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Phase 3 Report

For the final phase, we focused on finishing the simulation project and making it fully functional. Having finally chosen Dijkstra's algorithm and coded it using a priority queue, we used it to choose the prime path for each of the agents. We have also worked on visualization and storing of the variables. Scaling is still a problem that we are continually encountering for the simulation - for example, we do not know many agents there should be relative to the floor size. In addition, our Simulation.h and Agent.h files track the movement and force of each of the agents.

Using Java Processing, we implemented 250 CSV files for each agent's location. For each agent, a text file will track the movement. Some of the challenges included the process of making a separate text file, which is not possible with a for loop.

Our floor.h file now has set_wall_force, normalize_wall_force, and process_wall_force functions. From reading *Simulating dynamical features of escape panic*, we know that when an agent is trying to escape, his velocity is dependent on the walls and other pedestrians. The Simulation.h file gives positions for each agent and updates their position. Repulsion for each agent is calculated by iterating through each agent and calling calculate_repulsion in the agent class. While the Agent.h class models the force of individual agents, the Simulation.h class handles **all** of the agents. Another change we added is the see_stuff function to our Graph.h file. The see_stuff function helps us visualize everything that we have coded, making it easier to modify our code. For example, the first for loop prints the colors of each tile in the floor. We

have more for loops to print out the vertex number, the previous vertex number, the distance from source, and the direction to go.

Our current project, implemented in C++ and Python, is open-source. Unlike the previous simulation project, anyone on Github can view and contribute to the code. We believe that our replication can be useful for students who are excited about coding Djikstra's algorithm and people who are curious about evacuation plans.