Project 4 Brief Written Report

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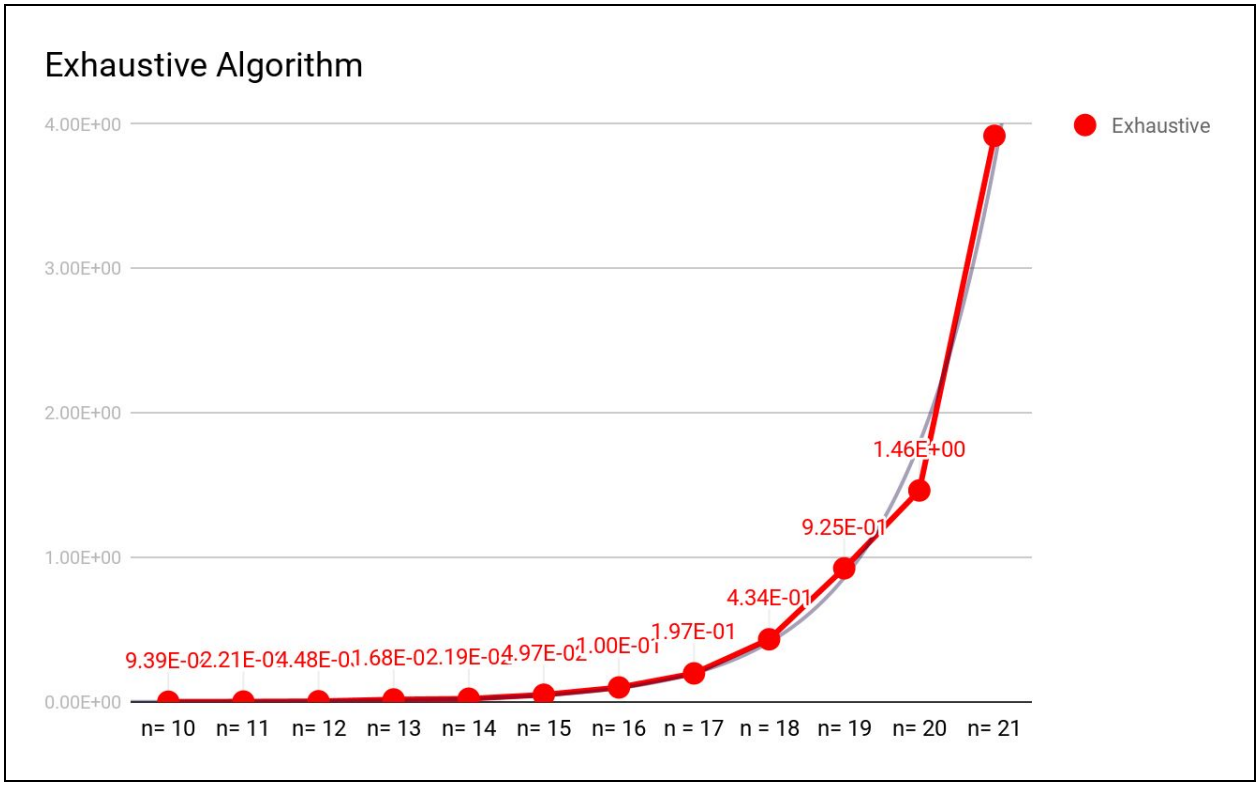
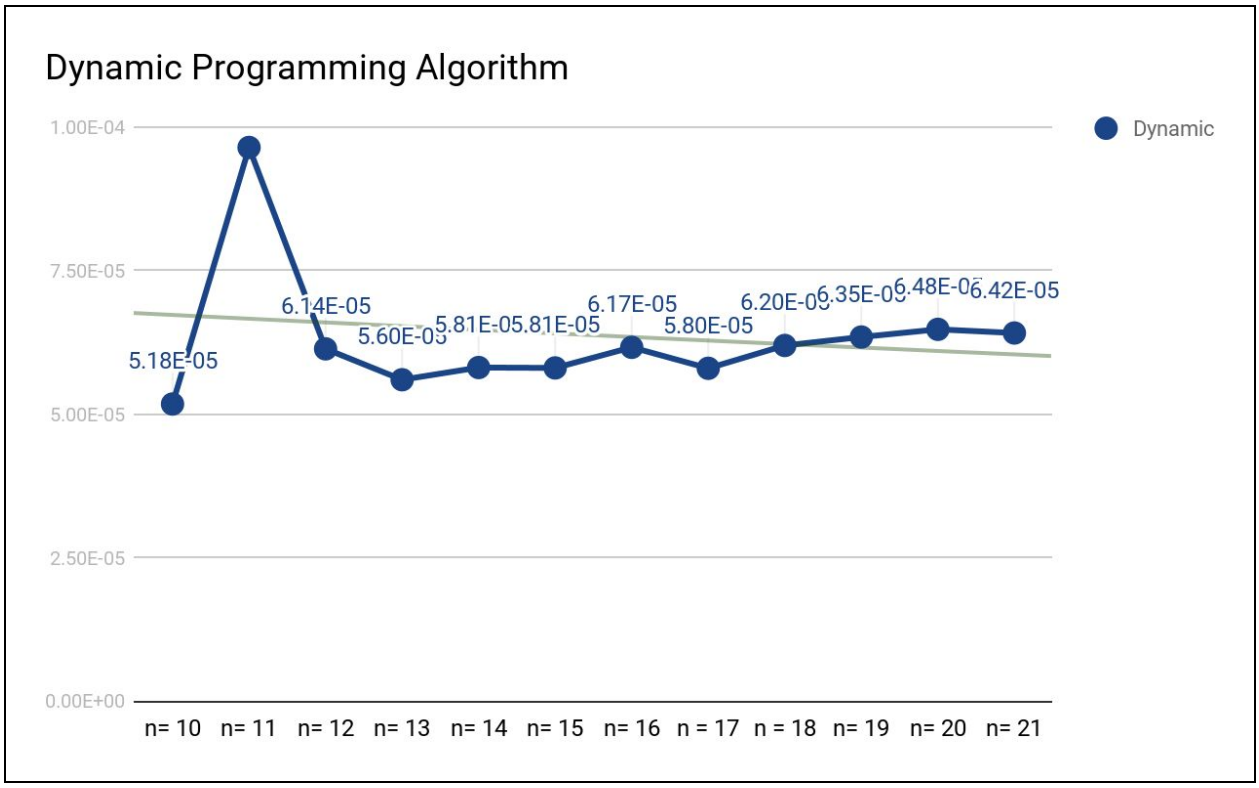
Three Scatter Plots

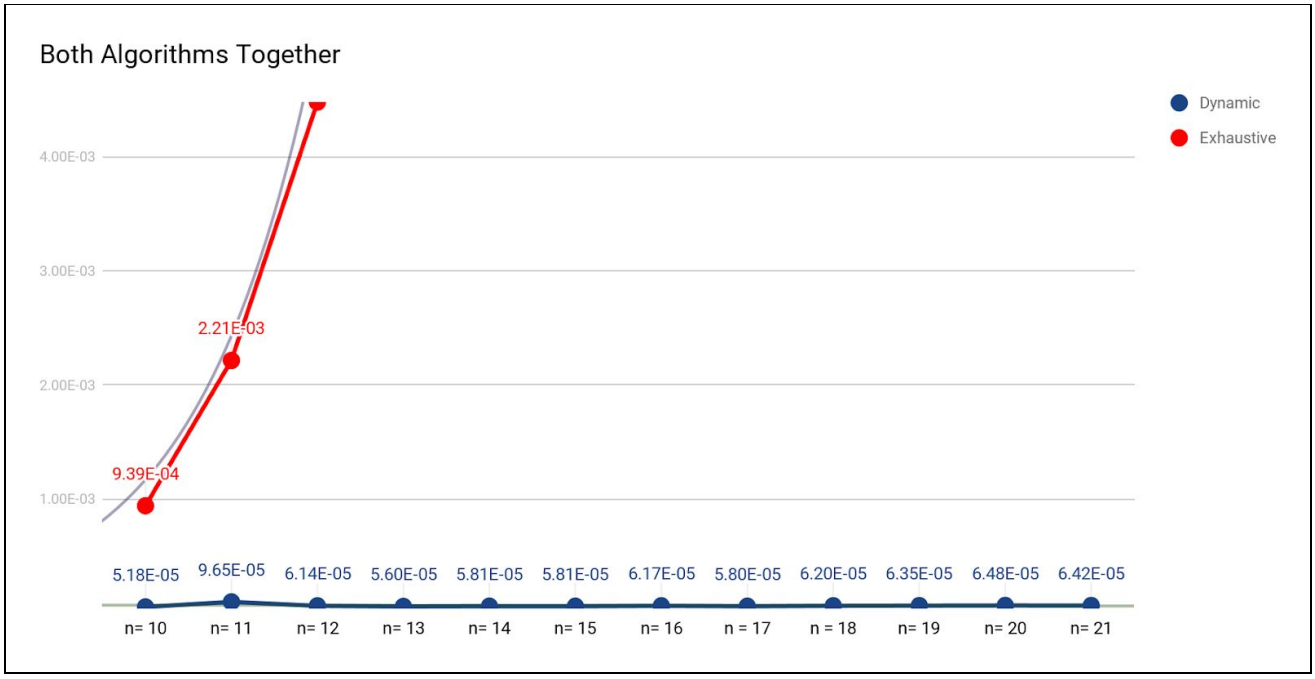
a. Time Complexity of Exhaustive Algorithm



b. Time Complexity of Dynamic Programming Algorithm



c. Both Algorithms on the Same Plot



Answer to the following questions

a. Yes, they are, as you can see the exhaustive algorithm is significantly less efficient compared to the dynamic programming algorithm.
b. It is consistent that polynomial-time algorithms are more efficient than exponential-time algorithms. By the scatter plots you can see how the run time of the exponential-time algorithms grows exponentially as n gets larger. The polynomial-time algorithm also grows as expected in polynomial time.
c. The most difficult aspect of the dynamic programming algorithm was checking if there are valid spaces from above and from the left. The most difficult aspect of the exhaustive algorithm was understanding how to create and validate every bit string as a valid path. Overall, we found the exhaustive algorithm to be more difficult because it was confusing trying to figure out how to create and count the valid paths towards our running count, so due to this, we preferred the dynamic programming algorithm.