Submission for Project 4: marsh crossing

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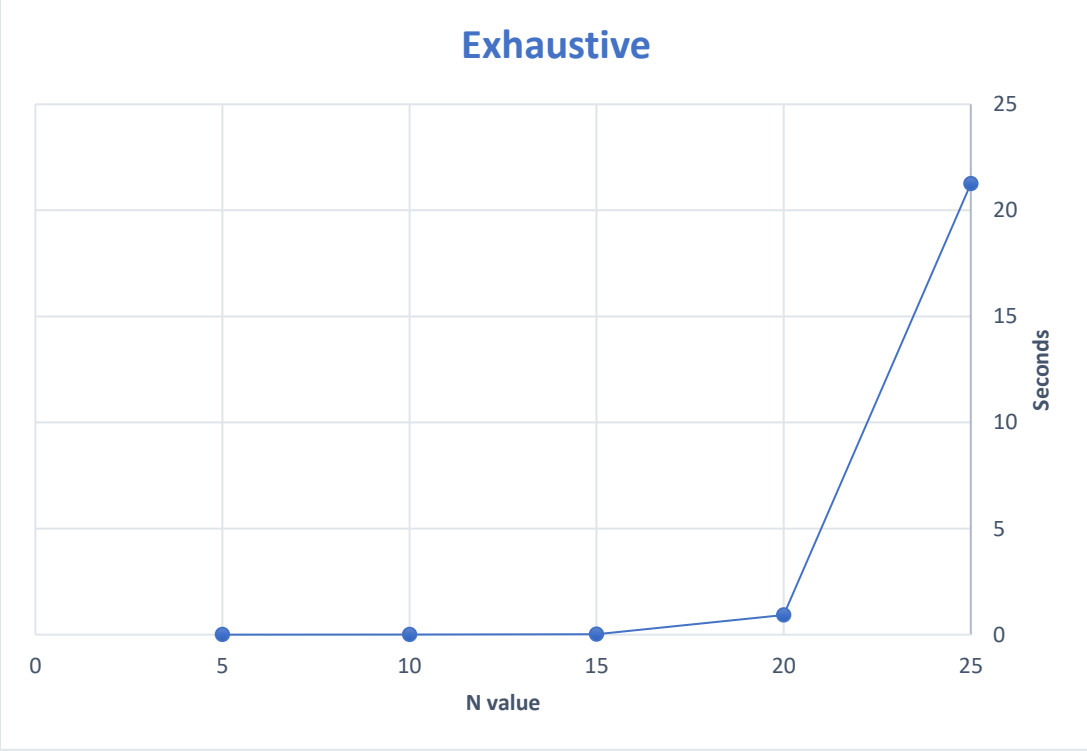
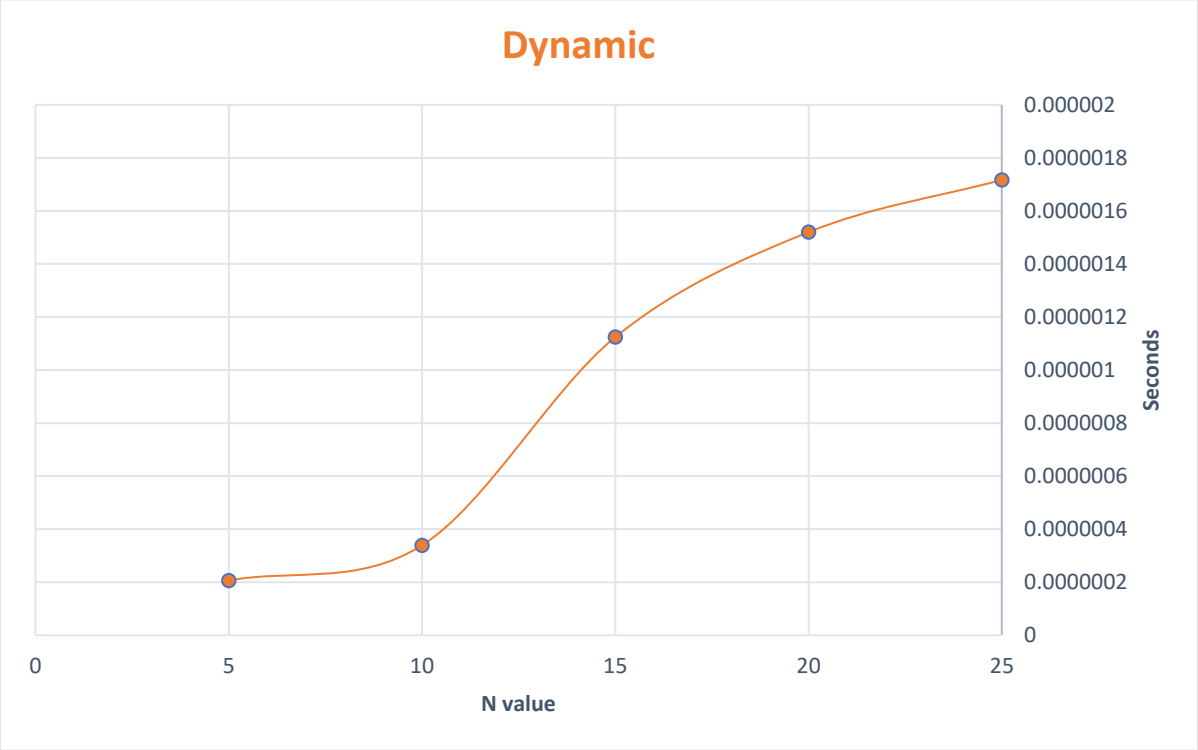
Scatter Plots

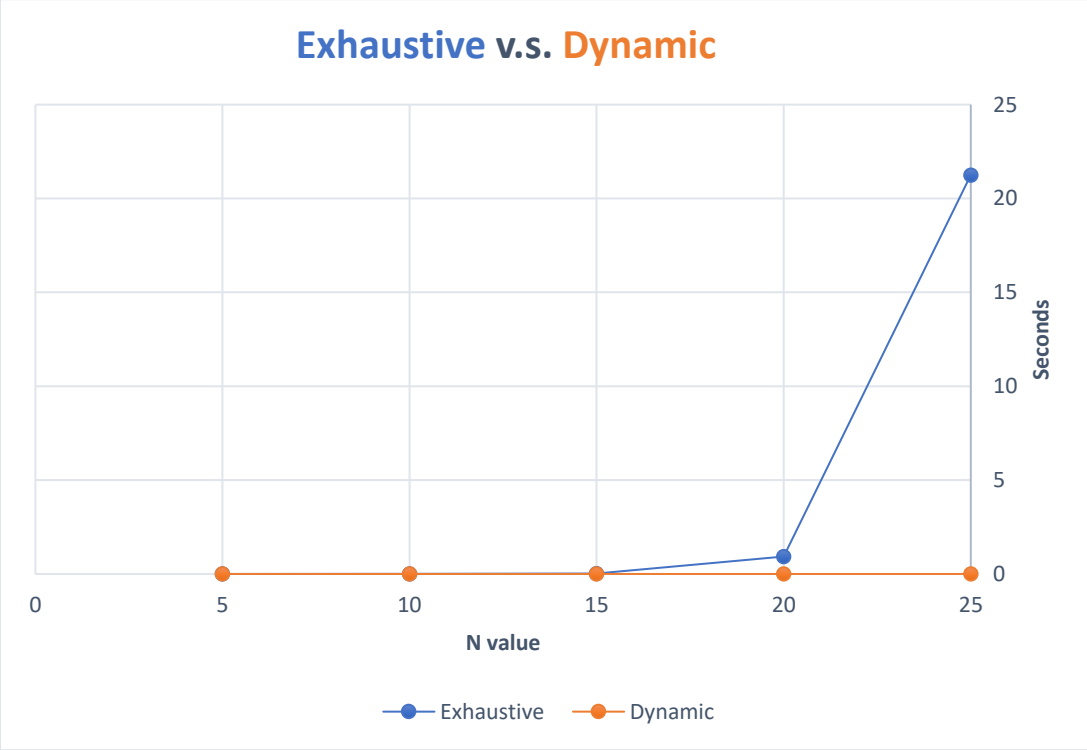
2A)



2B)


Dynamic
0.000002
0.0000018
0.0000016
0.0000014
0.0000012
0.000001
0.0000008
0.0000006
0.0000004
0.0000002
0
Seconds
0
5
10
15
20
25
N value

2C)


Exhaustive v.s. Dynamic
25
20
15
10
5
0
Seconds
0
5
10
15
20
25
N value
Exhaustive
Dynamic

3A) Yes, the fit lines are consistent with the efficiency class; For this problem the Exhaustive Optimization solution is $O(n2^n)$ with small values of N the time in seconds are similar to the Dynamic solution of $O(n^2)$. **BUT** when the value on N gets larger the Dynamic solution is Extremely more efficient.

3B) Yes, the evidence is consistent with the hypothesis that polynomial-time dynamic programming algorithms is far more efficient than exponential-time exhaustive search algorithms for the same problem. The graph on 2C shows the huge difference in time complexity.

3C) Implementing the Dynamic algorithm was difficult because you must pay attention to details when coding it, one small mistake in your logic and your solution is completely wrong. The Exhaustive Optimization was shorter and more understandable, the only part that was confusing was this section of code ***"bit = (bits >> k) & 1".*** Overall, I felt the Dynamic algorithm implementation was harder because of the attention to detail you must exert. I would prefer the Dynamic solution because although it might be difficult to implement the efficiency is vastly superior to Exhaustive Optimization.