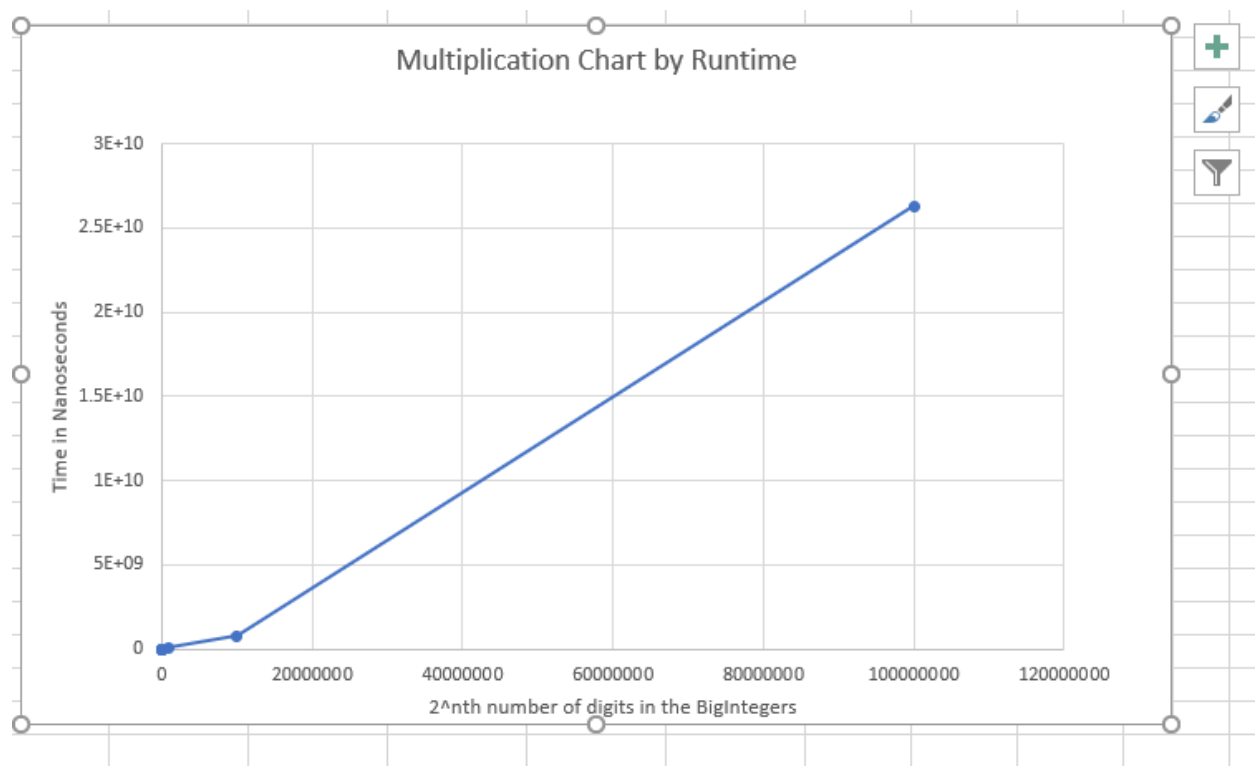


Big Integer Assignment

Multiplication of Big Integers Runtime Graph.

This assignment was to use the Big Integer Class to get data to create a graph showing the

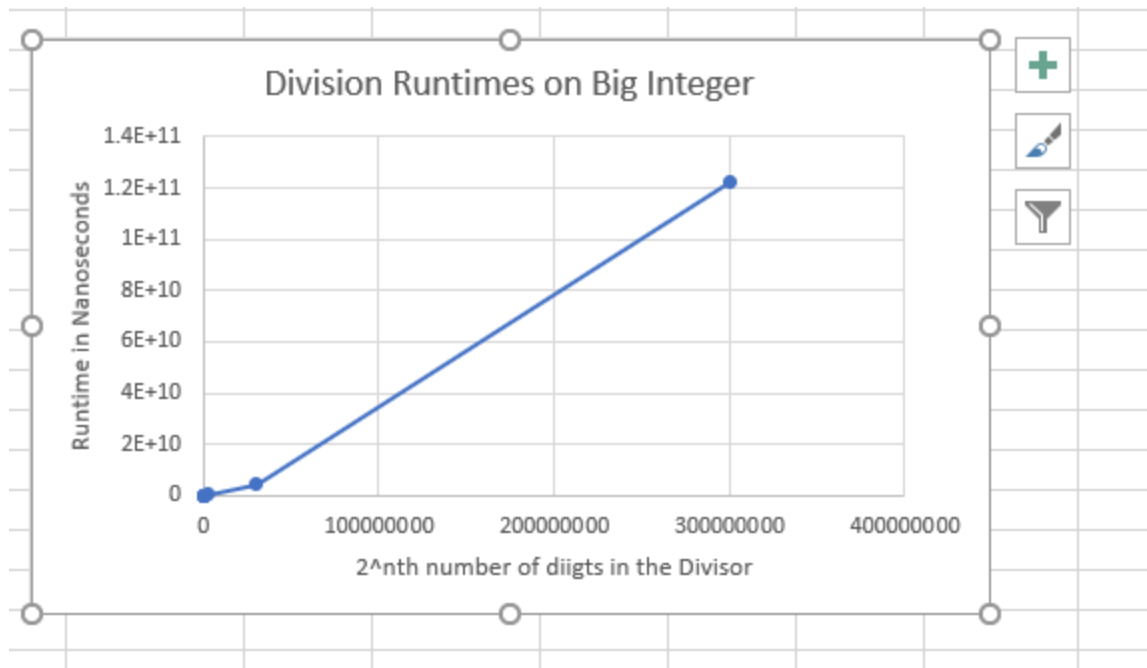


Based on my numbers we get the following math to determine the Big O notation.

For an input of 1000 we get a runtime of 32460, so to try assuming linear runtime we see that this is not an upper bound since 2000 input is averaged not at $2 * 32460 = 64,920$ but at 119,800. However, it is a Quadratic or $O(n^2)$. See here $1000000 = 1000^2$ has a runtime of 67,702,500 and we see that $(32,460)^2 = 1,053,651,600$ clearly an upper bound to it.

Division of Big Integers Runtime Graphs

This part of the assignment uses the similar analysis of Big Integers; however, it analyzes the runtimes of dividing the two Big Integers instead of multiplying them.



I found a similar result on the runtimes; it is clearly by its shape and runtimes that it is not $O(n)$, and when comparing the runtimes we see that it is also $O(n^2)$, as n^2 is an upper bound, and it has a similar shape to a quadratic function.