P1: Experimental Analysis of Sorting Algorithms

This project centered on the experimentation and breakdown of matrix chain algorithms and rod cutting algorithms. Both of these algorithms have multiple ways that they can be implemented and we implemented each algorithm in three different ways: straight forward recursion, a top down approached, and bottom up approach. Below you will see the results for all 6 of the created algorithms.

**Recursive Cut Rod**

This straight forward approach performed the second best of the three. T(n) = n^2 expected time. This performed worse than thought compared to the expected time if you look at the higher up numbers it achieved.



**Memoized Cut Rod**

This top down approach performed the second best of the three. T(n) = Θ(n^2) expected time. This performed worse than thought compared to the expected time if you look at the higher up numbers it achieved.



**Bottom-Up Cut Rod**

This bottom up approach performed way better than the other two and was much quicker than the other two. T(n) = Θ(n^2) expected time. This performed better than thought compared to the expected time.



**Recursive Matrix Chain**

This standard approach performed the second best of the three matrix algorithms. Θ(n) expected time. This performed better than thought compared to the expected time.



**Memoized Matrix Chain**

This top down approach performed the worst of the three matrix algorithms. Θ(n) expected time. This performed better than thought compared to the expected time.



**Matrix Chain Order**

This bottom up approach performed the best of the three matrix algorithms and did very well at high numbers. Θ(n) expected time. This performed better than thought compared to the expected time.

