Project 2

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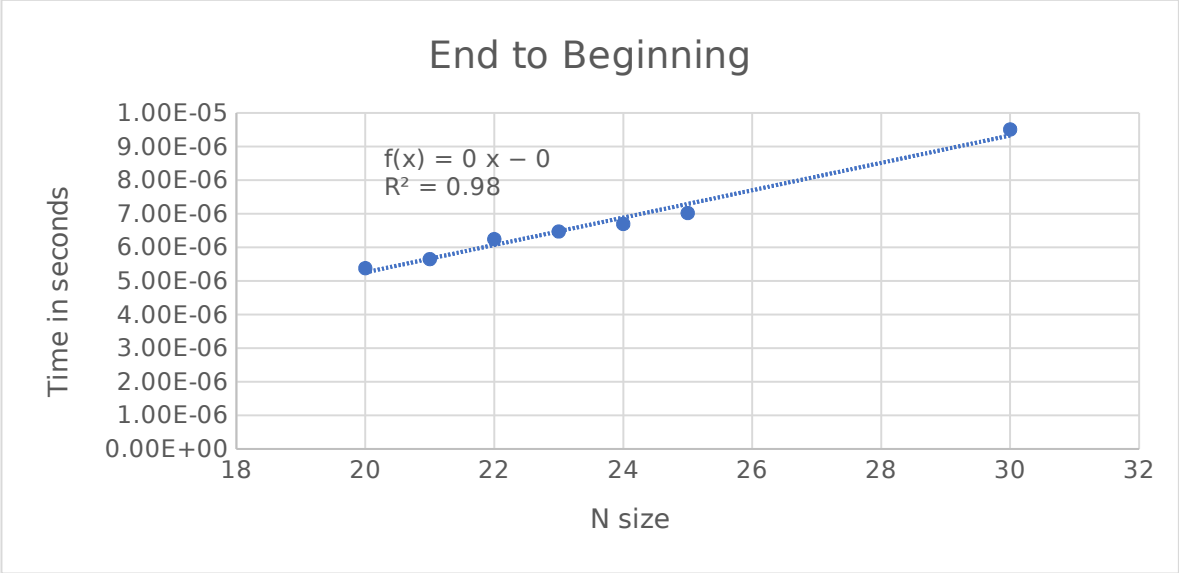
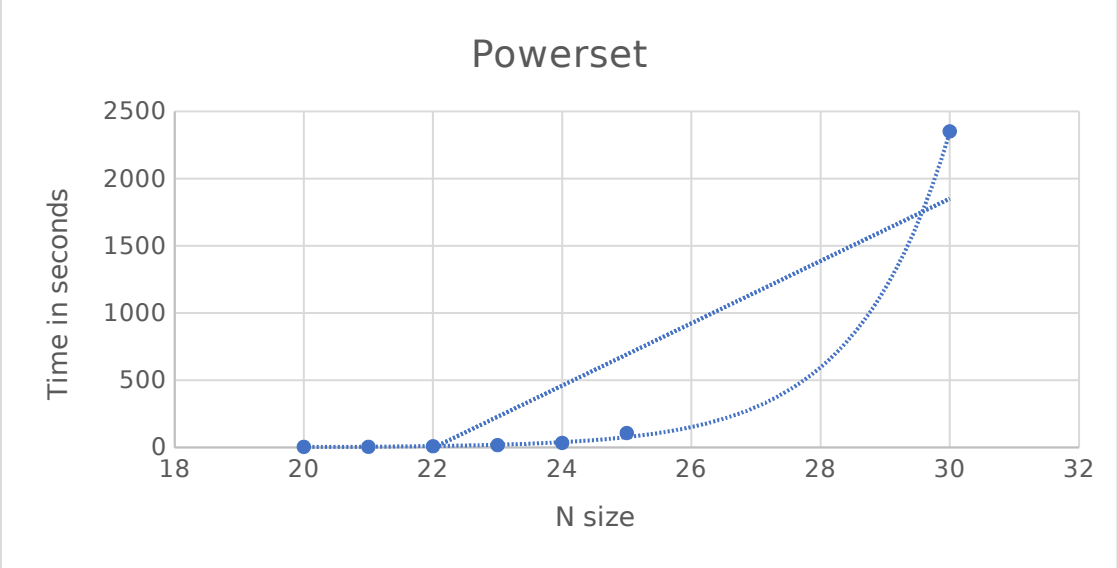


This algorithm has a linear increase in work time with a speed of about O n squared



This algorithm is more complex and has a much longer run time of O n squared log n

A Pseudo Code

End to Beginning Algorithm

```
create an array of size of inputted array of all zeros H

for every element in A from i = size - 2 to size - 2
        for every element in A from j = i + 1 to size - 1
                check if element at A i > A j and if H i <= H j
                        if true H i is equal to 1 plus h j

                for every element in array
                        if x == desired value
                        if true place in new array


        return desired array of decreasing integers
```

Powerset Algorithm

```
                while true
                if( value < size )
                keep adding values to stack
                        else
                take values off of stack

                if value is endpoint
                        break

for every element in array depending on stack size
        add element to an array for candidate validation
        if candidate is decreasing and better than best
                then replace best

        return best
```

B Efficiency classes

The efficiency class of the end to beginning algorithm is about O n squared.

The efficiency class of the powerset algorithm is about O n squared log n .

C Noticeable difference

The end to beginning algorithm runs faster than the powerset algorithm and there is a noticeable difference when running them with higher levels of input. The time for the beginning to end algorithm to finish was linear and consistent. The powerset algorithm kept getting longer and longer as the input went up. This does not surprise me because the algorithm tests all possible answers.

D

The fit lines are consistent because the end to beginning algorithm is roughly linear. The powerset algorithm run time goes up as the amount of input goes up exponentially because it tests all possible solutions for every value in the input.

E

This evidence is consistent with the first page of the assignment. This is because the correct answer was found by the first algorithm in seconds. While it took the second many minutes which is entirely unusable in a real world situation.