployment & Maintenance

- 7.1 Deploy to Production Server
- 7.2 Configure SSL & Security Policies
- 7.3 User Training
- 7.4 Ongoing Bug Fixes & Support
- 7.5 Monitor System Performance
- 7.6 Collect User Feedback

8. Post-Implementation Review

- 8.1 Gather Feedback from Stakeholders
- 8.2 Evaluate System Success
- 8.3 Identify Areas for Improvement
- 8.4 Plan for Future Updates
- 8.5 Develop Change Management Plan
- 8.6 Address Legal and Compliance Issues

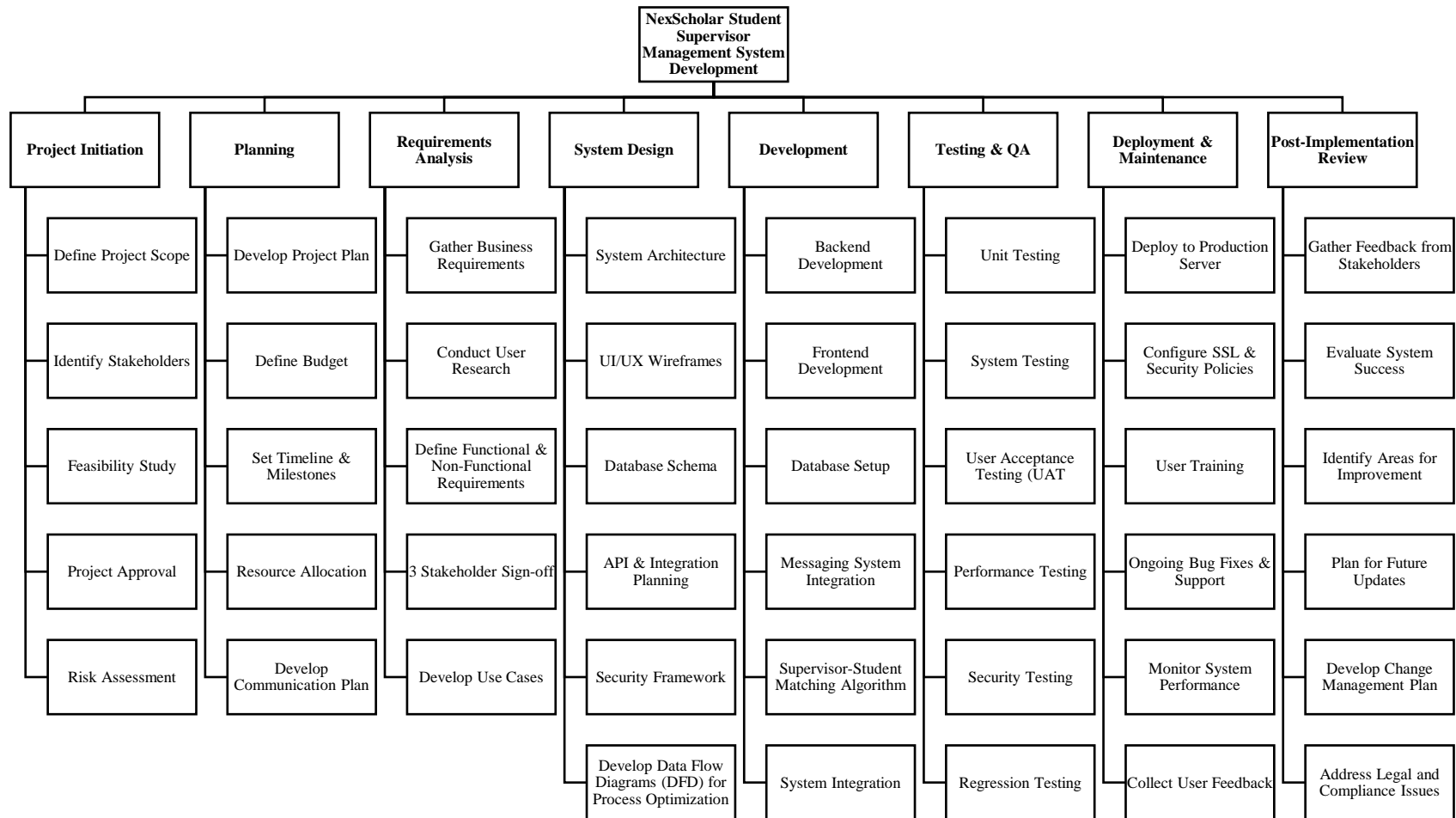


Figure 1: WBS

7.3 PERT Chart (based on WBS)

A PERT chart was created to map out the sequence of project activities and their dependencies. The diagram illustrates the logical flow of tasks from initiation to project deployment, highlighting key milestones and the critical path to ensure timely project completion within the planned 90-day timeframe. Each activity was assigned an estimated duration based on careful analysis, and dependencies were set to reflect real workflow needs like system design approval before development, and database integration before full system testing. The PERT chart helps the team to coordinate work among four members and maintain overall project momentum.

Table x :

Activity	Description	Predecessor	Adjusted Estimated Time (days)
A	Define Project Scope	-	5
B	Identify Stakeholders	A	4
C	Feasibility Study	A	6
D	Risk Assessment	A	3
E	Project Planning (WBS, timeline, resource allocation)	B, C, D	8
F	Gather Business Requirements	E	6
G	Conduct User Research	F	8
H	Define Functional & Non-Functional Requirements	G	5
I	Stakeholder Sign-off	H	4
J	System Architecture Design	I	7
K	UI/UX Wireframes Design	I	7
L	Database Schema & API Planning	J, K	7
M	Backend Development	L	15
N	Frontend Development	L	15
O	Develop Messaging System Integration	M, N	10
P	Develop Supervisor-Student Matching Algorithm	M, N	10
Q	System Integration	O, P	12
R	Testing (Unit, System, UAT)	Q	12
S	Bug Fixing & Optimization	R	6
T	User Training	S	5
U	Deploy to Production	T	3
V	Collect User Feedback	U	5
W	Post-Implementation Review	V	6
X	Ongoing Bug Fixes & Support	W	1

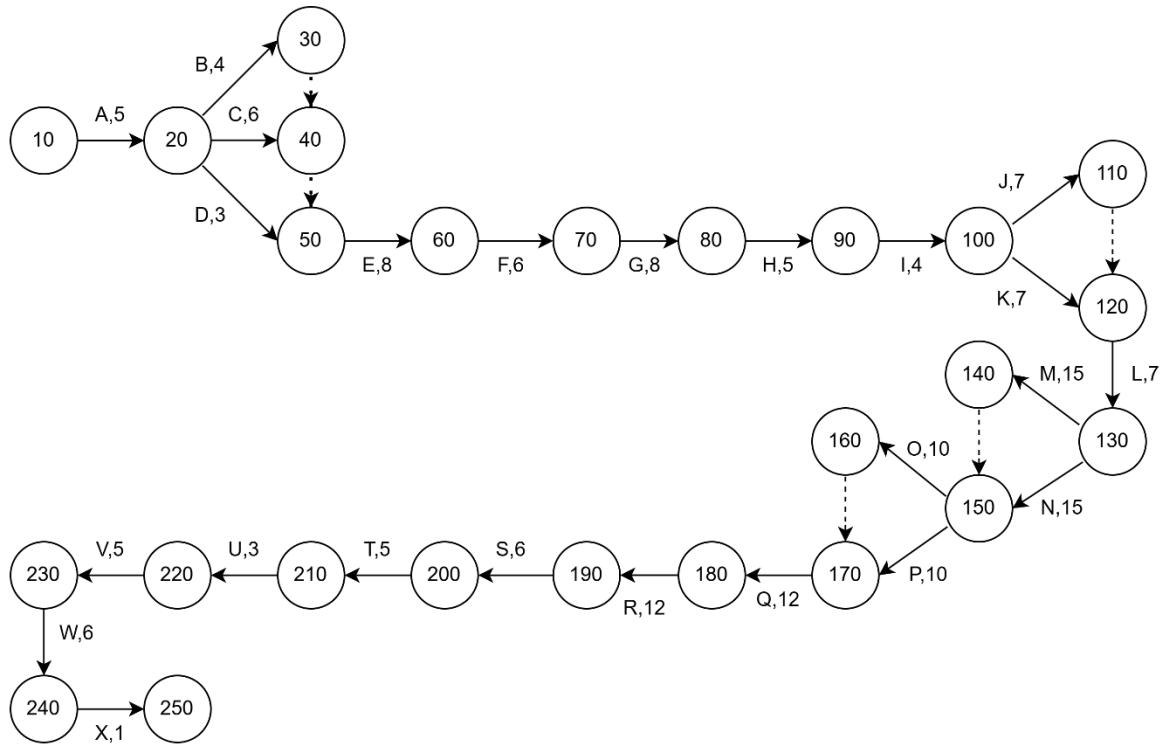


Figure 2: PERT Chart

PATH 1: A-B-E-F-G-H-I-J-L-M-O-Q-R-S-T-U-V-W-X

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PATH 2: A-B-E-F-G-H-I-K-L-M-O-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 3: A-B-E-F-G-H-I-J-L-N-O-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 4: A-B-E-F-G-H-I-K-L-N-O-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 5: A-B-E-F-G-H-I-J-L-M-P-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 6: A-B-E-F-G-H-I-K-L-M-P-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 7: A-B-E-F-G-H-I-J-L-N-P-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 8: A-B-E-F-G-H-I-K-L-N-P-Q-R-S-T-U-V-W-X

LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 9: A-C-E-F-G-H-I-J-L-M-O-Q-R-S-T-U-V-W-X
LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 10: A-C-E-F-G-H-I-K-L-M-O-Q-R-S-T-U-V-W-X
LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 11: A-C-E-F-G-H-I-J-L-N-O-Q-R-S-T-U-V-W-X
LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

PATH 12: A-C-E-F-G-H-I-K-L-N-O-Q-R-S-T-U-V-W-X
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PATH 13: A-C-E-F-G-H-I-J-L-M-P-Q-R-S-T-U-V-W-X
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PATH 14: A-C-E-F-G-H-I-K-L-M-P-Q-R-S-T-U-V-W-X
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PATH 15: A-C-E-F-G-H-I-J-L-N-P-Q-R-S-T-U-V-W-X
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PATH 16: A-C-E-F-G-H-I-K-L-N-P-Q-R-S-T-U-V-W-X
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PATH 17: A-D-E-F-G-H-I-J-L-M-O-Q-R-S-T-U-V-W-X
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PATH 18: A-D-E-F-G-H-I-K-L-M-O-Q-R-S-T-U-V-W-X
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PATH 19: A-D-E-F-G-H-I-J-L-N-O-Q-R-S-T-U-V-W-X
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PATH 21: A-D-E-F-G-H-I-J-L-M-P-Q-R-S-T-U-V-W-X
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PATH 22: A-D-E-F-G-H-I-K-L-M-P-Q-R-S-T-U-V-W-X
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PATH 23: A-D-E-F-G-H-I-J-L-N-P-Q-R-S-T-U-V-W-X
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PATH 24: A-D-E-F-G-H-I-K-L-N-P-Q-R-S-T-U-V-W-X
LENGTH: $5+4+8+6+8+5+4+7+7+15+10+12+12+6+5+3+5+6+1=129$

The project has 24 paths, each taking 129 days. Since all paths have equal duration, all paths are critical. Thus, the project requires careful monitoring across all paths, as delays in any task can affect the project deadline.

7.4 Gantt Chart

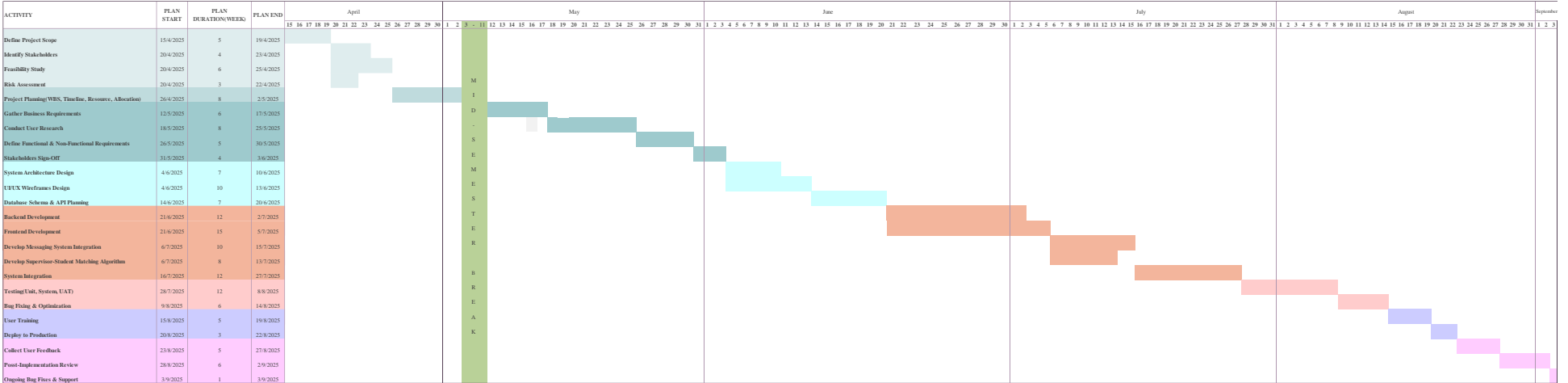


Figure 3: Gantt Chart

8.0 Benefit and Overall Summary of Proposed System

By addressing the current challenges in postgraduate supervision, the NexScholar Student Supervisor Management System will dramatically enhance the research experience at UTM. Students will benefit from a centralized platform for submitting documents, receiving timely feedback, and tracking their research milestones, leading to better supervision quality and reduced delays. Supervisors will be equipped with effective tools to manage communications, monitor supervisee progress, and coordinate meetings more efficiently. The university as a whole will experience improved research management, greater student satisfaction, and reduced dropout rates, aligning with its digital transformation goals.

The NexScholar Student Supervisor Management System aims to replace outdated manual practices with a fully integrated, user-friendly web platform. Designed with an agile development approach, the system will automate crucial supervision processes such as milestone tracking, meeting scheduling, document sharing, and structured feedback management. Although initial development and implementation will require significant investment, the long-term benefits—such as increased operational efficiency, improved research outcomes, and enhanced academic reputation—far outweigh the costs. The system also ensures tight security, scalability for future expansion, and seamless integration within UTM's existing NexScholar environment.

Ultimately, the NexScholar Student Supervisor Management System will empower students, supervisors, and administrators by offering a modern, transparent, and efficient approach to postgraduate supervision. Through real-time updates, automated reminders, and centralized data management, the system will foster a more structured and supportive academic environment. It stands as a critical step toward UTM's vision of achieving excellence in postgraduate education and solidifying its reputation as a leader in digital academic innovation.

9.0 Appendix

Repository Creation:

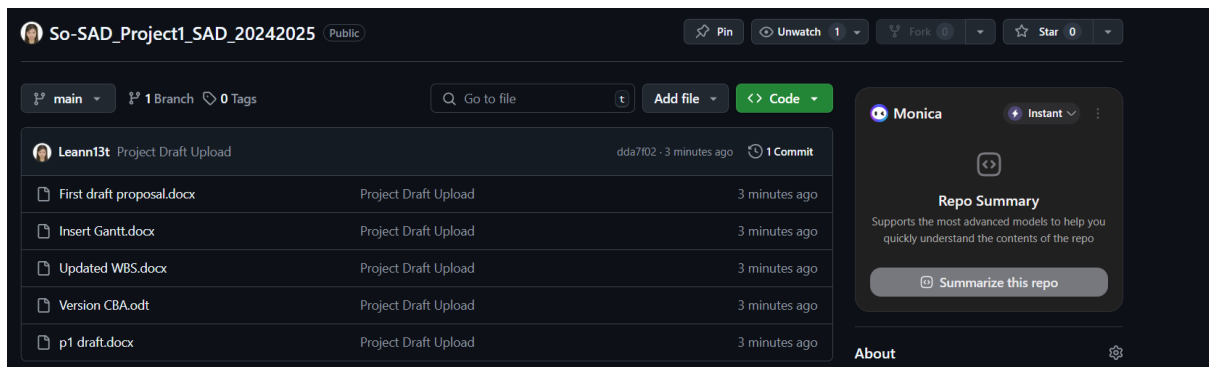


Figure 4: Project 1 GitHub Repository

GitHub Repository Link:

https://github.com/Leann13t/So-SAD_Project1_SAD_20242025

Kanban Integration:

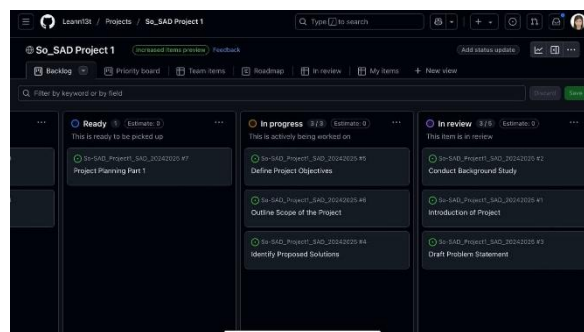


Figure 5: Week 1 Task Allocation

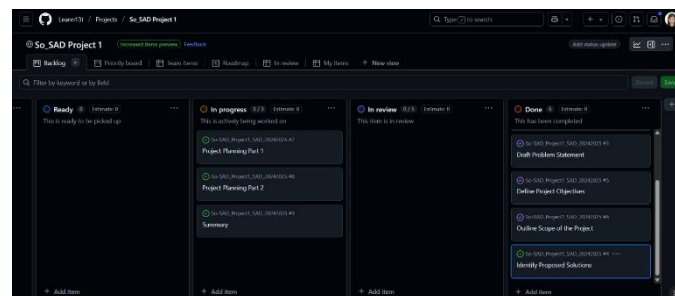


Figure 6: Week 2 Task Allocation

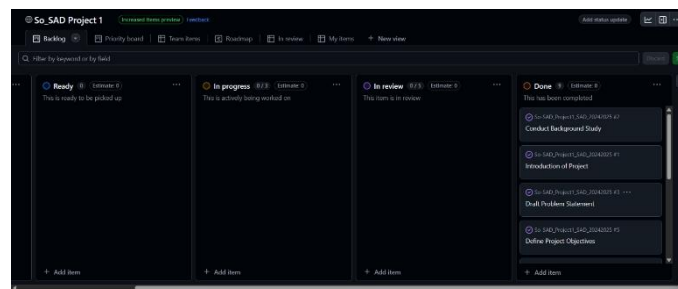


Figure 7: Task Completed