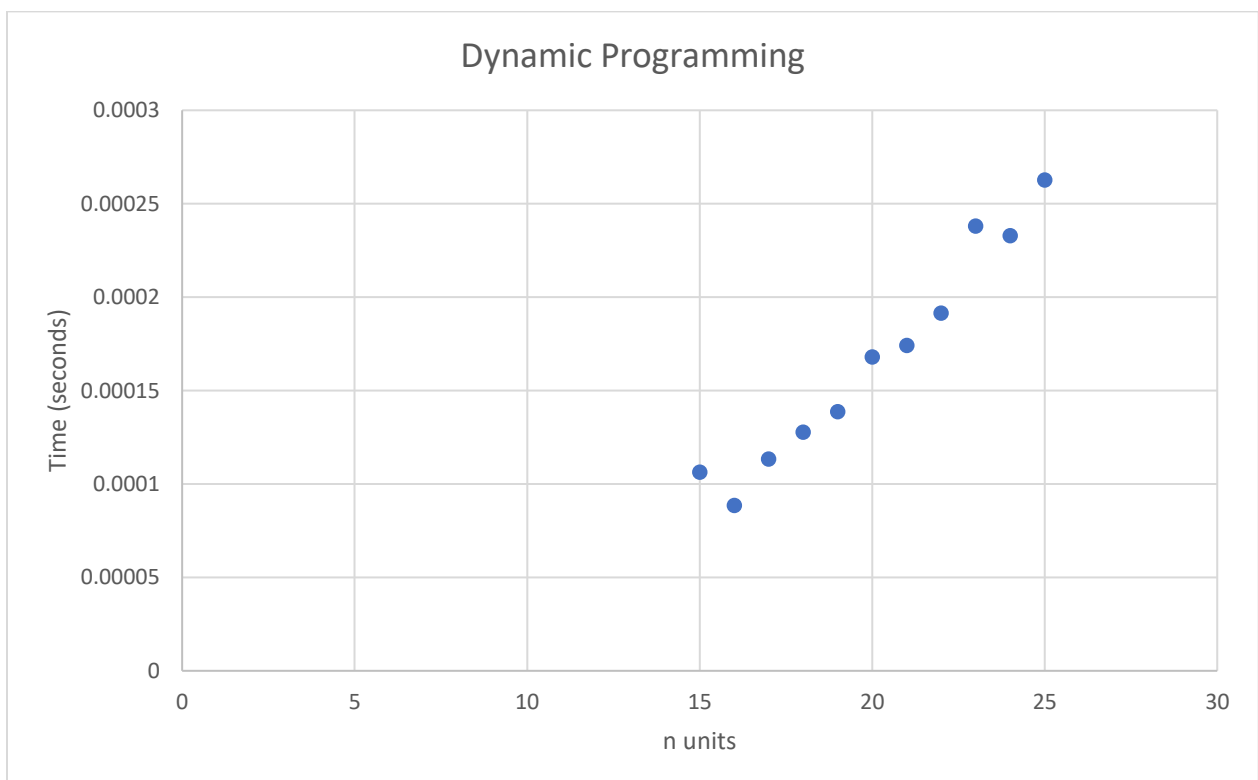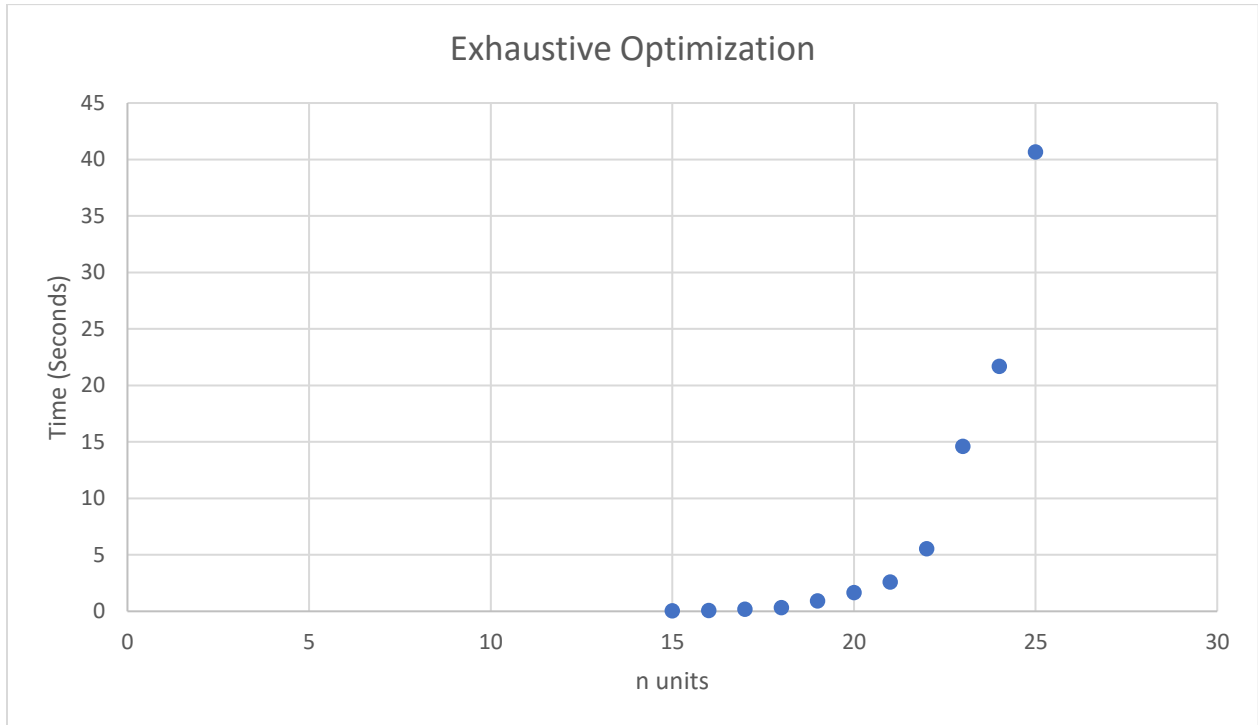Daniel Cao

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Project 4

Is there a noticeable difference in the performance of the two algorithms? Which is faster, and by how much? Does this surprise you?

There is a large noticeable difference in performance between the two algorithms. Dynamic programming is by far the faster algorithm by decreasing the time taken from seconds to less than a millisecond. This absolutely surprises me. I knew there would be sufficient performance gains with dynamic programming, but I did not expect this much performance gains.

Are your empirical analyses consistent with your mathematical analyses? Justify your answer.

The empirical analyses are consistent with my mathematical analyses. We see from the scatterplot that the exhaustive optimization is increasing at polynomial time. We also see from the scatterplot that the dynamic programming increases at exponential time.

Is this evidence consistent or inconsistent with the hypothesis? Justify your answer.

This evidence proves the hypothesis is inconsistent. The hypothesis stated that polynomial-time dynamic programming algorithms are more efficient than exponential-time exhaustive search algorithms that solve the same problem. However, the evidence shows that an exponential time dynamic programming algorithm are far more efficient than polynomial-time exhaustive optimization algorithms.