Program Structures & Algorithms  
Spring 2022  
Assignment No. 3

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Task:

Implement height-weighted Quick Union with Path Compression and determine the relationship between the number of objects (n) and the number of pairs (m) generated.

Output Screenshot:

Unit Test:

A screenshot of a computer

Description automatically generated with medium confidence

UF Client:

Sample Run1:

Text

Description automatically generated

SampleRun2:

Text

Description automatically generated

SampleRun3:

Text

Description automatically generated

Relationship Conclusion:

The relationship between the n(number of components) and m (number of pair generated) is linear, with the expression

m=c n logn

Evidence / Graph:

|  |  |
| --- | --- |
| n | m |
| 10 | 14 |
| 50 | 76 |
| 100 | 227 |
| 500 | 1764 |
| 1000 | 4207 |
| 1500 | 5284 |
| 3000 | 12554 |
| 5000 | 21398 |
| 5000 | 22627 |

**Git files: UF\_HWQUPC- File edited for implementing height-weighted Quick Union and UnionFindExperiment is the UF ("union-find") client developed.**