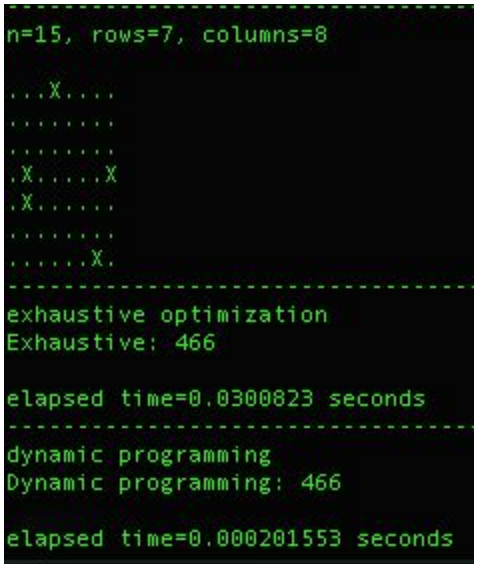
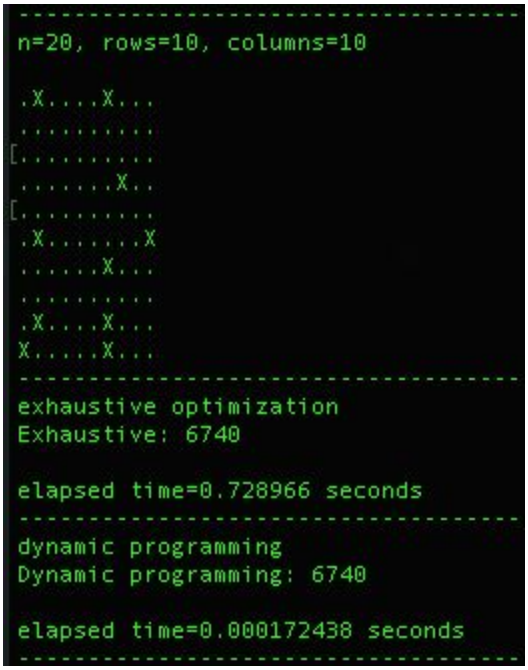
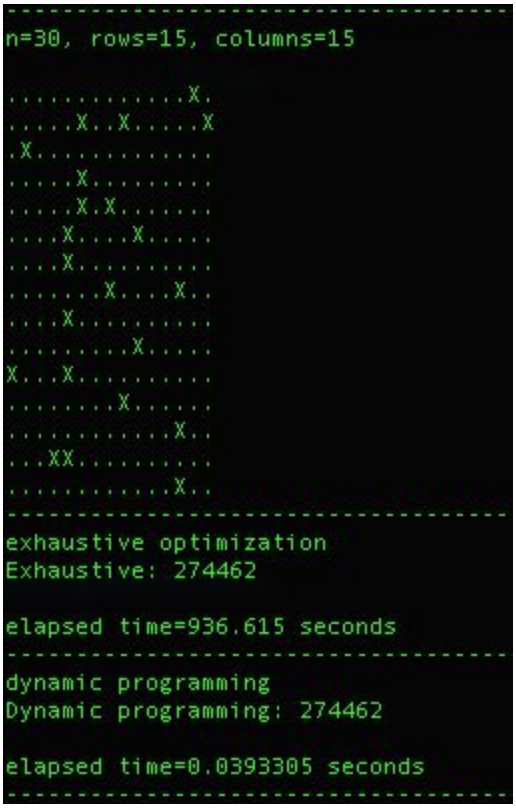
Jon Limas
Micah Lau
CPSC 335
Dr. Bein

Project 4 Algorithm Analysis Report



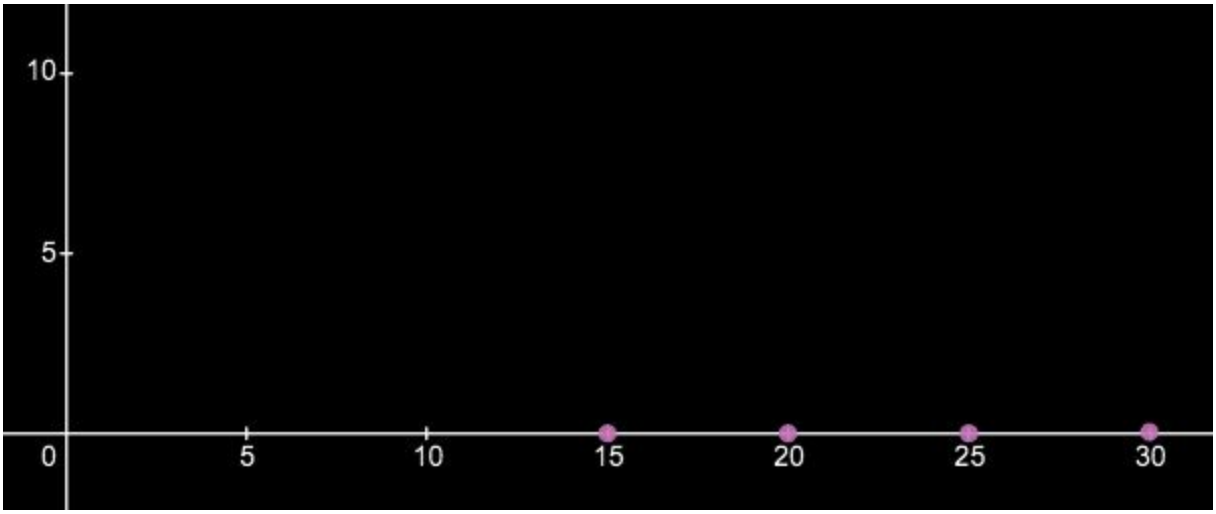


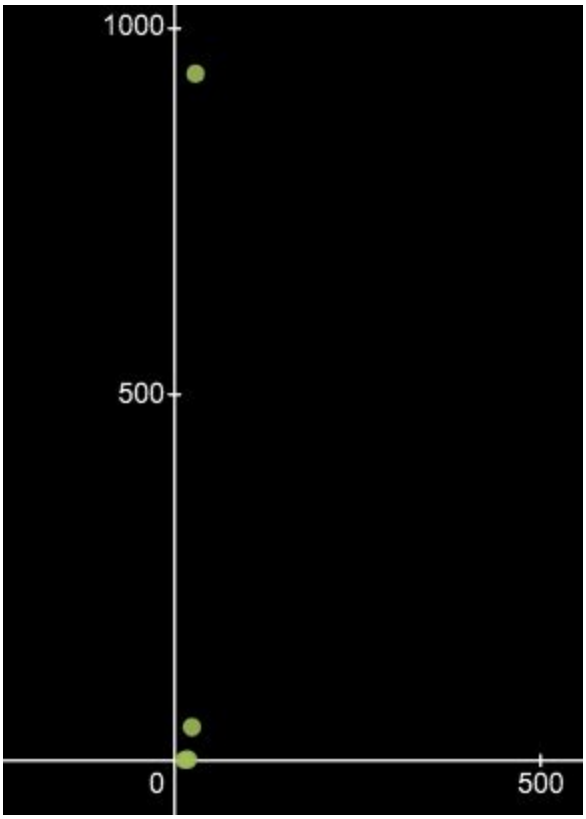
E = Exhaustive time

| $x_1$ | $E_1$ |
|---|---|
| 15 | 0.0307616 |
| 20 | 0.72896 |
| 25 | 44.8298 |
| 30 | 936.615 |

D = Dynamic time

| $x_2$ | $D$ |
|---|---|
| 15 | 0.000166041 |
| 20 | 0.000172438 |
| 25 | 0.000182776 |
| 30 | 0.0393305 |



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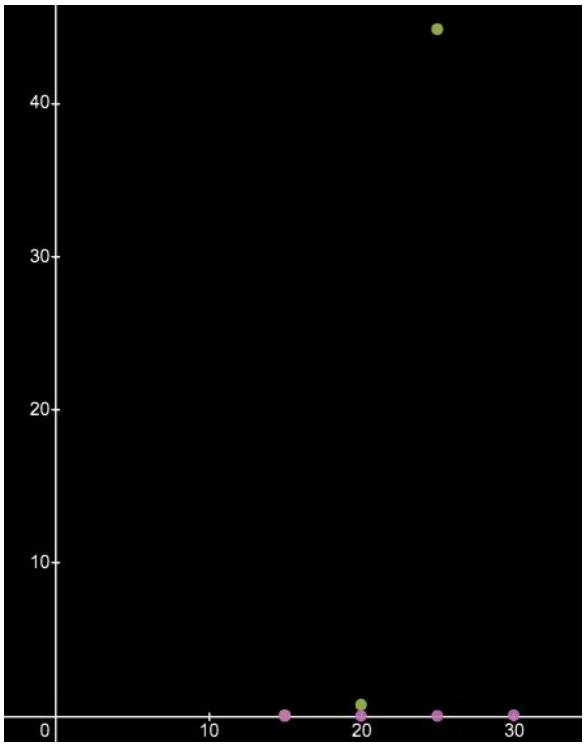
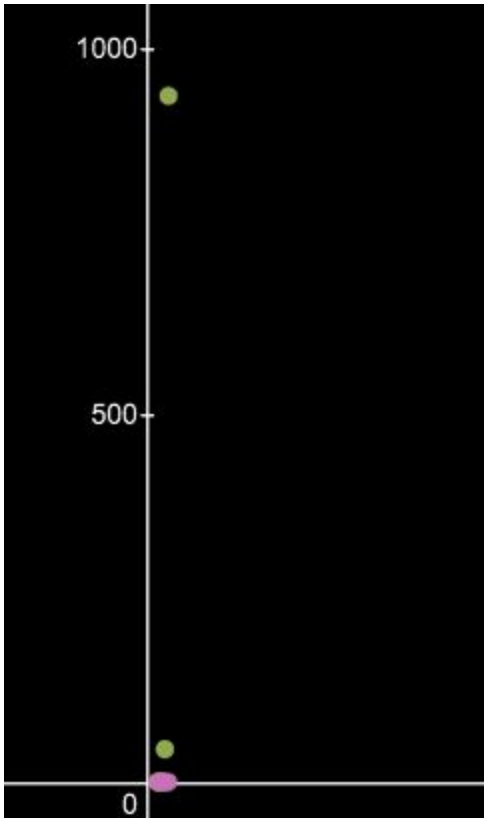
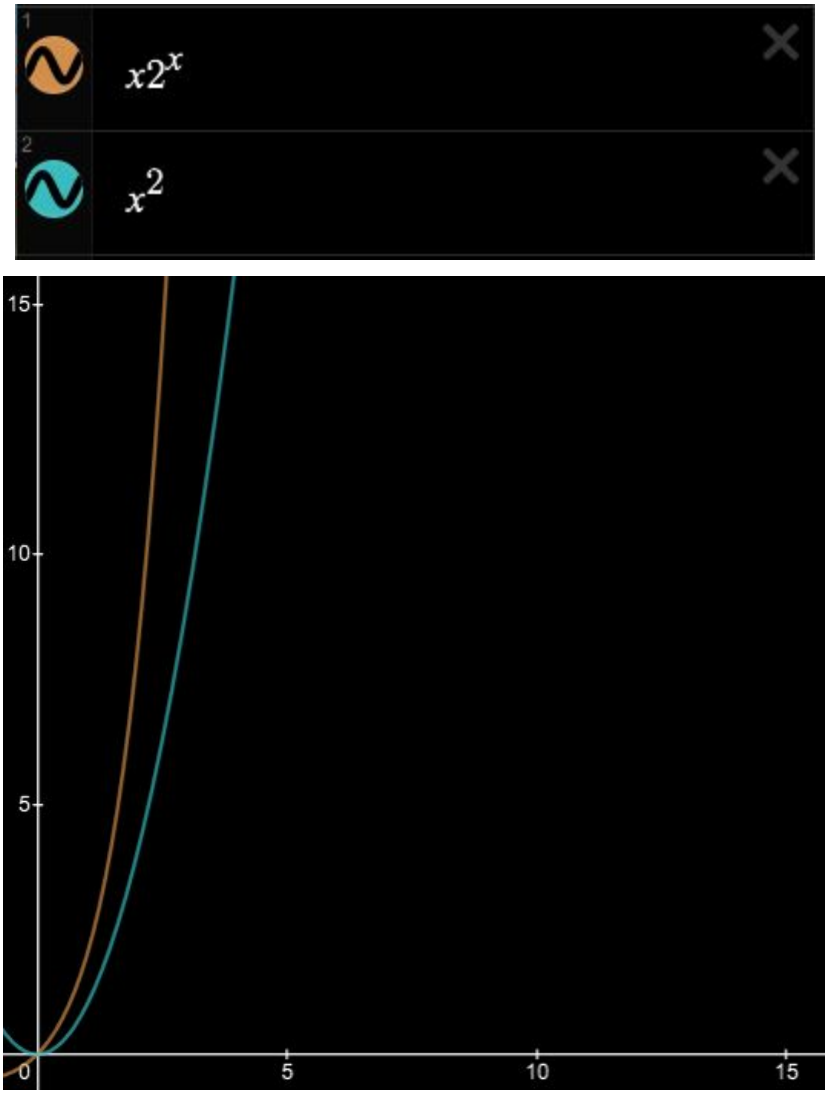


Time Complexities: Curve Comparison




a. **Are the fit lines on your scatter plots consistent with these efficiency classes? Justify your answer.**
    i. Yes, both fit lines reflect their respective efficiency classes.
    ii. The scatter plots follow the general trend in line with the curve of its respective efficiency class
b. **Is this evidence consistent or inconsistent with the hypothesis stated on the first page? Justify your answer.**
    i. Yes it is consistent. Based on the difference in time between the two algorithms implemented, polynomial-time dynamic programming algorithm time complexities were found to be more efficient than its exponential-time exhaustive search/optimization counterpart in this analysis.
    ii. As the size of the grid was increased, the exhaustive search implementation became significantly slower compared to the dynamic-programming one.

c. **Compare and contrast the difficulty you found in implementing the two algorithms. What was the most challenging part of implementing each algorithm. Overall, which implementation did you find harder, and why? Which algorithm implementation do you prefer?**
    i. This particular exhaustive search algorithm was personally more challenging to implement than the dynamic programming one because of the additional concept of having to convert the path as a binary string of bits. In contrast, the dynamic programming implementation was easier to visualize.
    ii. The preferred method of implementation would easily have to go to the dynamic programming one because it is significantly more efficient in the long run.