# Weekly Progress Report - Week 4

## Project: Campus Graph Modeling for Autonomous Navigation

This final week was dedicated to comprehensive system testing, performance analysis, and the preparation of the final project report. The focus was on ensuring the accuracy, reliability, and documentation of the entire system for final submission.

### 1. Overview

With the core pathfinding functionality in place, the objective for this week was to validate the entire system from end-to-end. This included running an extensive test suite, finalizing all documentation, and preparing the project for its final submission and demonstration.

### 2. Process Followed

a) **End-to-End System Validation:** A series of rigorous tests were performed to validate the accuracy of computed routes, particularly for complex and long-distance paths such as those from the Main Gate to the Hostel. The system's output was cross-referenced with satellite imagery and real-world campus pathways to confirm its correctness.

b) **Performance & Scalability Analysis:** We conducted performance tests to measure the time taken to compute paths of varying lengths. The results confirmed that the system is highly scalable and provides near-instantaneous route calculations for the entire campus graph.

c) **Final Documentation & Reporting:** All project documentation was compiled and finalized. This included an executive summary, a detailed report on the methodology, key findings from Weeks 1-3, and a conclusive summary of the project's success. The final report for this week encapsulates all the work from the previous three weeks.

### 3. Key Findings

* The system's pathfinding accuracy is consistently high, with no discrepancies found between computed and real-world paths.
* The combined use of the optimized graph model and A\* algorithm allows for efficient and reliable navigation.
* The project successfully transitioned from an abstract concept to a functional and validated navigation tool.

### 4. Issues Encountered

* Minor inconsistencies in coordinate precision had to be addressed to ensure paths seamlessly connected, particularly at junctions where multiple routes overlap.
* Finalizing the report required careful consolidation of data and findings from all project weeks to ensure a cohesive and comprehensive document.

### 5. Week 4 Outcomes

* The campus graph model and pathfinding system were **fully tested and validated**.
* The **final project report** was completed and prepared for submission.
* A robust and functional prototype was created, demonstrating the core capabilities of the "Campus Graph Modeling for Autonomous Navigation" project.