Sprint 4 Reflection Report

Sprint 4 represented another major step forward in the development of our UNT AR Map project. While Sprint 3 focused on constructing the navigation graph and integrating it with the 3D environment, Sprint 4 centered on strengthening the connections between floors and refining the overall system structure. This sprint allowed us to move from a single-floor implementation toward a more complete building navigation experience. Our primary accomplishment was successfully connecting navigation nodes across multiple floors, ensuring that vertical movement between levels could be accurately represented within our graph system.

One of the most significant achievements during Sprint 4 was linking nodes between floors. Previously, our graph structure functioned primarily within a single-floor context. However, real-world navigation inside Discovery Park requires users to move between levels using stairs or elevators. To solve this, we created special transition nodes that connect stairwells and elevators from one floor to another. These connections were carefully mapped so that the routing algorithm can recognize vertical movement as part of a valid path. This improvement brings our project much closer to a realistic indoor navigation system, as it now reflects how users physically travel throughout the building.

In addition to floor connectivity, we continued refining node placement and alignment within Unity. Ensuring that each node accurately corresponded to its real-world location required patience and multiple rounds of testing. Because the system relies on precise graph positioning, even small inconsistencies could impact future routing performance. By double-checking our node-to-floor relationships and testing transitions between levels, we confirmed that the system behaves logically and consistently. Seeing the nodes connect seamlessly between floors was a strong indication that our architecture is scalable and well-structured.

Several aspects of this sprint worked particularly well. Our team communication has improved compared to earlier sprints, and responsibilities were more clearly divided. This helped us work more efficiently when debugging node connections and verifying floor transitions. Additionally, our experience from previous sprints with Unity scaling and coordinate adjustments made this sprint smoother overall. We were better prepared to troubleshoot alignment issues and manage project files within GitHub.

However, there are still areas that can be improved. Node alignment and fine-tuning remain time-consuming, and small structural changes often require manual updates across multiple components.

Looking ahead, Sprint 5 will shift our focus beyond the AR application itself and toward expanding the project's accessibility and functionality. Our main goal for Sprint 5 is to develop a dedicated website for the UNT AR Map project. This website will serve as a platform to showcase our project, explain its purpose, and potentially host downloads or demonstrations. In addition, we plan to design and implement a database that stores users' class schedules. This database will allow students to input or retrieve their schedules so that the navigation system

can guide them directly to their classrooms. Integrating a database introduces a new technical layer to the project, combining web development, backend systems, and data management with our existing AR infrastructure.

In conclusion, Sprint 4 strengthened the structural integrity of our navigation system by successfully connecting nodes between floors and validating multi-level routing capabilities. While refinement is still needed, the project is now significantly more complete and realistic in terms of indoor navigation. With a solid graph architecture in place, Sprint 5 will expand our project into the web domain and introduce database functionality, moving us closer to delivering a fully integrated navigation solution for UNT students.