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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.

* **Relationship Conclusion:**
* **Evidence to support the conclusion:**

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

电脑萤幕

中度可信度描述已自动生成

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

图表, 折线图

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**Line chart with n and m**

The line chart shows how m(the number of pairs) grows with n(the number of object) As n grows, m grows.

图表, 折线图

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**Log-log graph with m and n**

The log-log graph shows the relationship between log(m) and log(n). To figure out the order of growth, and y = xlog(x) are drawn in the graph. It can be found that the line for m and n has a more similar slope with y = xlog(x) rather than y = x. The order of growth for an ordered array is .

图形用户界面, 文本, 应用程序

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Then the fit method is applied to figure out the relationship between m and n. That is

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

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