Lindsey Loveland
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Analysis Document

1. Who is your programming partner? Which of you submitted the source code of your program?

Jacob Brown. He did.

2. Evaluate your programming partner.

He was helpful, consistent, and thorough.

3. Does the straight-line distance (the absolute distance, ignoring any walls) from the start point to the goal point affect the running time of your algorithm?

Yes, it does. The further away the Goal is from the Start, the more Nodes the program will have to travel to.

4. Explain the difference between the straight-line distance and the actual solution path length. Give an example of a situation in which they differ greatly. How do each of them affect the running time of your algorithm? Which one is a more accurate indicator of run-time?

Straight-line distance is the distance of a straight line that stretches from point A to point B. Actual solution path length is the number of nodes the program had to travel to to reach the goal. For example, you could have a relatively small maze, which would have a very small straight-line distance, but if it is filled with walls/obstacles, it forces the program to step through more Nodes to reach the goal. Actual solution path length gives a better measure of run-time because a straight-line distance situation would only happen for a best case.

5. Assuming that the input maze is square (height and width are the same), consider the problem size, N to be the length of one side of the maze. What is the worst-case performance of your algorithm in Big-Oh notation? Your analysis should take in to account the density of the maze (how many wall segments there are in the field). For example, a completely open field with no walls other than the perimeter is not dense at all, as opposed to the example maze given "bigMaze.txt", which is very dense. There is no one correct answer to this since solutions may vary, but you must provide an analysis that shows you are thinking about the problem in a meaningful way related to your solution.

It would be O(N^2), in the case that it had to travel to every element in the maze. If there is a large maze and it is particularly dense, it would be O(N^2) since it has to travel to N*N amount of Nodes. A non-dense, large maze would be closer to O(N) because there are no obstacles in it’s path, ensuring that it travels the quickest, most direct route.

6. How many hours did you spend on this assignment?

About 8 hours.