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CS2401

Lab 3

The test cases that will be used will all maintain a constant amount of runs between trials, at 1,000,000. This number is a little high for what’s being tested, but it will allow for the average to be as accurate as possible and it won’t be changed because it doesn’t make much sense to vary this number at all, since we want as many trials as possible to be as accurate as possible. The numbers we will be changing will be the length of the array, since this is the main determinant in how many steps it takes for the algorithm to solve the water problem. It will be tested with the numbers 5, 10, 50, 100, 500, and 1000 for both algorithms and the end results will be compared for the two of them. These numbers will hopefully allow us to see a general trend in the algorithms and will help determine which algorithm is better for this problem.

|  |  |  |
| --- | --- | --- |
| Array length | islandWater1 | islandWater2 |
| 5 | 24.74 steps | 4.65 steps |
| 10 | 88.11 steps | 13.76 steps |
| 50 | 2045.96 steps | 102.67 steps |
| 100 | 8195.64 steps | 220.16 steps |
| 500 | 206869.28 steps | 1179.27 steps |
| 1000 | 829714.75 steps | 2384.98 steps |

As you can see from the above data, islandWater1 ends up having more steps across the board when compared to islandWater2. This is even evident in the graph, that uses a logarithmic scale to represent both sets of data since they don’t fit any other way. The larger the array is, the further apart the two algorithms are, and this is most easily seen in the last case. With an array length of 1000, islandWater1 took 829714.75 steps and islandWater2 only took 2384.98 steps, which is an entire 827329.77 steps fewer than islandWater1. If we were to continue testing for even larger array sizes it would be very likely that this trend would continue and islandWater1 will take longer than islandWater2.

Since islandWater2 has so many fewer steps compared to islandWater1 that I would easily recommend that over islandWater1. Even though time was not actively measured in this comparison, it was still easy to see that islandWater2 ran so much faster than islandWater1, especially on the larger array lengths of 500 and 1000. Runtime is very important and if this were done for a real life situation, it would be much better to use the second algorithm over the first.