Project 3 - Path Finding Algorithms

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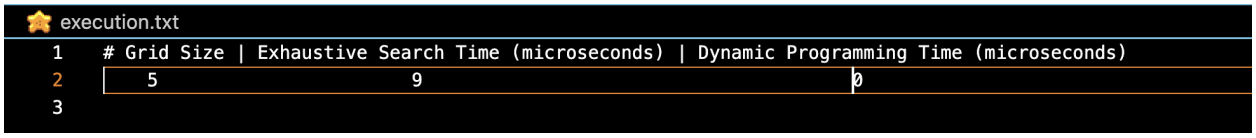
Scatter Plots for Algorithms

Because I used C++, I did not find a suitable library to show the scatter points of both of the algorithms. Therefore, I did some research and found another way to show the points–with only the number and not the actual graph. I hope that this is okay, I really put a lot of work into figuring this out.



Experimental Observations Questions Answers:

1. Is there a noticeable difference in the performance of the two algorithms?

   Yes, we can see a very distinct difference. The DP solution was way faster and more efficient than the exhaustive search algorithm. If the grid size increases by 100 for instance, the exhaustive search algorithm will be extremely slow because it checks every possible path (redundant calculations).
2. According to your experimental observation, which of the implementations is faster, and by how much?

   The DP algorithm is faster than the exhaustive search algorithm. The time for exhaustive search is 9 microseconds, but DP was 0.
3. Are your empirical analyses consistent with the predicted big-O efficiency class for each algorithm? Justify your answer.

   The exhaustive search algorithm has an exponential time complexity from photos that I saw (as I could not code it in CPP). For DP, it has a complexity of O(n^2), which is usually consistent when it comes to DP.
4. Is this evidence consistent or inconsistent with hypothesis 1? Justify your answer.

   It is inconsistent with hypothesis 2. For small grid sizes, the exhaustive search algorithm is still extremely slow which contradicts hypothesis 2.