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**Program Structures & Algorithms**

**Spring 2021**

**Assignment No. 4**

* **Task**

We mentioned two alternatives for implementing Union-Find:

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

For both of these, code the alternative and benchmark it against the implementation in the repository. You have all of that available from a previous assignment.

* **Output**

Do Path Compression vs undo Path Compression results:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sites | 625 | 1250 | 2500 | 5000 | 10000 |
| Do Path Compression  (ms) | 0.1476 | 0.3604 | 1.0259 | 3.3548 | 11.8832 |
| Undo Path Compression  (ms) | 0.1539 | 0.3905 | 1.1447 | 3.6207 | 13.2344 |

Each experiment runs 10,000 times. Fill in the average time above.

* **Conclusions:**

Union Found with Path Compression runs faster than without Path Compression.

* **Evidence to support the conclusion:**









