

R03941072 王品賀

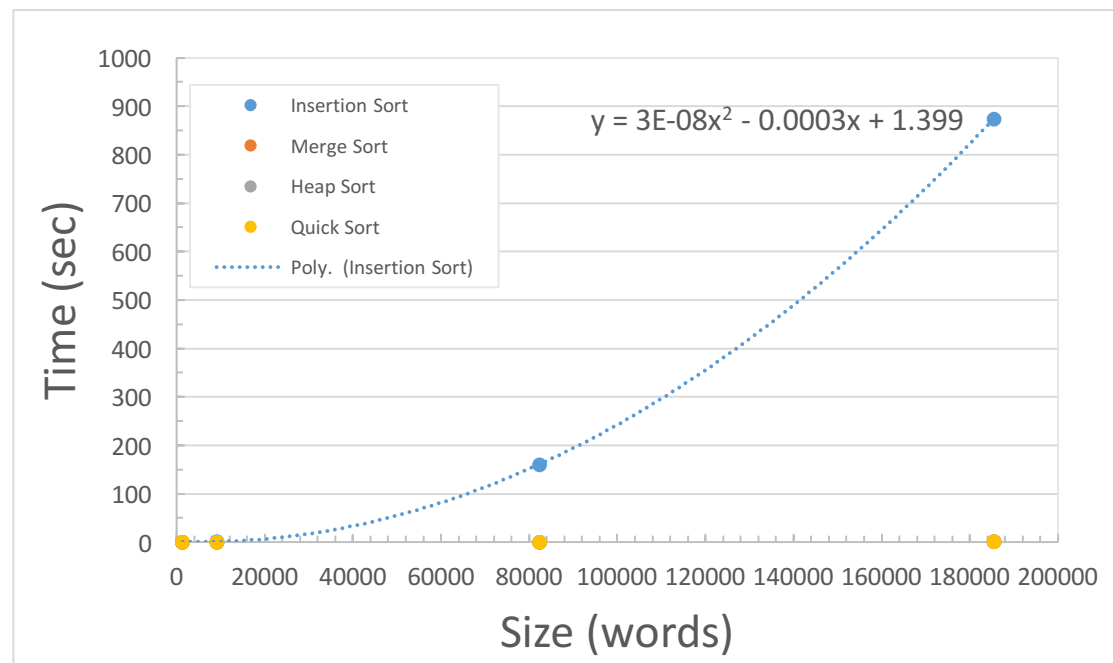
## Algorithm programming Assignment #1 Report

1.

Test Case	Insertion Sort		Merge Sort		Heap Sort		Quick Sort	
	Time (Sec)	Memory (MB)	Time (Sec)	Memory (MB)	Time (Sec)	Memory (MB)	Time (Sec)	Memory (MB)
Case1	0.059548	0.492	0.006607	0.58	0.008249	0.452	0.007787	0.468
Case2	2.33881	1.52	0.052578	1.704	0.064718	1.188	0.058247	1.184
Case3	160.938	12	0.45835	9.816	0.541224	7.092	0.432637	7.080
Case4	874.509	27	1.09407	14	1.28765	15	1.07256	14

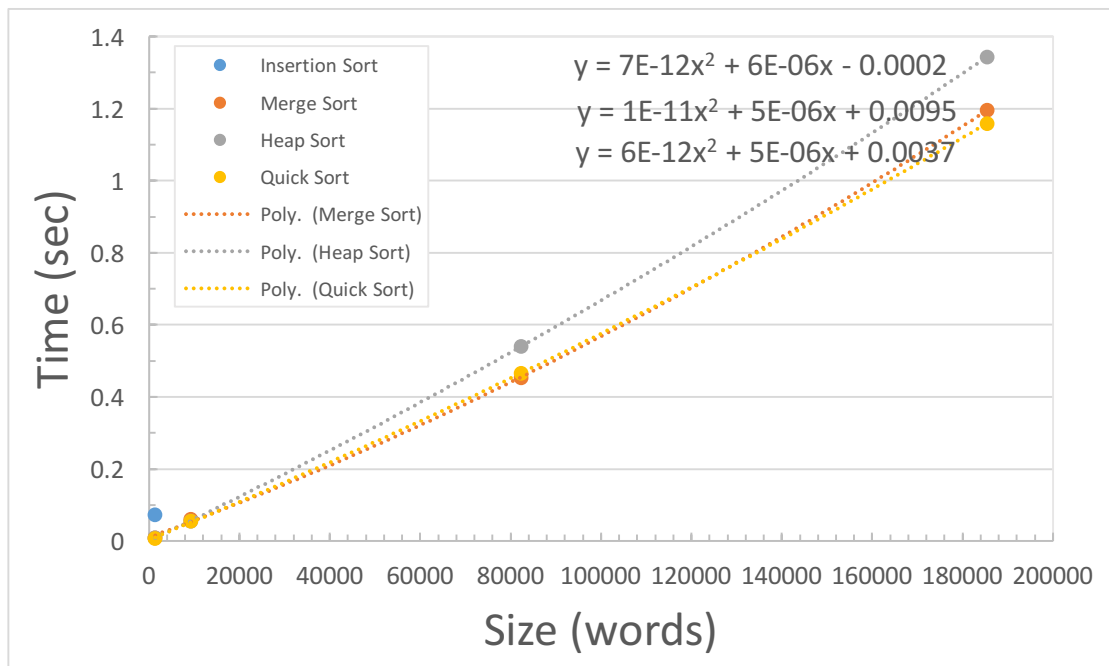
2.

CPU Time vs. problem size –



Insertion Sort 的時間複雜度： $O(n^2)$

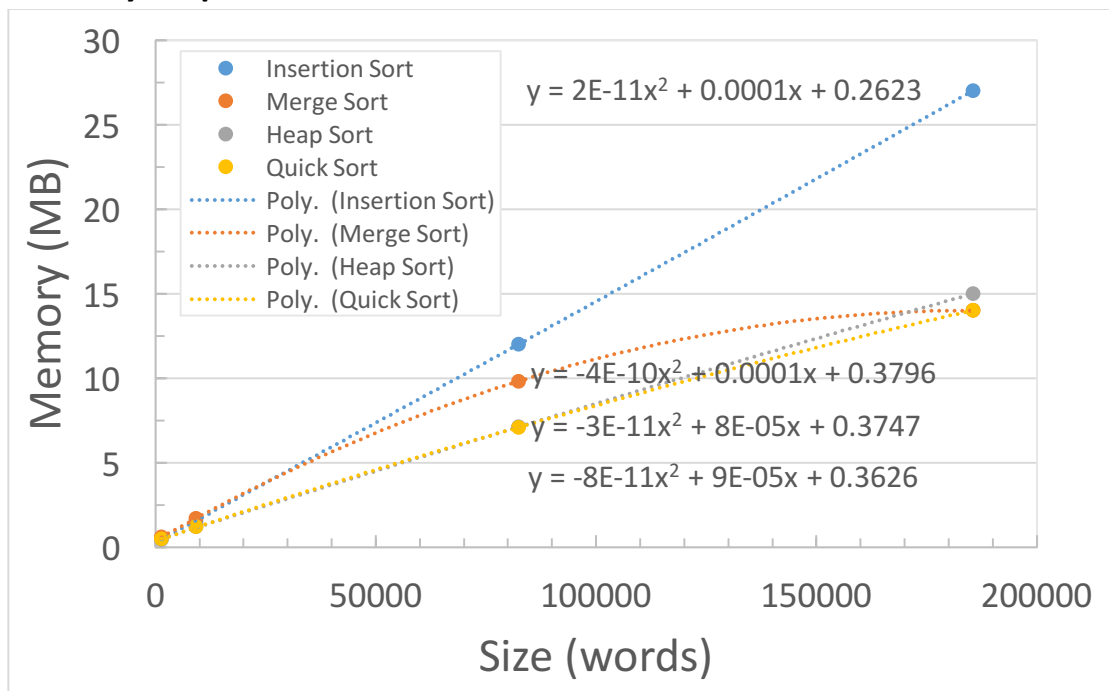
## Zoom in



Merge Sort / Heap Sort / Quick Sort 用 poly. 曲線來 fit，可以發現他們的二次項非常小，可以忽略看成 Linear。

時間複雜度： $O(n)$

## Memory vs. problem size –



四個算法的空間複雜度： $O(n)$