NAME: SWAFIYAH GICHUKI

ID. NO.: 665725

SEMESTER: FALL 2025

COURSE: SWE4900A

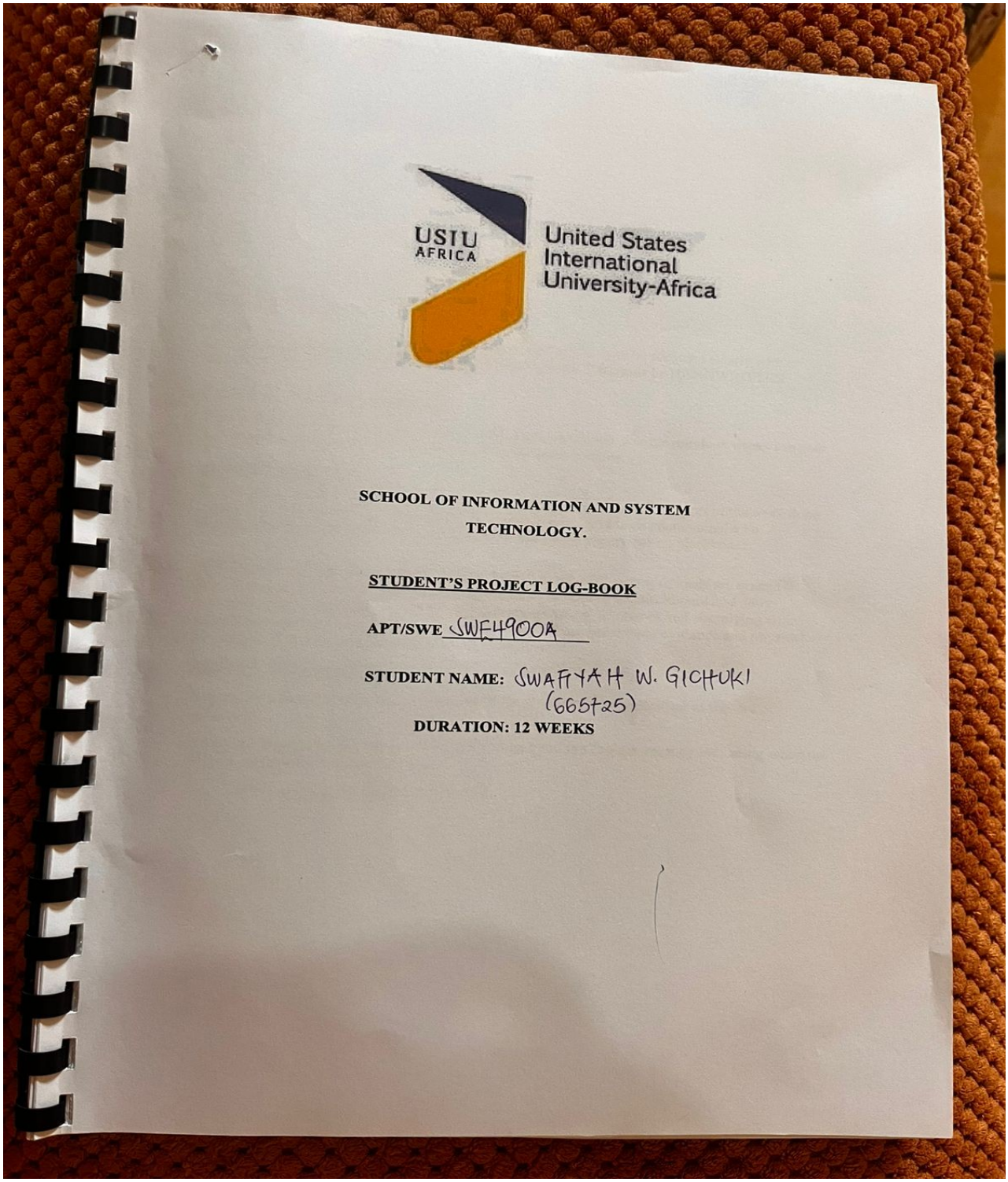
PROJECT LOGBOOK PICTURES

DISCLAIMER REGARDING LOGBOOK ENTRIES

The following pages contain photographic records of the Project Logbook.

All sections designated for the **Student/Trainee** have been manually completed by hand, detailing the daily and weekly project activities.

The sections marked for the **Industrial Supervisor** (General Comments and Signatures) appear blank in these images. These sections have been intentionally reserved for the supervisor's physical assessment, remarks, and official signature during the final review process.



SCHOOL OF INFORMATION AND SYSTEM TECHNOLOGY.

STUDENT'S PROJECT LOG-BOOK

APT/SWE SWE4900A

STUDENT NAME: SWAFIYAH W. GICHUKI
(665725)

DURATION: 12 WEEKS

DAILY REPORT

The daily work carried out during the period of PROJECT is to be recorded clearly with sketches and diagrams where applicable on the logbook. This must be HANDWRITTEN NOT WEEKLY.

WEEKLY SUMMARY REPORT

Take weekly photo or scan and upload on BB logbook section. For the previous weeks use your proposal and design process items to update your weekly items.

REPORT WRITING

In addition to the daily and weekly record, the student should submit a report of the work done during the Project. e.g full coverage of the project course, problems encountered e.t.c. A comprehensive guide on report writing is provided by the supervisor on blackboard.

N/B: Note those who don't submit on Blackboard on time OR wrong uploads are graded 0, late submission 5/10 even after presenting. Ensure you submit on Blackboard and daily manually update log book report. Ensure you are attending all classes and complying with weekly activities for any grading to be considered. Online Screenshot evidence and physical attendance for SWE will be used to verify student work.

REPORT SUBMISSION

The logbook and report must be submitted to the project course supervisor at the end of the Project.

Attach the letter from the employment that granted you the Project vacancy indicating when the Project started and when it will end.

The Log-Book should be well bound.

STUDENT'S PERSONAL INFORMATION

Name of student ..SWAFIYAH W. GICHUKI..... (Surname first)

Registration No. of the student .....665725.....

Faculty .....COMPUTING..... Course of Study

.....SOFTWARE ENGINEERING (SWE).....

Stage/year of study .....SENIOR..... Name and

Project undertaking.....

.....SMART MATERNAL EMERGENCY RESPONSE SYSTEM (SMERS)

.....

Name of Project supervisor..PROF. FREDRICK OGORE.....

.....

Mobile..+254717105568.....

Duration of the Project: 12 WEEKS.

STUDENT'S WEEKLY PROGRESS CHART

Proposed system (Final system)

SMART MATERNAL EMERGENCY RESPONSE SYSTEM (SMERS/MAMARESCUE)

Proposed System features.

- . Real Time Fleet Visualization.
- . Intelligent Dispatch algorithm.
- . Fault-Tolerant Hybrid Routing Engine.
- . Digital Triage and Incident Logging.
- Automated Financial Management

***APT/SWE Project Log Book Page* 4**

WEEK ONE: Project CONCEPTUALIZATION

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Brainstorming potential project ideas. Identifying a gap in emergency response in emergency response in semi-arid Kenya (Laikipia)	Problem Identification
Tue.	Researching existing solutions (Flare, m-mama, Beacon). Noted the lack of "fault-tolerant" routing in current apps/systems.	Problem Identification Research

Wed.	Selected the Technology Stack (PERN: Postgre SQL, Express, React, Node.js) based on open-source requirements.	Tech Stack Selection.
Thur.	Defined the main objective: To build a system that works even in bad conditions like the internet is slow. (Hybrid Routing)	Feasibility Analysis
Fri.	Consulted with the Prof. regarding the scope. Narrowed down the scope to main system.	Feasibility Analysis.

***APT/SWE Project Log Book Page* 5**
TRAINEE'S WEEKLY REPORT

(Please produce a summary for each week of Project) **FOR THE USE BY THE INDUSTRIAL SUPERVISOR ONLY**

General comments on the students' progress

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STUDENT'S WEEKLY PROGRESS CHART

APT/SWE Project Log Book Page 4 **[Note everything must be handwritten]**

WEEK TWO: Project PROPOSAL-Use your objectives
Main Objective: To Engineer and deploy a resilient, web-based Smart Emergency Response System (SMERS) that leverages geospatial telemetry and hybrid algorithmic routing to optimize the dispatch efficiency and administrative accountability of the heterogeneous EMS fleet in Laikipia County.
Clear system objectives [Ensure weekly activities match your objective/s]

- . To develop a real-time geospatial visualization module.
- . To implement a proximity-based heuristic algorithm
- . To integrate a Fault-Tolerant Routing Engine.
- . To systemize administrative governance by engineering a digital ledger.

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Drafting the Problem Statement. Focused on "Algorithmic Fragility" and "Logistic Invisibility".	Requirement Elicitation

Tue.	Formulating Specific Objectives. Defined the 4 goals: Visualization, Dispatch Algorithm, Hybrid Routing and Payments.	Requirement Elicitation.
Wed.	Writing the Justification. Researched the "Golden Hour" concept to back up the medical necessity.	Academic Writing.
Thur.	Creating the Project Plan (Gantt Chart). Broke down the development into 4 sprints.	Project Planning
Fri.	Finalizing and Submitting the Project Proposal document for approval.	-

***APT/SWE Project Log Book Page* 5**

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STUDENT'S WEEKLY PROGRESS CHART

***APT/SWE Project Log Book Page* 4**

Tools used for UML design:
PlantUML - used for generating diagrams from text-based code.
Draw.io (diagrams.net) - used as the visual editor to integrate PlantUML code and fine-tune the layout of diagrams.

UML interactions
1. Context Diagram (DFD level 0) - Interactions between External Entities.
2. Data Flow Diagram (DFD level 1) - Internal data movement between modules.
3. Entity Relationship Diagram (ERD) - Database Schema Interactions.
4. Activity Diagram (Flow chart) - The Hybrid Routing logic flow.

WEEK THREE: Project UML AND SYSTEM DESIGN

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Analyzing system Requirements. Identified the need for two user roles: dispatcher and Admin.	—
Tue.	Designing the Context Diagram (DFD Level 0). Mapped External entities: Driver, Dispatcher, Mpesa, GSRM.	Systems Modelling (UML)

Wed.	Developing the Data Flow Diagram (Level 1) Mapped how data flows from "Triage" to "Dispatch" to "Payment".	Architectural Design Patterns.
Thur.	Designing the Database Schema (ERD). Defined tables for "Users", "Incidents", "Responders" and "Payments".	Database Normalization (3NF)
Fri.	Designing the Flowchart for the "Hybrid Routing Engine" (API vs Math fallback logic).	Architectural design patterns.

***APT/SWE Project Log Book Page* 5**
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STUDENT'S WEEKLY PROGRESS CHART

WEEK FOUR: Project DESIGN/DATASET/DATABASE

Describe briefly your design activities

- Designed the PostgreSQL schema using 3rd Normal Form (3NF).
- Implemented strict data constraints.
- Developed a seeding script to populate the database with realistic dummy data.
- Defined the REST API endpoints and JSON payload structure.

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Installing PostgreSQL and pgAdmin 4. Setting up the local development environment.	Relational database management.
Tue.	Writing SQL scripts (schema.sql) to create tables with constraints (Foreign Keys, NOT NULL).	SQL scripting.
Wed.	Implementing ENUM types for 'Vehicle Types' (Ambulance, Boda, TukTuk) to enforce data integrity.	Relational database management.
Thur.	Writing seeding scripts to populate the database with dummy data (Laikipia coordinates).	SQL scripting

Fri.	Testing SQL queries to ensure relationships between Incidents and Payments work correctly	SQL Testing.

***APT/SWE Project Log Book Page* 5**
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STUDENT'S WEEKLY PROGRESS CHART

WEEK FIVE: PROGRESS REPORTING#1

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Initializing the Node.js project. Setting up "package.json" and installing dependencies (express, cors, pg).	—
Tue.	Creating the database connection module (db.js). Connecting Node to PostgreSQL.	~~the~~ Connection testing
Wed.	Building GET endpoints ("/api/responders", "/api/requests") to fetch data for the frontend.	RESTful API design
Thur.	Building POST endpoints ("/api/requests") to allow creating new emergency simulations.	RESTful API design

Fri.	Testing API endpoints using Postman to verify JSON responses	Postman testing

***APT/SWE Project Log Book Page* 5**
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APT/SWE Project Log Book Page 4
WEEK SIX: PROGRESS REPORTING#2

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Initializing the React app. Installing Material UI and setting up the theme	React components
Tue.	Designing the layout.js component (Sidebar navigation and Topbar)	Material UI grid system
Wed.	Designing the Emergency Queue component to display pending requests.	Material UI grid system.
Thur.	Creating the Admin Dashboard.js structure with Tabs (History, Users, Financials).	Material UI grid system
Fri.	Implementing the KPICard component for the analytics sidebar.	Frontend state management.

APT/SWE Project Log Book Page 5

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APT/SWE Project Log Book Page 4
WEEK SEVEN: PROGRESS REPORTING#3

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Installing react-leaflet. Setting up the base map centered on Nanyuki Laikipia.	React-leaflet Integration
Tue.	Creating custom icons (L.Icon) for Ambulances, Bodas and Tuktuks	Handling map assets.
Wed.	Fetching live responder data from the backend and rendering markers on the map.	Geospatial visualization
Thur.	Implementing the logic to filter "Idle" vs "Active" units on the map.	—

Fri.	Adding Popups to markers to show Driver Name and Vehicle Type.	—

***APT/SWE Project Log Book Page* 5**
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***APT/SWE Project Log Book Page* 5**
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APT/SWE Project Log Book Page 4
WEEK EIGHT: PROGRESS REPORTING#4

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Implementing the fetchRoute function. Setting up the call to the OSRM public API.	OSRM API Setup.
Tue.	Coding the "Fail-Fast" mechanism using AbortController to handle API timeouts.	Fault tolerance Patterns.
Wed.	Developing the "Mathematical fallback". Writing the linear interpolation logic to calculate paths without internet	Trigonometry in code.
Thur.	Adding randomized "jitter" to the mathematical path to make movement look realistic instead of straight lines.	—

Fri.	Testing the routing engine by disconnecting the internet and verifying the fallback works.	Testing routing.

***APT/SWE Project Log Book Page* 5**
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APT/SWE Project Log Book Page 4
WEEK NINE: PROGRESS REPORTING#5

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Creating the main useEffect loop in App.js to run at 20FPS (Frames Per Second).	React useEffect hooks.
Tue.	Implementing the "Proximity Logic" to calculate distance between moving units and patients.	—
Wed.	Coding the "Pickup" logic: changing status from "En-route" to "Transporting" when distance < 0.0005.	State synchronization
Thur.	Coding the "Drop-Off" logic: completing the mission when the unit reaches the hospital.	—
Fri.	Integrating the "Simulate 911 call" button to trigger the entire flow.	Real-time simulation logic.

***APT/SWE Project Log Book Page* 5**

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APT/SWE Project Log Book Page 4
WEEK TEN: PROGRESS REPORTING#6

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Identified a bug where the map markers would dicapper after pickup.	Debugging Complex logic
Tue.	Debugging the ID mismatch issue. Realized Database sent Numbers but React used strings.	Debugging complex logic
Wed.	Implementing "Type Safe" comparisons (StringCid) === StringCid) to fix the bug.	Debugging complex logic.
Thur.	Fixing the "0 Amount" bug in the Payment log by handling case sensitivity (amount_kes vs amount_kes)	—

Fri.	Conducting full system tests (End-to-End) from login to Payment Generation	Chrome DevTools

***APT/SWE Project Log Book Page* 5**
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APT/SWE Project Log Book Page 4
WEEK ELEVEN: PROGRESS REPORTING#7-REPORT PREPARATION & DOCUMENTATION

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Writing Chapter 1 and Chapter 2 Literature Review	Technical Documentation
Tue.	Writing Chapter 3 (Methodology) and Chapter 4 (System design)	"
Wed.	Taking screenshots of the system and writing descriptions for Chapter 5.	"
Thur.	Writing Conclusions and Recommendations for Chapter 6.	"

Fri.	Compiling References. Formatting the document according to guidelines. Reviewing the draft.	APA 7 referencing.

***APT/SWE Project Log Book Page* 5**
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APT/SWE Project Log Book Page 4

WEEK TWELVE: PROGRESS REPORTING#8-FINAL PROJECT FINALIZATION

DAY	DESCRIPTION OF WEEKLY ACTIVITIES	NEW SKILLS LEARNT
Mon.	Code cleanup. Removing all console.log statements and unused files (RequestItems)	—
Tue.	Preparing for the panel presentation focusing on the Hybrid Routing Engine explanation.	Code defense.
Wed.	Rehearsing the demo. Ensuring all modules work reliably on the local host.	Public Speaking.
Thur.	Final Review of the Logbook and documentation.	—
Fri.	Final Project presentation and Defense.	Project Presentation skills.