Algorithms PA3 Report

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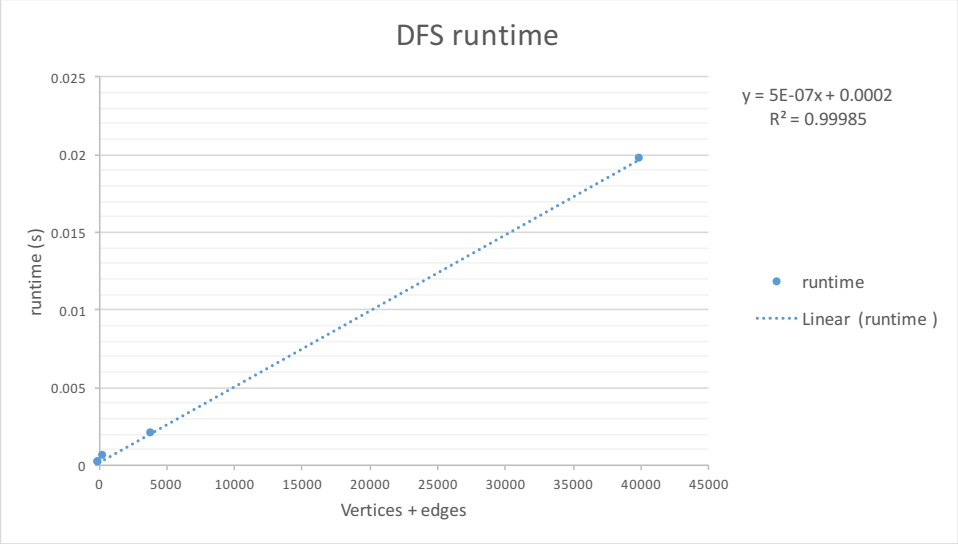
1. Data Analysis

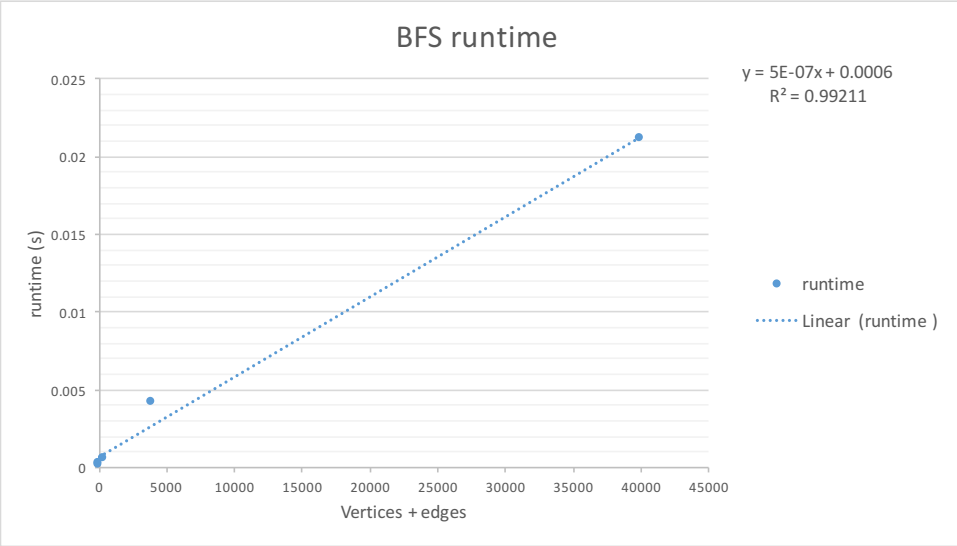
The table is as following.

		DFS		BFS		Coloring (greedy)		
input file	input size vertices/ edges	runtime (s)	memory (MB)	runtime (s)	memory (MB)	Number of colors	runtime (s)	memory (MB)
4	4/5	0.000121	12.692	0.000205	12.692	3	0.000147	12.692
10	10/21	0.000138	12.692	0.000141	12.692	4	0.00025	12.692
100	100/ 290	0.000522	12.692	0.000543	12.692	5	0.001663	12.692
1000	1000/ 2989	0.002006	13.088	0.004117	13.088	5	0.007147	13.088
10000	10000/ 29990	0.019674	17.04	0.021131	16.72	6	0.072435	17.04

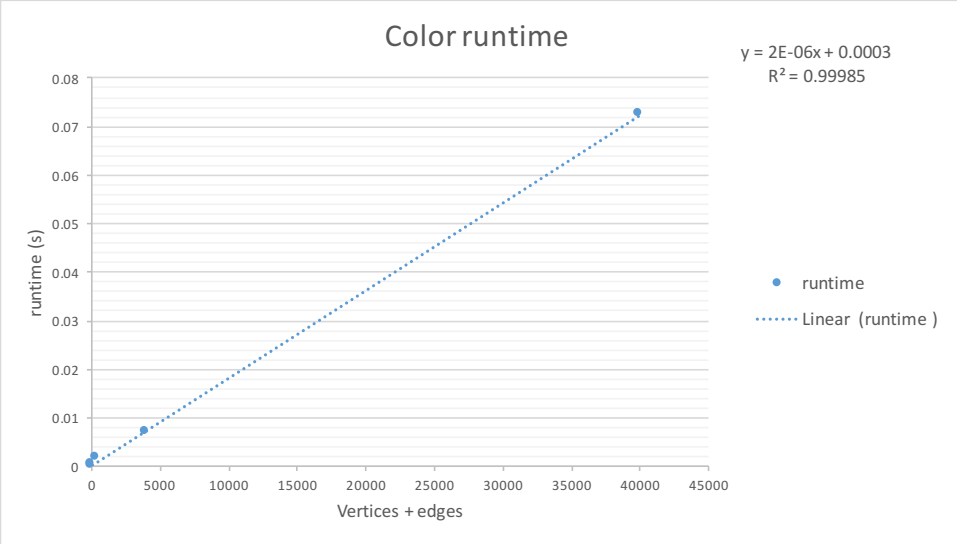
DFS, BFS, and Coloring runtime chart is as following.



In this chart, we can see the time complexity is $\Theta(V+E)$. It equal to the textbook.

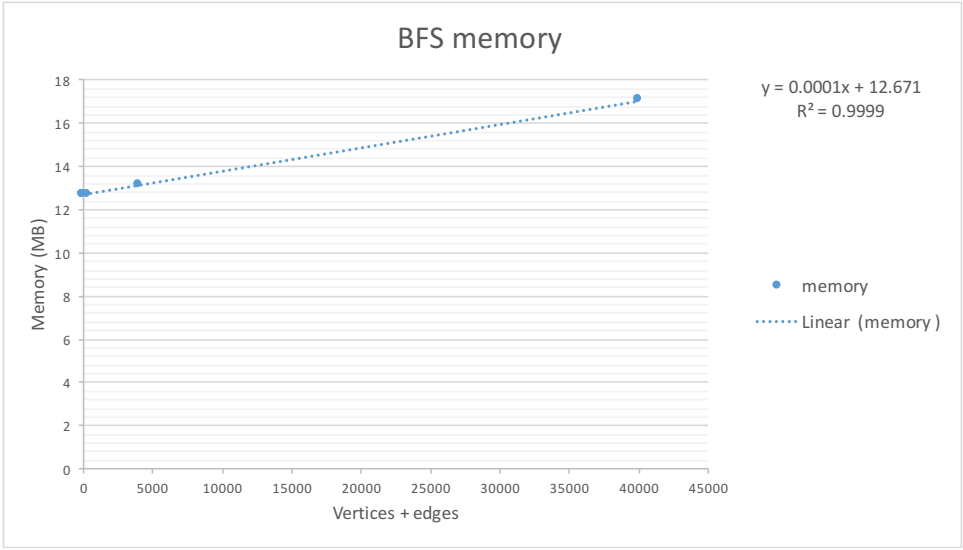


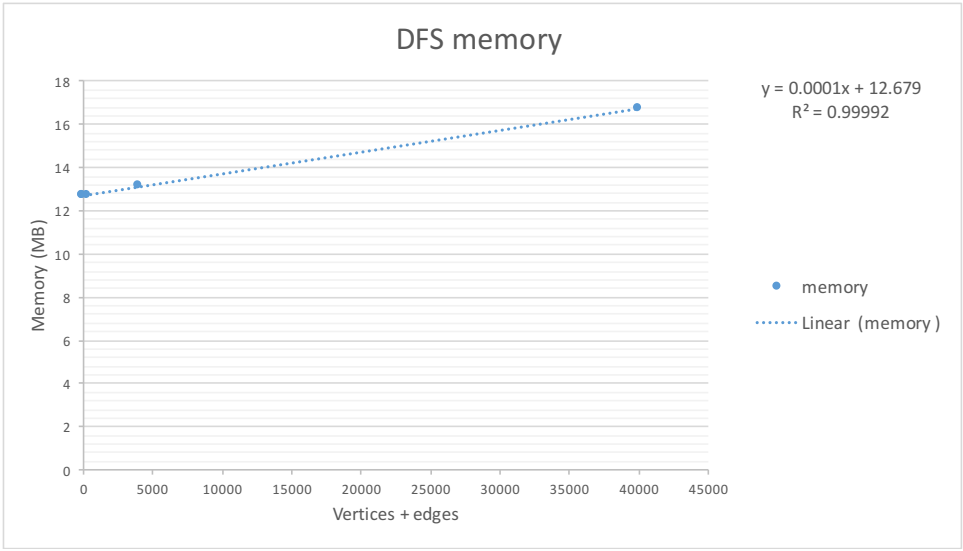
In this chart, we can see the time complexity is $O(V + E)$. It equal to the textbook.

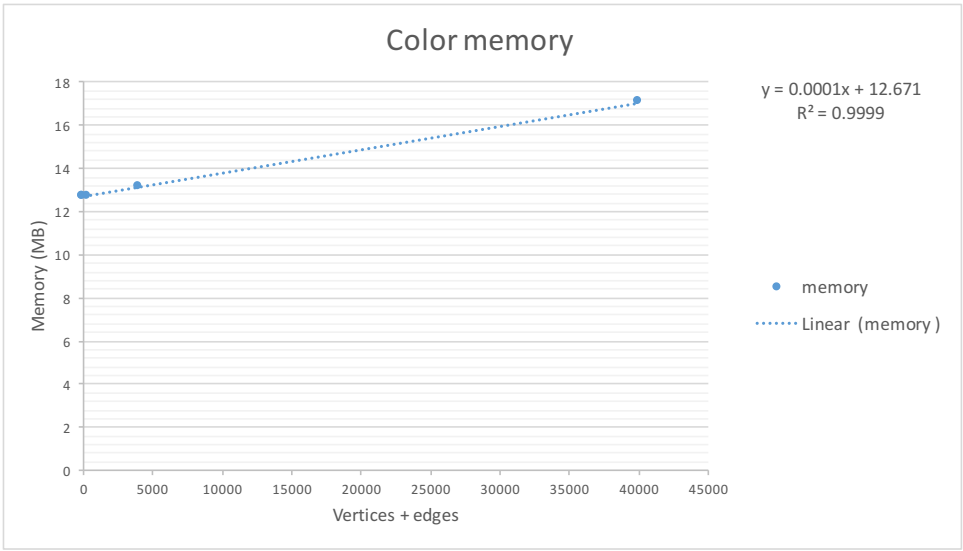


In the Color runtime, we can see the time complexity is about $\Theta(V + E)$

The DFS, BFS, Coloring memory chart is as following.







Obviously, my program use a little larger memory. It is larger than the data of my group members. Probably, it is related to the way to store the data.

2. 心得

   這次較為麻煩的部分其實是最一開始的讀檔，原本我的方法是一行一行讀進來後，在對每個字串慢慢去判斷讀到哪些字母，但是只要當 vertice > 1000 後，讀進來的資料就會怪怪的。後來與組員討論之後，決定使用 stringstream 的方式來讀檔，這個方法不僅讓我的程式簡潔許多，也解決了在 gn1000 以後發生的問題。其他 DFS, BFS 部分則大多是按照老師的投影片方式寫出來的，coloring 則是與組員討論後，再自行完成。

3. 討論組員

   呂宗翰、吳省澤