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Program Structures & Algorithms

Spring 2021

Assignment No. 4

**Task:** Code and benchmark two alternatives for implementing union-find:

1. Weighted quick union with depth instead of size
2. Weighted quick union with path compression (two loops) so that all intermediate nodes point to the root

**Output:**

**Depth weighted quick union benchmarked -**

**Graphical user interface, text, application

Description automatically generated**

**Path halving and double loop (second alternative) benchmarked**

**Graphical user interface, text, application, Word

Description automatically generated**

**Relationship Conclusion:**

Based on the benchmarks, the mean time for depth weighted quick union increases faster as N increases. This makes this method not suitable for larger values of N. When comparing path halving and two loops, we can see from the table and the graph that there is not a significant performance gain when doing two loops. The performance is about the same for both but path halving and two loops both perform faster than depth weighted quick union.

**Evidence:**

**Table

Description automatically generated**

**Chart, line chart

Description automatically generated**