Mohamed Ihab

7000399

Analysis Assignment 1 Report

**Q1.**

Code: 1(a,c)

A screenshot of a computer program

Description automatically generated

Output:

**Output when n Values from 1 to 5\*10^5=500,000 used**

A graph with a line

Description automatically generated

**Output when n Values from 1 to 10^6=1,000,000 used**

A graph with a line and a line

Description automatically generated

Conclusion:

#1(b)

#the theoritically expected for the naive method would be O(n) and for the divide&conquer method would be o(log(n))

#1(d)

As for the results from my code and graphs it looks like the naïve iterative algorithm has a time complexity of O(n) while the complexity of the divide&conquer algorithm looks like an O(log(n))

So, in conclusion the results 1(c) are as what we expected theoretically from 1(b).

**Q2.**

Code:

A screen shot of a computer program

Description automatically generated

Output:

A graph showing a line

Description automatically generated with medium confidence

#2(b)

# THEORETICALLY merge sort time complexity is o(nlog(n))

# AND binary search time complexity is O(log(n))

# BUT the modified binary search we created time

# complexity is expected to be higher and possibly

# equal to O(n) so I will consider it O(n) theoritically

# therefore our program using both of these sequentially

# would prove time complexity of O(nlog(n))+O(n) which

# AND the complexity is the dominant therefore it is theoretically O(nlog(n))

# 2(c)

# The answer corresponds to our expected time complexity which is overall O(nlog(n))