Week 9 Report

We spent some time studying the fundamentals of the A\* searching algorithm and we saw why it is a good tool to utilize in this project. We understand that it is simply a version of the Dijkstra searching algorithm that uniformly searches all possible paths of interest. Dijkstra is useful when multiple paths need to be considered before the most optimal path is determined. However, as this is fairly time consuming, approximately O(nlog(n)). This could be detrimental when seconds matter during an evacuation. A\* is slightly better as it includes a heuristic system that calculates the distance between the start and whatever the end node may be using comparative lengths analysis and removes the paths that are too long for it to compute. Assume there are multiple paths that a drone must survey during a disaster. Of the 6 paths that could be used, say that 2 are determined to take longer to compute and traverse than the others. The drone’s recursive algorithm would then drop those 2 paths and their accompanying base nodes and continue recursively searching the remaining 4 paths. This way, time is not wasted computing paths that will not provide any useful output while allowing the drone to follow the most efficient path. When looking at which paths, it takes in two primary factors (it also takes in other factors in the case of a new obstacle), weight and distance. Weight and distance are added together to get the total amount of effort needed to get a drones from point a to b, with the routes taking too much effort being put last in priority.