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INFO 6205

Program Structures & Algorithms

Fall 2020

Assignment No4

Note: the implement of this assignment is main written in the UF_Alternative file packaged in a package named UF_HWQUPC_Client.

1. 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. 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.

2. Output:

```
D:\Java\jdk\bin\java.exe "-javaagent:D:\intelliJ IDEA\Intel
Please input the size of sites:1000

weighted-QU's pairs generated is: 3863
compression-path-QU's pairs generated is: 3897
weighted-compression-path-QU's pairs generated is: 3933

Please input the size of sites:2000

weighted-QU's pairs generated is: 9592
compression-path-QU's pairs generated is: 9735
weighted-compression-path-QU's pairs generated is: 7845

Please input the size of sites:4000

weighted-QU's pairs generated is: 20339
compression-path-QU's pairs generated is: 18306
weighted-compression-path-QU's pairs generated is: 19892

Please input the size of sites:8000

weighted-QU's pairs generated is: 33178
compression-path-QU's pairs generated is: 47066
weighted-compression-path-QU's pairs generated is: 43887

Please input the size of sites:16000

weighted-QU's pairs generated is: 66177
compression-path-QU's pairs generated is: 92700
weighted-compression-path-QU's pairs generated is: 96992
```

3. Relationship conclusion:

It can be observed that all of these three situation are growing with growth of size. Especially, weighted_compression_QU(alternative#1 + alternative#2) and compression_QU(alternative#2) have similar increasing trend faster than weighted_QU(alternative#1).

4. Evidence to support relationship:

Relationship between size(N) and pairs(M) among WQU, CQU,WQCU improvements
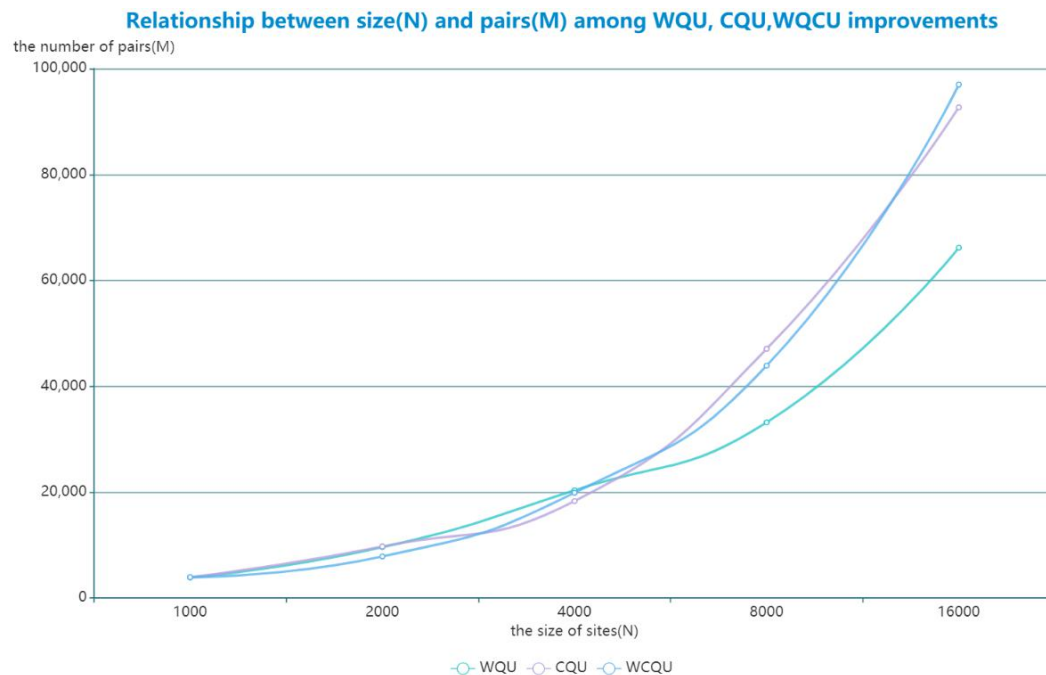
5. Screenshot of Unit test passing: