Assignment 4 Weighted Union Find with Path Compression

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Relationship Conclusion:

For a value of **n** (number of elements in an array) the number of connection generated by the union method for randomly generated pairs is **n-1**. Similarly, when the value of n increases the number of pairs generated increases linearly.
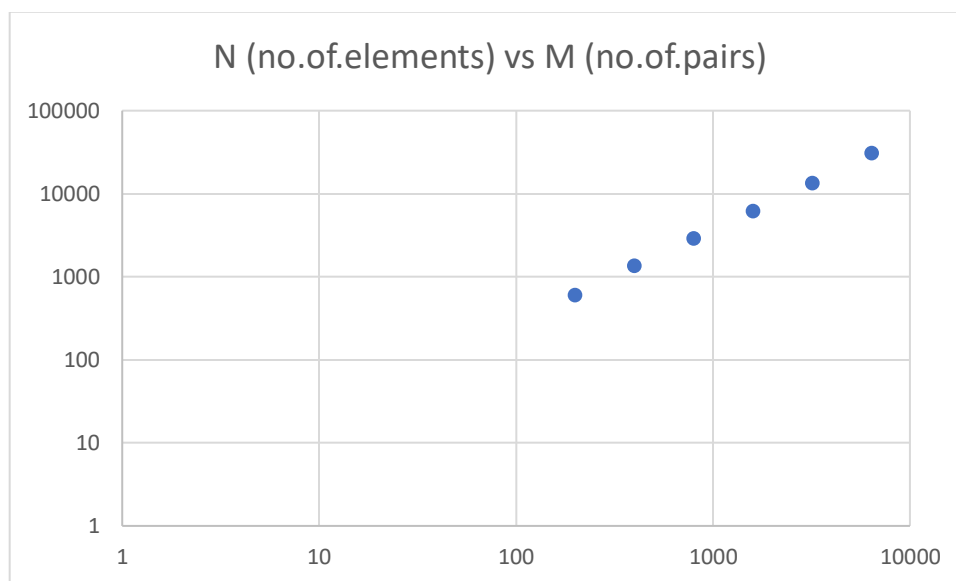
Evidence to Support Conclusion:

Below is the table generated for different n values using the HWQUPC class. It is clear from the table that the number of pairs increases as the number of elements in the array increases.

N	Mean of Pairs	Connections
200	594	199
400	1329	399
800	2837	799
1600	6107	1599
3200	13311	3199
6400	30091	6399

Graphical Representation:

The graph plotted between log n (number of elements in the array) and log m (number of pairs generated) is given below.

Unit test case screen shots:

Run: ◆▶ UF_HWQUPC_Test ✕

∨ ✔ UF_HWQUPC_Test (edu.neu.coe.info6205.union_f 17 ms ✔ Tests passed: 13 of 13 tests – 17 ms
  ✔ testIsConnected01   2 ms   /Library/Java/JavaVirtualMachines/jdk-19.jdk/Contents/Home/bin/java ...
  ✔ testIsConnected02   3 ms
  ✔ testIsConnected03   6 ms   Process finished with exit code 0
  ✔ testFind0   0 ms
  ✔ testFind1   1 ms
  ✔ testFind2   0 ms
  ✔ testFind3   1 ms
  ✔ testFind4   1 ms
  ✔ testFind5   0 ms
  ✔ testToString   3 ms
  ✔ testConnect01   0 ms
  ✔ testConnect02   0 ms
  ✔ testConnected01   0 ms