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**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 3**

* **Task (List down the tasks performed in the Assignment)**

1. Implement height-weighted Quick Union with Path Compression.
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."
3. Determine the relationship between the number of objects (n) and the number of pairs (m) generated to accomplish this (i.e. to reduce the number of components from n to 1).

* **Relationship Conclusion:**

1. **m = 7.2556n - 21726**
2. The number of objects (n) and the number of pairs (m) generated has a linear relationship.
3. For n objects, the sequence of M unions and finds takes O(M) time.

* **Evidence to support the conclusion:**

1. **Output (Snapshot of Code output in the terminal)**

**Text

Description automatically generatedText

Description automatically generated**

1. **Graphical Representation (Observations from experiments should be tabulated and analyzed by plotting graphs (usually in excel) to arrive on the relationship conclusion)**

**Use the doubling method for choosing n**

* **Unit tests result:(Snapshot of successful unit test run)**

Graphical user interface, text

Description automatically generated