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**Program Structures & Algorithms**

**Spring 2021**

**Assignment No. 3**

* **Task :**

--Implement height-weighted Quick Union

--Develop a UF client that takes an integer value n and determines the number of “sites”

--Determine the relationship between n and m

* **Output:**

-- The given relationship between number of given objects(n) and total pairs generated(m) is:

total pairs generated(m)= number of given objects(n)\*log(n)

-- I have implemented 3 cases in my output:

1. For creating a single tree at the end. This is the best case.

2. For creating multiple trees at the end.

3. For creating a single tree at the end but not taking the best case. This might be the average case.

-- When implementing the Union find client to form a single tree at the end, the total pairs generated(m) at the end is number of given objects(n)-1, since the number of trees created is 1 at the end. This is the best case.

-- When implementing the Union find client to form multiple tree at the end, the total pairs generated(m) at the end is number of given objects(n)-number of trees created(i.e. count).

* **Relationship Conclusion:**

-- The given relationship between number of given objects(n) and total pairs generated(m) is:

total pairs generated(m)= number of given objects(n)\*log(n)

* **Graphical representation:**

A picture containing text, electronics, computer, screenshot

Description automatically generated

Graphical user interface

Description automatically generated with medium confidence

* **Unit tests result:**

--Attached below is a screenshot of all the unit test case running successfully.

For

UF\_HWQUPC\_Test.java

Graphical user interface

Description automatically generated