Large number multiplication

# Introduction

For this assignment I compared two different multiplication algorithms and tested to see how much faster the Karatsuba algorithm is from the standard multiplication algorithm that is taught to most students in schools.

# Algorithms

Below is the Karatsuba Algorithm that runs at a time complexity of nlog2(3)

Text

Description automatically generated

Below is the Standard Algorithm that runs at a time complexity of n2

A screenshot of a computer

Description automatically generated with medium confidence

# Results

Below are the results of running three tests on two algorithms speeds, the numbers they were multiplying were 3141592653589793238462643383279502884197169399375105820974944592 and 2718281828459045235360287471352662497757247093699959574966967627. They both got the result of 8539734222673567065463550869546574495034888535765114961879601127067743044893204848617875072216249073013374895871952806582723184

As is shown by the results the Karatsuba algorithm is faster than the standard version by about 7-8 times. If your program works with large amounts of extremely large numbers such as in the case of cryptography, then using an algorithm like Karatsuba would be useful.





