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Program Structures & Algorithms

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Assignment No. 4

- **Task**

- For weighted quick union, store the depth rather than the size;
- For weighted quick union with path compression, do two loops, so that all intermediate nodes point to the root, not just the alternates.

- **Output**

- **Relationship Conclusion:**

- For weighted quick union, storing the depth almost has no different.


In theory, this method will make the height of the tree smaller. Although there may be trees with a high height but a small size, which will affect the efficiency of the algorithm, it has been carried out more times of the method If-else judgment. This will affect the final time.

As a result, the final time is almost with no much difference.

- For weighted quick union with path compression and do two loops will make the time much longer than before.

- Evidence to support the conclusion:

- Graphical representation:

A	B	C	D	E	F
n	UF_HWQUPC	UF_HWQUPC_TwoLoops	WQUPC	WQUPC_depth	
50	0.1585	0.148	0.1077	0.1267	
100	0.199	0.3273	0.2565	0.177	
200	0.641	0.8816	0.6979	0.7491	
400	1.5246	2.7527	1.6486	1.669	
800	5.5699	8.7067	5.9663	5.5595	
1600	13.9404	26.6725	16.4491	16.5346	

- Unit tests result: