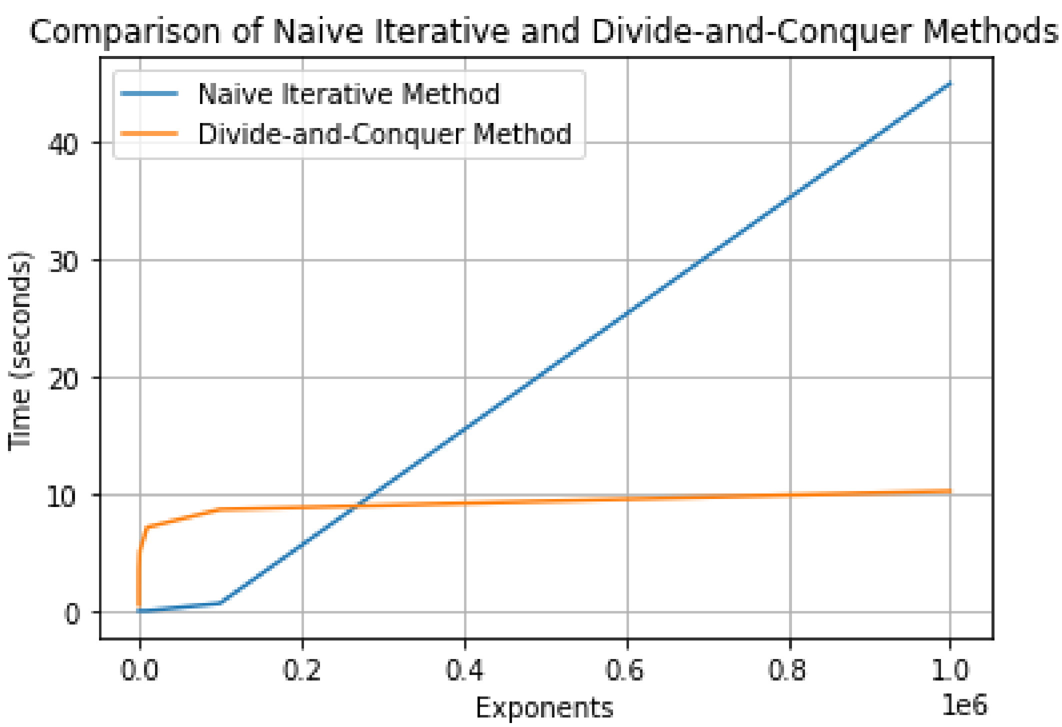
Analysis_Assignement1_Report

Question1:

B) We have 2 approaches here the Iterative (naive) one and the Divide and conquer one:

Iterative	Divide and conquer
Θ (n) as we see in the graph and in the code that the function has a linear growth.	Θ (log n)
	will be proved using master's theorem and we can see it also using the graph.
	Recurrence relation { T(n)=Θ(1) If(n=1) T(n)=T(n/2)+Θ(1) +Θ(1) Otherwise }

C)



D)

Proof (Master's Theorem):

*a=1; b=2; f(n)=*Θ (1)

*n**(log-b(a)) = n**(log-2(1)) =1*

since f(n)= Θ*[n**(log-b(a))] =* Θ*[n**(log-2(1))] =* Θ *(1)*

then T(N)= Θ[(n**log-b(a)) *log(n)] = Θ(log(n))

Question2

B)

Recurrence relation

{T(n)= Θ (1) If(n=1)

T(n)=2 T(n/2)+n Otherwise

}

Proof (Master's Theorem):

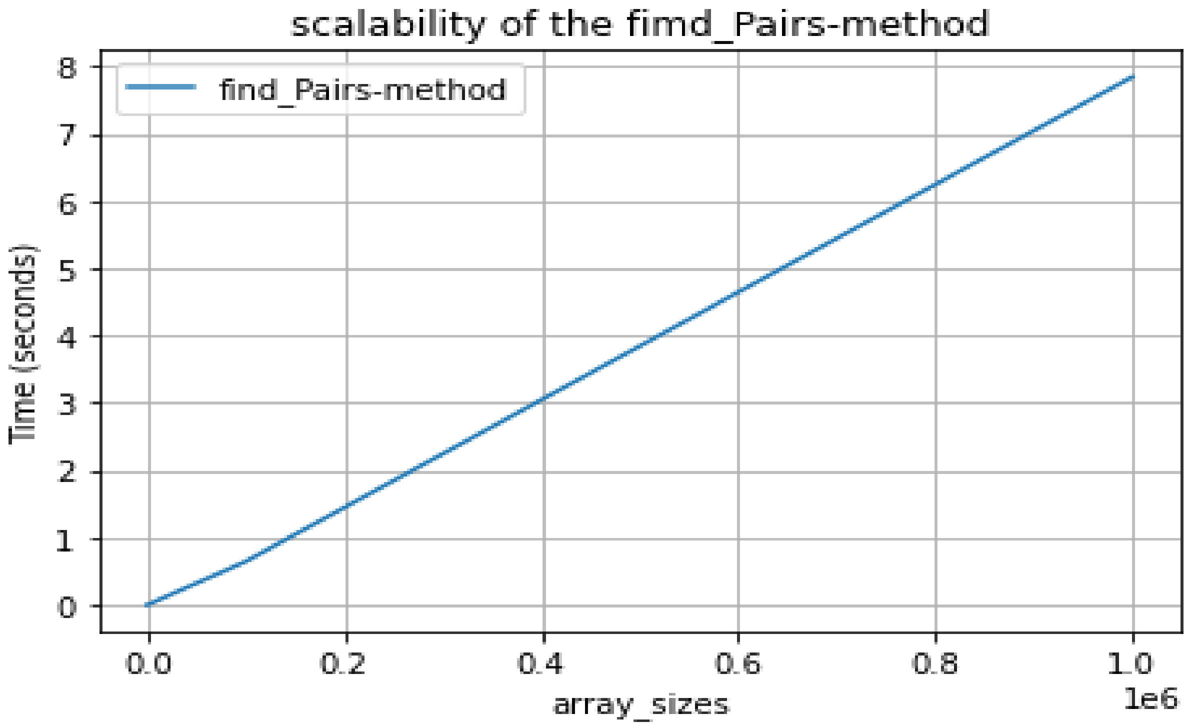
*a=2; b=2; f(n)=*n

*n**(log-b(a)) = n**(log-2(2)) =n*

since f(n)= Θ*[n**(log-b(a))] =* Θ*[n**(log-2(2))] =* Θ *(n)*

then T(N)= Θ[(n**log-b(a)) *log(n)] = Θ(n*log(n))

C)


scalability of the fimd_Pairs-method
find_Pairs-method
Time (seconds)
0
1
2
3
4
5
6
7
8
0.0
0.2
0.4
0.6
0.8
1.0
1e6
array_sizes