Venkata Srinivas Kompally (NUID : 002137855)

**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 3**

* **Task:** Implement height-weighted Quick Union with Path Compression.

Step 1 a): Fill in the sections // TO BE IMPLEMENTED

b): Check all the unit tests.

Step 2: Using your implementation of UF\_HWQUPC, develop a UF ("union-find") client that takes an integer value n from the command line to determine the number of "sites."

Step 3: Determine the relationship between the number of objects (n) and the number of pairs (m) generated

* **Relationship Conclusion:**

The relationship between the number of objects(n) and the number of pairs(m) generated is the above relation.

I pasted the table and line graph to justify the relationship.

We can observe that the relation between N vs M graph is very similar to N vs NlogN graph even for large values.

* **Evidence to support the conclusion:**

**Output (Snapshot of Code output in the terminal):**

**A screenshot of a computer

Description automatically generated with medium confidence**

**Console Output:**

m: 351.9 n: 128

m: 755.9 n: 256

m: 1769.7 n: 512

m: 3955.3 n: 1024

m: 8604.9 n: 2048

m: 17307.5 n: 4096

m: 38546.9 n: 8192

m: 85838.8 n: 16384

m: 176039.2 n: 32768

m: 377753.9 n: 65536

m: 812188.0 n: 131072

m: 1727530.8 n: 262144

m: 3647762.0 n: 524288

Process finished with exit code 0

**Graphical Representation**

**Table

Description automatically generated**

* **Unit tests result:**

**Text

Description automatically generated**