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CS2420
Assignment 09 Analysis

1. Who is your programming partner? Which of you submitted the source code of your program?
– My partner is Adrian Bollerstev, and he will be submitting the code.

2. Evaluate your programming partner.
– He was sort of hard to work with this time due to constantly changing when we should meet, but we kept in touch over text and worked together to get the assignment done.

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?
– It doesn't since we never even check for what the straight-line distance is, though it can give a good guess on how long the program should take.

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?
– The straight-line is the absolute distance between the start and the goal, whereas the solution path's length is how far the path must be with going around the given walls. For example, the mazeTurn that was given to us has a straight-line distance of only one character between the S and the G. However, since there was a large wall in between them, the actual path for the solution required the path to go all the way up and around. The actual solution path is a much better indicator of how long the program is going to run, as that's what the program looks for, taking the walls into account. However, the straight-line distance can be a good estimate depending on how dense the maze appears to be (a less dense maze means a more accurate estimate.)

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.
– The worst-case would be close to N^2. If the maze is completely empty, the start and goal would have to be in completely opposite corners to reach this running complexity. However, the more dense the maze is, the more likely the running time is to be close to N^2 with the start and goal being anywhere within the map, as it will eventually get to the point where the number of possible paths are small and there's eventually just one single route that will force the search to check every single possible node.

6. How many hours did you spend on this assignment?
– We spent about 7 – 8 hours on this assignment.